MCLAB

Molecular Cloning Laboratories

Catalog 2012-2013

ABOUT US

Established in 1998, Molecular Cloning Laboratories (MCLAB) is a leader in providing genomic research consumables and services to the Life Sciences community.

MCLAB provides cost-effective consumables and reagents, focusing on first generation as well as next-generation sequencing and DNA fragment analysis. We carry a large selection of molecular biology related products, including antibodies, biochemical reagents, cloning kits, enzymes, PCR kits, protein gels & solutions and more. Being our own manufacturer allows us to control the production process and minimizes delays in custom and large-scale orders. It helps to ensure our customers are getting the highest quality and value.

With a team of over twenty experienced scientists, MCLAB is committed to offering first-rate services to researchers. We specialize in the field of genomics, with experts in DNA sequencing, fermentation, fragment analysis, molecular cloning, over-expression, protein purification, and protein synthesis. We take a tailored approach to customer service, giving you the opportunity to customize your project and speak directly with our team of scientists for technical support. With over six decades of experience, our talented and skilled staff is dedicated to getting the results you need.

MCLAB has offices in China and distributors all around the world, including Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Germany, Hungary, Greece, India, Israel, Poland, New Zealand, Turkey, United Kingdom and Vietnam, so we can better reach our customers. If your country is not on this list, please contact our USA headquarters for more information.

TABLE OF CONTENTS

Cloning

PCR & Real-time PCR

DNA Sequencing, Fragment Analysis and Next-Generation Sequencing

DNA/RNA Modifying Enzymes & Other Proteins

Restriction Endonucleases

Protein Expression and Purification

Electrophoresis Products

Competent E. coli

Antibody-related Products

Nucleic Acid Purification

RNAi, MicroRNA & Gene Regulation

Bio Chemical Reagents

Services

Appendix

Order Information

Preparation for Phone, Mail or Fax Orders:
Please have the following information ready before you order:
- Name and phone number of the principal investigator.
- Name and phone number of the purchasing agent.
- Product catalog number, description, size, quantity and price.
- Shipping address
- Billing address.
- Payment information options:
a) Purchase order number (PO number).
b) Credit card (Credit card number, expiration date, card holder name, and billing address).
c) Wire transfer.

Order Online:
You have two options for placing orders electronically.
1. Create your own account by registering at www.mclab.com. Submit your order via our online shopping system.
2. Email your order to order@mclab.com

Order by Phone:
Call 1-888-MCLAB-88 or 1-650-872-0245 to place your order by phone. Our customer service representatives are available to receive orders Monday through Friday from 8:30 am to 6:00 pm Pacific Time.

Order by Mail:
Fill out MCLAB's order form and send it to MCLAB when placing your order.
384 Oyster Point Boulevard, Suite 15
South San Francisco, California 94080
USA

Order by Fax:
Fax your order to: 1-650-872-0253.

Technical Support:
E-mail: labsupport@mclab.com
Online: www.mclab.com
Phone: 1-888-MCLAB-88 or 1-650-872-0245

Cloning

Choo-Choo Cloning™ Kits

Description:
Choo-Choo Cloning™ Kits are highly efficient directional PCR cloning kits for rapid, ligase- and restriction enzyme-independent cloning of PCR products. It allows you to clone any PCR fragment into any linearized vector at any location. By a simple incubation on ice, the end of a PCR-generated DNA fragment can precisely fuse to another DNA (vector) end with 6 bp (or more) of overlap. The system is very robust. Up to 8 PCR-generated DNA fragments can be assembled and cloned into one piece (up to 10 kb in one step). The system is highly efficient, with 98-100% positive clones.

Function:
The function of Choo-Choo Cloning™ Kits depends on our proprietary enzyme systems. There is no need for restriction enzyme digestion, ligation, or blunt-end polishing. You may limit any extra bases in the final construct. The linearized vector can be generated by PCR or restriction enzyme digestion. The PCR fragments can be generated by Taq DNA polymerase or other high fidelity DNA polymerase. The addition of A by Taq DNA polymerase is not required and has no effect on cloning efficiency. If the PCR product is amplified from plasmid template, then it needs to be gel-purified to reduce the background. In addition to PCR cloning, Choo-Choo Cloning™ Kits also have the following functions: adaptor, linker and tag addition before and after the inserts, and for gene synthesis.

Features:
- Clone any insert into any location within any vector you choose
- No restriction digestion, phosphatase treatment, or ligation required
- Multiple fragments (up to 8 pieces)
- Broad PCR size (up to 10 kb)
- Final constructs are seamless with no extra or unwanted base pairs
- Simple 45 minute single-tube reaction on ice protocol
- High Efficiency with >=98% positive clones
- Multiple functions: compatible for adaptor, linker and tag addition before or after the inserts; compatible for gene synthesis
- High throughput application

Other PCR Cloning Kits result
Choo-Choo Cloning™ Kits result

Recommended Storage Conditions:
Store Box 1 at -20°C.
Store Box 2 at -80°C.

Components:
The Choo-Choo Cloning™ Kits are available in 10-, 20-, 100-, and 96-reaction sizes.

Cat #: CCK-20 Choo-Choo Cloning™ Kit (20 reactions):
Box 1:
10x Choo-Choo Cloning™ Reaction Buffer, 40µl
Choo-Choo Cloning™ Enzyme Mix, 40 µl
Box 2:
Choo-Choo Cloning™ Blue Chemical Competent E. coli Cells, 50 µl x 20 tubes

Cat #: CCK-100 Choo-Choo Cloning™ Kit (100 reactions):
Box 1:
10x Choo-Choo Cloning™ Reaction Buffer, 200 µl
Choo-Choo Cloning™ Enzyme Mix, 200 µl
Box 2:
Choo-Choo Cloning™ Blue Chemical Competent E. coli Cells, 50 µl x 100 tubes

Name	Cat #	Size
Choo-Choo Cloning™ Kits	CCK-10	10 rxns with Choo-Choo Cloning™ Blue Chemical Competent E. coli Cells (50 µl x 10 tubes)
Choo-Choo Cloning™ Kits	CCK-20	20 rxns with Choo-Choo Cloning™ Blue Chemical Competent E. coli Cells (50 µl x 20 tubes)
Choo-Choo Cloning™ Kits	CCK-096	96 rxns with Choo-Choo Cloning™ Blue Chemical Competent E. coli Cells (50 µl x 96 wells)
Choo-Choo Cloning™ Kits	CCK-100	100 rxns with Choo-Choo Cloning™ Blue Chemical Competent E. coli Cells (50 µl x 100 tubes)

EZ-TOPO PCR Cloning Kits

Description:
EZ-TOPO PCR Cloning Kit allows rapid, one-step, 5-minute cloning of PCR products, using the specific DNA rejoining activity of DNA topoisomerase I. It provides you a fast and efficient strategy to clone any PCR products (both blunt-end and 3'-deoxyadenosine(A) overhangs) into a linearized vector. No post-PCR or ligation procedures are required.

Function:
In vivo, DNA topoisomerase I assists in DNA replication by relaxing and rejoining DNA strands. Topoisomerase I binds to double-stranded DNA at specific sites and cleaves the phosphodiester backbone after the sequence 5'-CCCTT in one strand [1]. After forming a covalent DNA-enzyme intermediate, the conserved energy in the phosphor-tyrosyl bond can be used for religating the cleaved DNA to a heterologous DNA acceptor, and releasing topoisomerase[2]. The cloning reaction products can be transformed into chemically competent cells or electroporated into electrocompetent cells.
In addition, the supplied vector contains the LacZα fragment in C-terminal, which allows blue/white screening, and the lethal E. coli gene, ccdB [3], which will kill most of the cells that bear the non-recombinant vector.

Features:
- Clone any PCR products (both blunt-end and 3'-deoxyadenosine(A) overhangs) into provided linearized vector
- No restriction digestion, phosphatase treatment, or ligation required
- Simple 5 minutes single-tube reaction in room temperature
- High efficiency with visible blue/white screening
- Also direct selection of recombinants by disrupting the lethal E. coli gene, ccdB

Recommended Storage Conditions: -20°C

Components:
The EZ-TOPO PCR Cloning Kits are available in 20 and 100 reaction sizes.

Cat #: EZTP-100 EZ-TOPO PCR Cloning Kits (20 reactions):
EZ-TOPO vector 20 reactions
Salt Solution 50µl
Sterile Water 1ml

Cat #: EZTP-200 EZ-TOPO PCR Cloning Kits (100 reactions):
EZ-TOPO vector 100 reactions
Salt Solution 300µl
Sterile Water 1ml

Reference:
1. Shuman, S. (1991). Recombination Mediated by Vaccinia Virus DNA Topoisomerase I in Escherichia coli is Sequence Specific. Proc. Natl. Acad. Sci. USA 88, 10104-10108.
2. Shuman, S. (1994). Novel Approach to Molecular Cloning and Polynucleotide Synthesis Using Vaccinia DNA Topoisomerase. J. Biol. Chem. 269, 32678-32684.
3. Bernard, P., Gabant, P., Bahassi, E. M., and Couturier, M. (1994). Positive Selection Vectors Using the F Plasmid ccdB Killer Gene. Gene 148, 71-74.

Name	Cat #	Size
EZ-TOPO PCR Cloning Kits	EZTP-100	EZ-TOPO vector 20 reactions, Salt Solution 50µl, Sterile Water 1ml
EZ-TOPO PCR Cloning Kits	EZTP-200	EZ-TOPO vector 100 reactions, Salt Solution 300µl, Sterile Water 1ml

LB Agar Plates

Description:
LB Agar plates contain 1.0% Tryptone, 0.5% yeast extract, 1.0% NaCl and 1.5% agar.
MCLAB offers you single to multiple antibiotic plates; For customized antibiotics and concentrations, please contact MCLAB for a quote.

Recommended Storage Conditions:
All plates must be stored at 4°C and in the absence of continuous exposure to light.

Name	Cat #	Size
LB Agar	LBA-100	1% Trypton, 0.5% yeast extract, 1.0% NaCl, 1.5% agar; Plate Size, 150 x 15 mm; 10/pk
LB Agar	LBA-200	1% Trypton, 0.5% yeast extract, 1.0% NaCl, 1.5% agar; Plate Size, 100 x 15 mm; 20/pk
LB Agar Amp-100	LB-Amp101	100µg/ml; Plate size, 150 x 15 mm; 10/pk
LB Agar Amp-100	LB-Amp102	100µg/ml; Plate size, 100 x 15 mm; 20/pk
LB Agar Amp-100, X-gal	LB-AmpX101	100µg/ml ampicillin, 60µg/ml X-gal; Plate size, 150 x 15 mm; 10/pk
LB Agar Amp-100, X-gal	LB-AmpX102	100µg/ml ampicillin, 60µg/ml X-gal; Plate size, 100 x 15 mm; 20/pk
LB Agar Amp-50	LB-Amp501	50µg/ml ampicillin; Plate size, 150 x 15 mm; 10/pk
LB Agar Amp-50	LB-Amp502	50µg/ml ampicillin; Plate size, 100 x 15 mm; 20/pk
LB Agar Amp-50, 1% Glucose	LB-AmpG501	50µg/ml ampicillin, 1% glucose; Plate size, 150 x 15 mm; 10/pk
LB Agar Amp-50, 1% Glucose	LB-AmpG502	50µg/ml ampicillin, 1% glucose; Plate size, 100 x 15 mm; 20/pk
LB Agar Amp-50, X-gal	LB-AmpX501	50µg/ml ampicillin, 60µg/ml X-gal; Plate size, 150 x 15 mm; 10/pk
LB Agar Amp-50, X-gal	LB-AmpX502	50µg/ml ampicillin, 60µg/ml X-gal; Plate size, 100 x 15 mm; 20/pk
LB Agar Carbenicillin-100	LB-Car101	100µg/ml carbenicillin; Plate size, 150 x 15 mm; 10/pk
LB Agar Carbenicillin-100	LB-Car102	100µg/ml carbenicillin; Plate size, 100 x 15 mm; 20/pk
LB Agar Carbenicillin-100, X-gal	LB-CarX101	100µg/ml carbenicillin, 60µg/ml X-gal; Plate size, 150 x 15 mm; 10/pk
LB Agar Carbenicillin-100, X-gal	LB-CarX102	100µg/ml carbenicillin, 60µg/ml X-gal; Plate size, 100 x 15 mm; 20/pk
LB Agar Carbenicillin-50	LB-Car501	50µg/ml carbenicillin; Plate size, 150 x 15 mm; 10/pk
LB Agar Carbenicillin-50	LB-Car502	50µg/ml carbenicillin; Plate size, 100 x 15 mm; 20/pk
LB Agar Carbenicillin-50, X-gal	LB-CarX501	50µg/ml carbenicillin, 60µg/ml X-gal; Plate size, 150 x 15 mm; 10/pk
LB Agar Carbenicillin-50, X-gal	LB-CarX502	50µg/ml carbenicillin, 60µg/ml X-gal; Plate size, 100 x 15 mm; 20/pk
LB Agar Chloramphenicol-12.5	LB-Chl101	12.5µg/ml chloramphenicol; Plate size, 150 x 15 mm; 10/pk

Name	Cat #	Size
LB Agar Chloramphenicol-12.5	LB-Chl102	12.5µg/ml chloramphenicol; Plate size, 100 x 15 mm; 20/pk
LB Agar Kana-100, 1% Glucose	LB-KanaG101	100µg/ml kanamycin, 1% glucose; Plate size, 150 x 15 mm; 10/pk
LB Agar Kana-100, 1% Glucose	LB-KanaG102	100µg/ml kanamycin, 1% glucose; Plate size, 100 x 15 mm; 20/pk
LB Agar with X-gal	LBAX-100	60µg/ml X-gal; Plate size, 150 x 15 mm; 10/pk
LB Agar with X-gal	LBAX-200	60µg/ml X-gal; Plate size, 100 x 15 mm; 20/pk
LB Kana-100	LB-Kana101	100µg/ml kanamycin; Plate size, 150 x 15 mm; 10/pk
LB Kana-100	LB-Kana102	100µg/ml kanamycin; Plate size, 100 x 15 mm; 20/pk
LB Kana-50	LB-Kana501	50µg/ml kanamycin; Plate size, 150 x 15 mm; 10/pk
LB Kana-50	LB-Kana502	50µg/ml kanamycin; Plate size, 100 x 15 mm; 20/pk
LB Kana-50, X-gal	LB-KanaX501	50µg/ml kanamycin, 60µg/ml X-gal; Plate size, 150 x 15 mm; 10/pk
LB Kana-50, X-gal	LB-KanaX502	50µg/ml kanamycin, 60µg/ml X-gal; Plate size, 100 x 15 mm; 20/pk

Super Broth Agar Plates

Description:
3.2% Tryptone, 2.0% yeast extract, 0.5% NaCl, 1.5% agar.

Application:
For the growth of E. coli and other enteric bacteria.

Recommended Storage Conditions: 4°C.

Name	Cat #	Size
Super Broth Agar Plates	SBA-100	plate size, 150 x 15 mm, 10/PK
Super Broth Agar Plates	SBA-200	plate size, 100 x 15 mm, 20/PK

Terrific Broth Agar Plates

Description:
1.2% Bacto tryptone, 2.4% yeast extract, 1.6% glycerol, 1.5% agar, 72mM K2HPO4, and 17mM KH2PO4.

Application:
Carbenicillin is an analog of ampicillin. For use with ampicillin resistant strains and strains harboring plasmids such as pBluescript, pGEM, pUC series plasmids.

Recommended Storage Conditions: 4°C.

Name	Cat #	Size
Terrific Broth Agar Carbenicillin-100	TBAC-101	plate size 150 x 15 mm, 10/PK
Terrific Broth Agar Carbenicillin-100	TBAC-102	plate size 100 x 15 mm, 20/PK
Terrific Broth Agar Plates	TBAP-100	plate size, 150 x 15 mm, 10/PK
Terrific Broth Agar Plates	TBAP-200	plate size, 100 x 15 mm, 20/PK

YT Agar Plates

Description:
0.8% Tryptone, 0.5% yeast extract, 0.5% NaCl, 0.7% agar.

Application:
Recommended for growth and propagation of E. coli.

Recommended Storage Conditions: 4°C.

Name	Cat #	Size
YT Agar Carbenicillin-50	YT-AC501	Plate size, 150 x 15 mm, 10/PK, 50µg/ml carbenicillin
YT Agar Carbenicillin-50	YT-AC502	Plate size, 100 x 15 mm, 20/PK, 50µg/ml carbenicillin
YT Agar Plates	YTAP-100	Plate size, 150 x 15 mm, 10/PK
YT Agar Plates	YTAP-200	Plate size, 100 x 15 mm, 20/PK
2YT Agar Amp-100	2YP-Amp101	Plate size, 150 x 15 mm, 10/PK, 100µg/ml ampicillin
2YT Agar Amp-100	2YP-Amp102	Plate size, 100 x 15 mm, 20/PK, 100µg/ml ampicillin
2YT Agar Carbenicillin-50	2TY-ACa501	Plate size, 150 x 15 mm, 10/PK, 50µg/ml carbenicillin
2YT Agar Carbenicillin-50	2TY-ACa502	Plate size, 100 x 15 mm, 20/PK, 50µg/ml carbenicillin
2YT Agar Chloramphenicol-34	2YT-Ach341	Plate size, 150 x 15 mm, 10/PK, 34µg/ml chloramphenicol
2YT Agar Chloramphenicol-34	2YT-Ach342	Plate size, 100 x 15 mm, 20/PK, 34µg/ml chloramphenicol
2YT Agar Plates	2YTA-100	Plate size, 150 x 15 mm, 10/PK
2YT Agar Plates	2YTA-200	Plate size, 100 x 15 mm, 20/PK
2YR Agar Kanamycin-30	2YT-AK301	Plate size, 150 x 15 mm, 10/PK, 30µg/ml kanamycin
2YR Agar Kanamycin-30	2YT-AK302	Plate size, 100 x 15 mm, 20/PK, 30µg/ml kanamycin

1 Kb DNA Ladder

Description:
The 1 Kb DNA Ladder is suitable for sizing linear double-stranded DNA fragments from 500 bp to 9 kb. The ladder may be radioactively labeled by one of the following methods: (i) Partial exonucleolytic degradation and resynthesis with T4 DNA polymerase (this method is preferred because higher specific activity is achieved with less 32P input); (ii) Labeling the ends with T4 polynucleotide kinase; (iii) Filling in the recessed ends with E. coli DNA polymerase I or the large fragment of DNA polymerase I.
This ladder is premixed with loading dyes for direct gel electrophoresis.

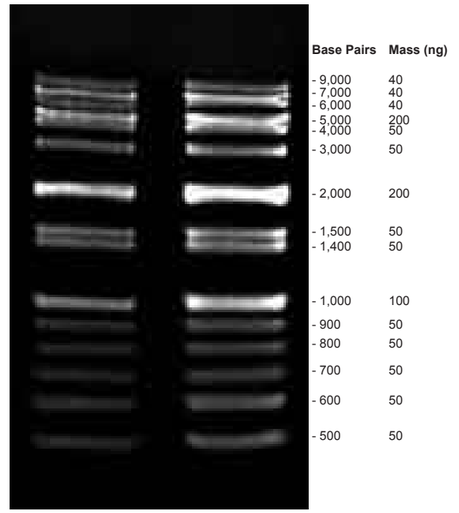
Application:
Determination of the molecular weight of nucleic acids.

Concentration and Usage:
Conc. 0.1 µg/µl and 5 µl per lane

Storage: Store at room temperature.

Stability: Stable under room temperature.

Recommended Storage Conditions: -20°C.



Name	Cat #	Size
1 Kb DNA Ladder	kDNA-050	50 µg, 100 lanes
1 Kb DNA Ladder	kDNA-250	250 µg, 500 lanes

100 bp DNA Ladder

Description:
The 100 bp DNA Ladder is suitable for sizing double-stranded DNA fragments from 100-2000 bp. The ladder is prepared from a plasmid containing repeats of a 100 bp DNA fragment. Agarose gel analysis must show that bands between 100-1500 bp are distinguishable after ethidium bromide staining. The 1000 bp band must be more intense than any other ladder band except the 2000 bp band.
This ladder is premixed with loading dyes and glycerol for direct gel electrophoresis.

Reagents Supplied:
Gel Loading Dye, Blue (6x)

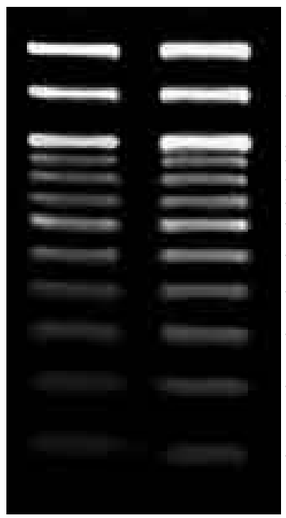
Application:
Determination of the molecular weight of nucleic acids

Concentration and Usage:
Conc. 0.1 µg/µl and 5 µl per lane

Storage: Store at room temperature.

Stability: Stable under room temperature.

Recommended Storage Conditions: -20°C.



5 µl	10 µl
100 bp	

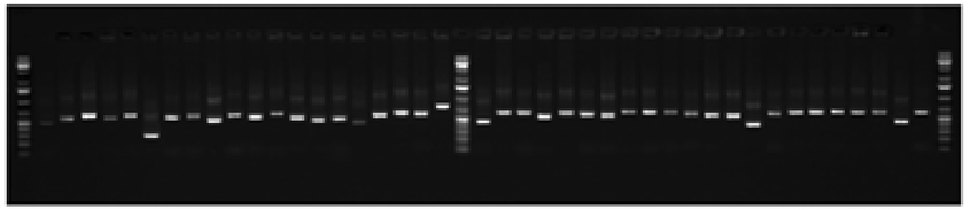
Name	Cat #	Size
100 bp DNA Ladder	bpDNA-050	50 µg, 100 lanes
100 bp DNA Ladder	bpDNA-250	250 µg, 500 lanes

PCR & Real-time PCR

2x HiFi HTP PCR Master Mix

Description:
Superior specificity: High fidelity DNA polymerase plus modified hot start DNA polymerase with our proprietary enzyme system, minimizes primer-dimers and non-specific amplification
- Broad dynamic range: from 3.3 ng of genomic DNA (one copy of the target gene) or up to 100 ng in 25 µl rxn
- Broad range of targets: amplification of a wider range of targets from high GC templates, high AT templates and more
- High-throughput amplification: amplification of one pathway or gene family with ONE protocol, minimize secondary products, negative PCR results, and repeat experiments
- Convenience: optimized 2x mixes and protocols
- Superior sequencing results via direct sequencing from PCR products

Recommended Storage Conditions: -20°C.



2x HiFi HTP PCR Master Mix

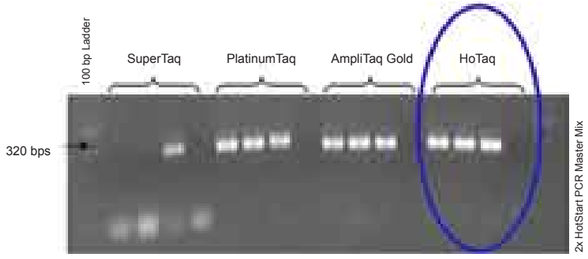
Name	Cat #	Size
2x HiFi HTP PCR Master Mix	HTP-200	200 Reactions, 10µl/Reaction
2x HiFi HTP PCR Master Mix	HTP-500	500 Reactions, 10µl/Reaction
2x HiFi HTP PCR Master Mix	HTP-1000	1000 Reactions, 10µl/Reaction

2x HotStart PCR Master Mix

Description:
2x HotStart PCR Master Mix is a premixed 2x concentrated solution of HoTaq DNA Polymerase, reaction buffer, $MgCl_2$ and dNTPs. The DNA template and primers are simply added for PCR reactions. The consistency and efficiency of routine PCR amplifications are optimized.

Technology:
The Taq enzyme has been modified to MCLAB's HoTaq in this product. The HoTaq is inactive at room temperature, but become active after 10 minutes at 95°C.

Comparison:
Here is the result of comparing MCLAB's HoTaq with some other leading brands.



Advantages:
Better than or as good as ABI's AmpliTaq Gold.

Features:
- Hot-start to keep background low
- Solves the primer-dimmer problem
- All handling can be done at room temperature
- Easy calculation
- Taq DNA Polymerase in ready-to-use mixture
- Low contamination risk

Application:
- Regular PCR
- Genotyping
- Multiplex (multiple pairs of primers) PCR

Instructions:
Please follow the instructions for each PCR reaction (20µl final volume; can be done at room temperature):

1. Mix DNA template and primers
2. Add H_2O to total 10µl
3. Add 10µl 2x HotStart Taq PCR Master Mix
4. Set the first PCR step to 95°C for 10 minutes to active the HoTaq
5. Continue PCR as usual

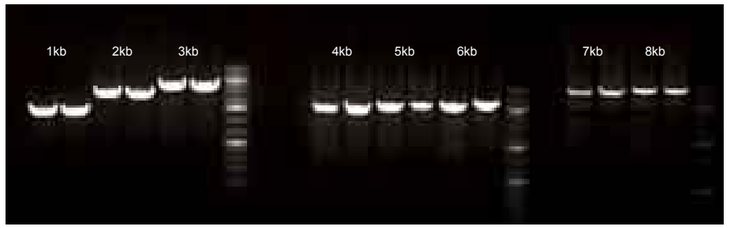
Recommended Storage Conditions: -20°C.

Name	Cat #	Size
2x HotStart PCR Master Mix	HMM-100	100 Reactions, 10µl/Reaction
2x HotStart PCR Master Mix	HMM-300	500 Reactions, 10µl/Reaction

2x Universal Taq Master Mix

Description:
2x Universal Taq Master Mix combines high-quality MCLAB recombinant Taq DNA Polymerase, a recombinant hot start protein, and MCLAB Ultrapure nucleotides in a proprietary reaction buffer. This ready-to-use mix provides robust and reliable performance for demanding PCR experiments in which high specificity and high sensitivity are desired. Since the mix is pre-formulated, experimental variability is significantly reduced. It can be used for PCR amplification up to 8 kb .

Application:
- High-specificity PCR amplification
- High-sensitivity PCR amplification
- TA cloning
- High throughput PCR



2x Universal Taq Master Mix

Convenient and Usage:
The pre-mixed formulation saves time, reduces potential contamination and eliminates pipetting errors. For a 20 µl reaction, simply add 10 µl of 2x Universal Taq Master Mix to primers, DNA template and PCR-Qualified H_2O. Reactions can be easily performed in 10 µl, 25 µl, 50 µl or 100 µl volumes. Room temperature reaction assembly is possible because of the hot start feature.

2x Universal Taq Master Mix Formulation:
2x Universal Taq Master Mix combines MCLAB proprietary Taq DNA Polymerase in a unique buffer formulation. Magnesium and nucleotide concentrations are 7.0 mM and 0.4 mM each, respectively.

Recommended Storage Conditions: -20°C.

Brief Protocol:
This standard protocol applies to a single reaction where only template, primers, and water need to be added to the master mix. For multiple reactions, scale-up volume of reaction components proportionally.
1. Thaw reagents at room temperature. Mix thoroughly and then place on ice.
2. Assemble reactions on ice or at room temperature, whichever is more convenient.
3. The following table shows recommended component volumes

Components	Vol. for 20 µl reaction	Final Concentration
Universal Taq Master Mix (2x)	10 µl	1 x
10 µM Forward Primer	1 µl	0.2 µM
10 µM Reverse Primer	1 µl	0.2 µM
Template DNA	1-100 ng of genomic DNA or up to 20 µl plasmid DNA	As needed
Water, PCR-Qualified		N/A

4. Ensure reactions are mixed thoroughly by gentle vortexing followed by a brief spin in a microcentrifuge.
5. The following table shows recommended cycling conditions:

Cycle Step	Temperature	Time
Initial Denature	94-95°C	2 minutes
Repeat following three cycles as necessary, generally 25- 35 times.*		2 minutes
Denature	94-95°C	30 seconds
Anneal *	55°C	30 seconds
Extend **	72°C	60 seconds per 1 kb
Final Extend	72°C	5 minutes
Final hold	4°C	as necessary

6. * 45 cycles may be required for low-copy targets.
** Initially, annealing temperature should be 5°C below the calculated Tm of the primers. If non-specific products are produced, increase the annealing temperature in 1-2°C increments.
*** Extension time should be about one minute for every kilobase of expected product size.
Analyze sample (typically 1 to 10 pl aliquots) by agarose gel electrophoresis. Visualize PCR product in gel with DNA intercalating dyes and an imaging device.

Name	Cat #	Size
2x Universal Taq Master Mix	UTM-100	100 reactions, 25µl/Reaction
2x Universal Taq Master Mix	UTM-300	300 reactions, 25µl/Reaction
2x Universal Taq Master Mix	UTM-500	500 reactions, 25µl/Reaction

High Purity Solution dNTPs

Description:
High quality deoxynucleotide triphosphate (dNTPs) are functionally tested in long PCR to be PCR qualified, and meet or exceed the criteria for high-quality sequencing with Thermo Sequenase DNA polymerase. High purity: 98% triphosphate, (as confirmed by chromatographcic analysis and 31P nuclear magnetic resonance (NMR) spectroscopy) ensures high levels of incorporation. It´s supplied in buffer-free, ready to use solution and is available as either individual products, sets or premixes.

Application:
For use in all molecular biology applications, including amplification, dideoxy sequencing, labeling, mutagenesis, cDNA synthesis, RNA protection assay, expression profiling, PCR, long PCR, real-time PCR, high fidelity PCR, RT-PCR, cDNA synthesis, primer extension, DNA labeling and more.

Recommended Storage Conditions:
Solution dNTPs are stable for 12 months when stored at -20°C

Name	Cat #	Size
dATP nucleotides	dNTP-5DA	100mM, 500µl
dCTP nucleotides	dNTP-5DC	100mM, 500µl
dGTP nucleotides	dNTP-5DG	100mM, 500µl
dTTP nucleotides	dNTP-5DT	100mM, 500µl
Mix of 4 dNTPs	dNTP-10M	10mM each dNTP, 1ml
Mix of 4 dNTPs	dNTP-25M	25mM each dNTP, 1ml
Set of 4 nucleotides	dNTP-2DN	100mM each, 4 x 200µl
Set of 4 nucleotides	dNTP-5DN	100mM each, 4 x 500µl

HoTaq DNA Polymerase (hot start)
See page 73.

Pfu DNA Polymerase
See page 74.

Taq DNA Polymerase (regular)
See page 75, 76.

Taq DNA Polymerase (full length exo-)
See page 78.

Taq DNA Polymerase (Klenow Fragment)
See page 79.

Taq DNA Polymerase (exo+ and polymerase-)
See page 77.

Taq DNA Polymerase (truncated and exo-)
See page 80.

2x HoTaq Real-time PCR Kit

Description:
This is a high performance real-time PCR reagent. It utilizes MCLAB's proprietary quantitative PCR technology.

Application:
Probe based quantitative PCR: including DNA quantification, 2-step RT PCR, SNP analysis, etc.

Primer and probe design:
1. To achieve the best performance, appropriate software, such as ABI Primer Express™, should be used to design primers with 50°C~65°C annealing temperature and 68°C~70°C for probes with 17~30 nucleotides in length
2. Amplicon size should be small, <150bp
3. Avoid secondary structures in primers and probes
4. Avoid more than 3 consecutive Gs in primers and probes
5. Primers should not have complementary 3' -ends
6. 17 ~ 30 nucleotides in length

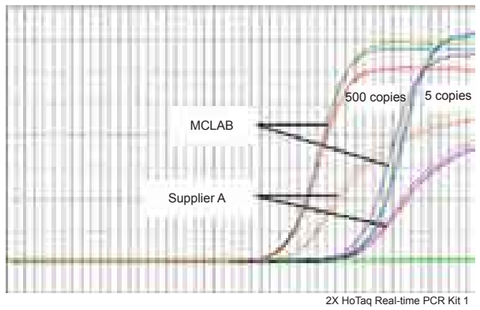
Recommended Reaction Conditions:
95°C, 10 minutes. -> (95°C, 5 seconds. -> 60°C, 30 seconds.) for 50 cycles.

Recommended Storage Conditions:-20°C

Notes:
To achieve accurate quantification, it is highly recommended to do replicates and to reduce pipetting error.

Reference:
1. Holland, P. M., Abramson, R. D., Watson, R., and Gelfand,
2. D. H. 1991. Proceedings of the National Academy of Sciences USA 88:7276-7280.
3. Livak, K. J., Flood, S. J. A., Marmaro, J., Giusti, W., and Deetz, K. 1995. PCR Methods and Applications 4:357-362.
4. Lee, L. G., Connell, C. R., and Bloch, W. 1993 Nucleic AcidsResearch 21:3761-3766.

Advantages:
1. 2x HotSybr PCR Reaction Mix products cut the total reaction time down to half.



2X HoTaq Real-time PCR Kit 1

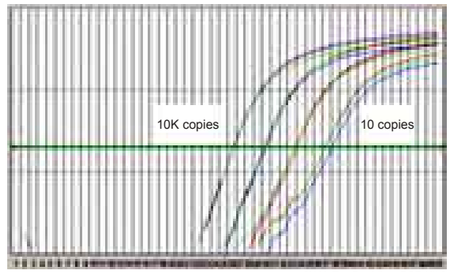
- Normally the total reaction time is 4350 seconds: 95°C, 10 minutes => (95°C, 15 seconds => 60°C, 60 seconds) x 50
- For MCLAB's 2x HotSybr PCR Reaction Mix, the total reaction time is reduced to 2350 seconds: 95°C, 10 minutes => (95°C, 5 seconds => 60°C, 30 seconds) x 50

2. One-step RT-PCR products are faster.

		MCLAB		Supplier A	
		Ct, Ave	Stdev n=4	Ct, Ave	Stdev n=4
Target 1		32.03	0.06	34.56	0.61
Target 2		33.43	0.42	35.52	0.13
Target 3		32.60	0.15	34.10	0.14
Target 4		31.82	0.31	34.27	0.42
Target 5		33.36	0.25	41.09	0.15
Target 6	Allele 1	32.76	0.52	38.17	0.13
	Allele 2	34.05	0.26	40.44	0.28
Target 7	Allele 1	33.45	0.19	41.04	0.32
	Allele 2	33.27	0.16	40.16	0.68
Target 8	Allele 1	33.47	0.46	40.04	N/A*
	Allele 2	36.00	0.69	N/A	N/A

*:2 out 4 were not amplified

3. 2x HoTaq PCR Reaction Mix products are superior in amplifying difficult templates comparing with similar products from other suppliers.



2X HoTaq Real-time PCR Kit 3

- This is the amplification of GPIIB gene (70% G+C) .
- 10 ~ 10K copies from 30pg human genomic DNA have been detected.

Name	Cat #	Size
2x HoTaq Real-time PCR Kit	HTP400	Regular level of ROX, for Real-time PCR Machines ABI 7000, 7300, 7700, 7900, 200 rxns, 4x1.25ml
2x HoTaq Real-time PCR Kit	HTP400LR	Low level of ROX, for Real-time PCR Machines ABI 7500, Mx 3000P, Mx 3005P, 200 rxns, 4x1.25ml
2x HoTaq Real-time PCR Kit	HTP400RF	ROX Free, for Real-time PCR Machines BioRad iCycler MiniOpticon, Opticon 2, Chromo4, iQ5; Roche LightCycler 480; MJ Research DNA Engine Opticon 2, Chromo4; Corbett Roto-gene 3000, 6000, 200 rxns, 4x1.25ml
2x HoTaq Real-time PCR Kit	HTP405	Regular level of ROX, for Real-time PCR Machines ABI 7000, 7300, 7700, 7900, 200 rnx, 5 ml

2x HotSybr Real-time PCR Kit

Description:
This is a high performance real-time PCR reagent. It utilizes MCLAB's proprietary quantitative PCR technology.

Application:
Probe based quantitative PCR: including DNA quantification, 2-step RT PCR, SNP analysis, etc.

Primer and probe design:
Appropriate software, such as ABI Primer Express™, should be used.

Recommended Reaction Conditions:
95°C, 10 minutes -> (95°C, 5 seconds. -> 60°C, 30 seconds.) for 50 cycles -> melting curve.

Recommended Storage Conditions: -20°C

Notes:
To achieve accurate quantification, it is highly recommended to (1) do replicates; (2) reduce pipetting error; (3) primer concentration from 100nM to 300nM; (4) run melting curve following amplification cycles.

Reference:
Higuchi R, Dollinger G, Walsh PS, Griffith R; Bio/Technology 10: 413-417, 1992

Advantages:
See page 22.

Name	Cat #	Size
2x HotSybr Real-time PCR Kit	HSM400	Regular level of ROX, for Real-time PCR Machines ABI 7000, 7300, 7700, 7900, 200 rxns, 4x1.25ml
2x HotSybr Real-time PCR Kit	HSM400LR	Low level of ROX, for Real-time PCR Machines ABI 7500, Stratagene Mx 3000P, Mx 3005P, 200 rxns, 4x1.25ml
2x HotSybr Real-time PCR Kit	HSM400RF	ROX Free, for Real-time PCR Machines BioRad iCycler MiniOpticon, Opticon 2, Chromo4, iQ5; Roche LightCycler 480; MJ Research DNA Engine Opticon 2, Chromo4; Corbett Roto-gene 3000, 6000, 200 rxns, 4x1.25ml

HoTaq One-step Real-time RT-PCR Kit

Description:
This is a high performance real-time PCR reagent. It utilizes MCLAB's proprietary quantitative PCR technology.

Application:
Probe based quantitative PCR: including DNA quantification, 2-step RT PCR, SNP analysis, etc.

Primer and probe design:
To achieve the best performance, appropriate software, such as ABI Primer Express™, should be used.

Recommended Reaction Conditions:
55°C, 15 minutes —> 95°C, 10 minutes. —> (95°C, 5 seconds. —> 60°C, 30 seconds.) for 50 cycles.
Supplied reverse transcriptase is 200x.

Recommended Storage Conditions: -20°C

Notes:
To achieve accurate quantification, it is highly recommended to (1) avoid any RNase contamination; (2) design probe on sense strand; (3) use primer concentration from 100nM to 300nM; (4) shorten time between setting up reaction and loading plate onto PCR machine.

Reference:
1. Holland, P. M., Abramson, R. D., Watson, R., and Gelfand, D. H. 1991. Proceedings of the National Academy of Sciences USA 88:7276-7280.
2. Livak, K. J., Flood, S. J. A., Marmaro, J., Giusti, W., and Deetz, K. 1995. PCR Methods and Applications 4:357-362.
3. Lee, L. G., Connell, C. R., and Bloch, W. 1993 Nucleic AcidsResearch 21:3761- 3766.

Advantages:
See page 22.

Name	Cat #	Size
HoTaq One-step Real-time RT-PCR Kit	HTRT400	Regular level of ROX, for Real-time PCR Machines ABI 7000, 7300, 7700, 7900, 200 rxns, 4x1.25ml
HoTaq One-step Real-time RT-PCR Kit	HTRT400LR	Low level of ROX, for Real-time PCR Machines ABI 7500, Mx 3000P, Mx 3005P, 200 rxns, 4x1.25ml
HoTaq One-step Real-time RT-PCR Kit	HTRT400RF	ROX Free, for Real-time PCR Machines BioRad iCycler MiniOpticon, Opticon 2, Chromo4, iQ5; Roche LightCycler 480; MJ Research DNA Engine Opticon 2, Chromo4; Corbett Roto-gene 3000, 6000, 200 rxns, 4x1.25ml

Human and Mouse Housekeeping Gene Primer Sets

Table: Validated primer sets for human and mouse housekeeping genes and their expression levels.

	Human Genes			Mouse Genes	
Name	GeneBank Accession #	Relative Expression*	Name	GeneBank Accession #	Relative Expression*
h18S rRNA	X0325	****	m18S rRNA	K01364	****
hActß	NM_001101	***	mAct²	NM_007393	***
hB2m	NM_004048	***	mB2m	NM_009735	***
hGapdh	NM_002046	***	mGapdh	NM_008084	***
hPpia	NM_021130	***	mPpia	NM_008907	***
hRpl13a	NM_012423	***	mRpl13a	NM_009438	***
hRplp0	NM_001002	**	mHsp90ab1	NM_008302	**
hHprt1	NM_000194	**	mLdhal6b	NM_175349	**
hTfrc	NM_003234	**	mHprt1	NM_013556	**
hHsp90ab1	NM_007355	*	mGusb	NM_010368	*
hGusb	NM_000181	*	mTbp	NM_013684	*
hUbc	NM_021009	*	mTfrc	NM_011638	*

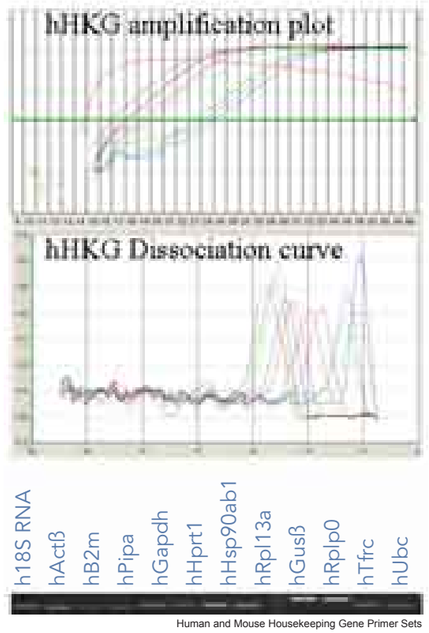
* Summary of the expression levels of genes in comparison with 18S rRNA using our sensitivity human or mouse reference cDNA and our proprietary SYBR green master mix.

Related Products: qHRcDNA, HSM, HTP

Reaction Conditions:
95°C, 10 minutes -> (95°C, 15 seconds. -> 60°C, 30 seconds.)
for 40 cycles -> melting curve.

Recommended Storage Conditions: -20°C

Figure: Standard curve for housekeeping gene hprt1 expression at medium levels.



Name	Cat #	Size
Human and Mouse Housekeeping Gene Primer Sets	hHKG-100	2 human genes, h18S rRNA and hActß, 100rxns
Human and Mouse Housekeeping Gene Primer Sets	hHKG-110	2 high expression level hACtß, hGapdh; 2 medium expression level genes, hHprt1, hTfrc; 2 low expression level genes, hGusb, hUbc; 100rxns
Human and Mouse Housekeeping Gene Primer Sets	hHKG-120	All 12 human housing keeping genes at different expression levels, 100rxns
Human and Mouse Housekeeping Gene Primer Sets	mHKG-100	2 mouse genes, m18S rRNA and mActß, 100rxns
Human and Mouse Housekeeping Gene Primer Sets	mHKG-110	2 high expression level mACtß, mGapdh; 2 medium expression level genes, mHprt1, mHsp90ab1; 2 low expression level genes, mGusb, mTbp; 100rxns
Human and Mouse Housekeeping Gene Primer Sets	mHKG-120	All 12 mouse housekeeping genes at different expression levels, 100rxns

Human Apoptosis PCR Array

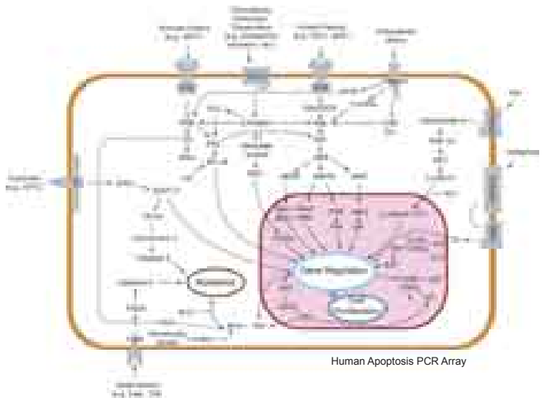
Description:
Apoptosis is a genetically controlled mechanism of cell death involved in the regulation of tissue homeostasis. The 2 major pathways of apoptosis are the extrinsic (Fas and other TNFR superfamily members and ligands) and the intrinsic (mitochondria-associated) pathways, both of which are found in the cytoplasm. The extrinsic pathway is triggered by death receptor engagement, which initiates a signaling cascade mediated by caspase-8 activation. Caspase-8 both feeds directly into caspase-3 activation and stimulates the release of cytochrome c by the mitochondria. Caspase-3 activation leads to the degradation of cellular proteins necessary to maintain cell survival and integrity. The intrinsic pathway occurs when various apoptotic stimuli trigger the release of cytochrome c from the mitochondria (independently of caspase-8 activation). Cytochrome c interacts with Apaf-1 and caspase-9 to promote the activation of caspase-3. Recent studies point to the ER as a third subcellular compartment implicated in apoptotic execution. Alterations in Ca2+ homeostasis and accumulation of misfolded proteins in the ER cause ER stress. Prolonged ER stress can result in the activation of BAD and/or caspase-12, and execute apoptosis.

Gene List (88 genes):
ABL1;AIFM1; AKT1; AKT2; AKT3; APAF1; ATM; BAD; BAX; BCL2; BCL2L1; BID; BIRC2; BIRC3; CAPN1; CAPN2; CASP10; CASP3; CASP6; CASP7; CASP8; CASP9; CFLAR; CHP; CHP2; CHUK; CSF2RB; CYCS; DFFA; DFFB; ENDOD1; ENDOG; EXOG; FADD; FAS; FASLG; IKBKB; IKBKG; IL1A; IL1B; IL1R1; IL1RAP; IL3; IL3RA; IRAK1; IRAK2; IRAK3; IRAK4; MAP3K14; MYD88; NFKB1; NFKBIA; NGF; NTRK1; PIK3CA; PIK3CB; PIK3CD; PIK3CG; PIK3R1; PIK3R2; PIK3R3; PIK3R5; PPP3CA; PPP3CB; PPP3CC; PPP3R1; PPP3R2; PRKACA; PRKACB; PRKACG; PRKAR1A; PRKAR1B; PRKAR2A; PRKAR2B; PRKX; RELA; RIPK1; TNF; TNFRSF10A; TNFRSF10B; TNFRSF10C; TNFRSF10D; TNFRSF1A; TNFSF10; TP53; TRADD; TRAF2; XIAP

Reaction Conditions:
95°C, 10 minutes. -> (95°C, 5 seconds. -> 60°C, 30 seconds.) for 50 cycles.

Recommended Storage Conditions: -20°C

Notes:
To achieve accurate quantification, it is highly recommended to do replicates and to reduce pipetting error.


Human Apoptosis PCR Array

Name	Cat #	Size
Human Apoptosis PCR Array	hap-102	96-well plate containing 88 pathway regulated genes plus 5 endogenous control genes, one non-transcribed genomic DNA contamination control, one reverse transcription control and one positive PCR control (2 plates)
Human Apoptosis PCR Array	hap-102S	hap-102 with 2.5 ml SYBR Green master mix
Human Apoptosis PCR Array	hap-104	96-well plate containing 88 pathway regulated genes plus 5 endogenous control genes, one non-transcribed genomic DNA contamination control, one reverse transcription control and one positive PCR control (4 plates)
Human Apoptosis PCR Array	hap-104S	hap-104 with 5.0 ml SYBR Green master mix

Human Cell Cycle PCR Array

Description:
The cell cycle, or cell-division cycle, is the series of events that takes place in a cell leading to its division and duplication. The human cell cycle is accomplished through a reproducible sequence of events, DNA replication (S phase) and mitosis (M phase) separated temporally by gaps known as G1 and G2 phases. Cyclin-dependent kinases (CDKs) are key regulatory enzymes, each consisting of a catalytic CDK subunit and an activating cyclin subunit. CDKs regulate the cell's progression through the phases of the cell cycle by modulating the activity of key substrates. Downstream targets of CDKs include transcription factor E2F and its regulator Rb. Precise activation and inactivation of CDKs at specific points in the cell cycle are required for orderly cell division. Cyclin-CDK inhibitors (CKIs) are involved in the negative regulation of CDK activities, thus providing a pathway through which the cell cycle is negatively regulated.

Human cells respond to DNA damage by activating signaling pathways that promote cell cycle arrest and DNA repair. In response to DNA damage, the checkpoint kinase ATM phosphorylates and activates Chek2, which in turn directly phosphorylates and activates p53 tumor suppressor protein. p53 and its transcriptional targets play an important role in both G1 and G2 checkpoints. ATR-Chk1-mediated protein degradation of Cdc25A protein phosphatase is also a mechanism conferring intra-S-phase checkpoint activation.

Gene List (88 genes):
ABL1; ANAPC1; ANAPC10; ANAPC11; ANAPC13; ANAPC2; ANAPC4; ANAPC5; ANAPC7; ATM; ATR; BUB1; BUB1B; BUB3; CCNA1; CCNA2; CCNB1; CCNB2; CCNB3; CCND1; CCND2; CCND3; CCNE1; CCNE2; CCNH; CDC14A; CDC14B; CDC16; CDC20; CDC23; CDC25A; CDC25B; CDC25C; CDC26; CDC27; CDC45L; CDC6; CDC7; CDK1; CDK2; CDK4; CDK6; CDK7; CDKN1A; CDKN1B; CDKN1C; CDKN2A; CDKN2B; CHEK1; CHEK2; CREBBP; CUL1; DBF4; E2F4; E2F5; EP300; ESPL1; FZR1; GADD45A; GADD45B; GADD45G; GSK3B; HDAC1; HDAC2; MAD1L1; MAD2L1; MAD2L2; MCM2; MCM3; MCM4; MCM5; MDM2; MYC; PCNA; PKMYT1; PLK1; PRKDC; RAD21; RB1; RBL1; RBL2; RBX1; SFN; SKP1; SKP2; TFDP1; TFDP2; TP53.

Reaction Conditions:
95°C, 10 minutes . -> (95°C, 5 seconds. -> 60°C, 30 seconds.) for 50 cycles.

Recommended Storage Conditions: -20°C

Notes:
To achieve accurate quantification, it is highly recommended to do replicates and to reduce pipetting error.

Name	Cat #	Size
Human Cell Cycle PCR Array	hCC-102	96-well plate containing 88 pathway regulated genes plus 5 endogenous control genes, one non-transcribed genomic DNA contamination control, one reverse transcription control and one positive PCR control (2 plates)
Human Cell Cycle PCR Array	hCC-102S	hCC-102 with 2.5 ml SYBR Green master mix
Human Cell Cycle PCR Array	hCC-104	96-well plate containing 88 pathway regulated genes plus 5 endogenous control genes, one non-transcribed genomic DNA contamination control, one reverse transcription control and one positive PCR control (4 plates)
Human Cell Cycle PCR Array	hCC-104S	hCC-104 with 5.0 ml SYBR Green master mix

Human p53 Signaling PCR Array

Description:
p53 activation is induced by a number of stress signals, including DNA damage, oxidative stress and activated oncogenes. The p53 protein functions as a transcriptional activator of p53-regulated genes. The three major results of activation of p53 pathway are: cell cycle arrest, cellular senescence or apoptosis. Other p53-regulated gene functions communicate with adjacent cells, repair the damaged DNA or set up positive and negative feedback loops that enhance or attenuate the functions of the p53 protein and integrate these stress responses with other signal transduction pathways.

APAF1; ATM; ATR; BAI1; BAX; BBC3; BID; CASP3; CASP8; CASP9; CCNB1; CCNB2;CCNB3; CCND1; CCND2;CCND3; CCNE1; CCNE2; CCNG1; CCNG2; CD82; CDK1; CDK2; CDK4; CDK6; CDKN1A; CDKN2A; CHEK1; CHEK2; CYCS; DDB2; EI24; FAS; GADD45A; GADD45B; GADD45G; GTSE1; IGF1; IGFBP3; LRDD; MDM2; MDM4; PERP; PMAIP1; PPM1D; PTEN; RCHY1; RFWD2; RPRM; RRM2; RRM2B; SERPINB5; SERPINE1; SESN1; SESN2; SESN3; SFN; SHISA5; SIAH1; STEAP3; THBS1; TNFRSF10B; TP53; TP53AIP1; TP53I3; TP73; TSC2; ZMAT3.

Reaction Conditions:
95°C, 10 minutes. -> (95°C, 5 seconds. -> 60°C, 30 seconds.) for 50 cycles.

Recommended Storage Conditions: -20°C

Notes:
To achieve accurate quantification, it is highly recommended to do replicates and reduce pipetting error.

Name	Cat #	Size
Human p53 Signaling PCR Array	H53-102	96-well plate containing 88 pathway regulated genes plus 5 endogenous control genes, one non-transcribed genomic DNA contamination control, one reverse transcription control and one positive PCR control (2 plates)
Human p53 Signaling PCR Array	H53-102S	H53-102 with 2.5 ml SYBR Green master Mix
Human p53 Signaling PCR Array	H53-104	96-well plate containing 88 pathway regulated genes plus 5 endogenous control genes, one non-transcribed genomic DNA contamination control, one reverse transcription control and one positive PCR control (4 plates)
Human p53 Signaling PCR Array	H53-104S	H53-104 with 5.0 ml SYBR Green master Mix

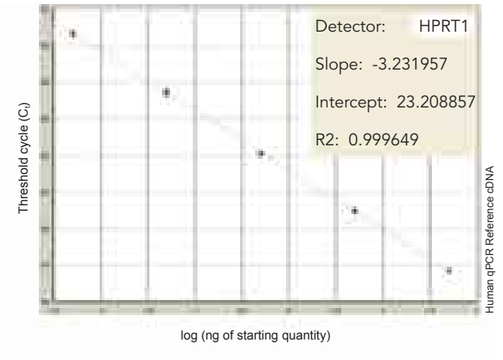
Human qPCR Reference cDNA

Description:
High quality and performance standard for qPCR. Broad gene coverage and virtually free of genomic DNA tested by qPCR. Reverse transcription primed by oligo dT and random from total RNA isolated human tissues and cultured human cell lines.

Application:
- Positive control for human gene expression
- Normalization for gene expression data from different qPCR experiments

Recommended Storage Conditions: -20°C

Figure Standard curve for housekeeping gene hprt1 expression at medium levels.



Name	Cat #	Size
Human qPCR Reference cDNA	qHRcDNA-50	50rxns, 100ul
Human qPCR Reference cDNA	qHRcDNA-100	100rxns, 200ul

Human Stem Cell Gene Biomarkers PCR Array

Description:
Stem cells are found in most multi-cellular organisms. They are characterized by the ability to renew themselves through mitotic cell division and differentiating into a diverse range of specialized cell types. Stem cells have virtually unlimited application in the treatment and cure of many human diseases and disorders including Alzheimer's, diabetes, cancer, strokes, etc. Stem cells come in two general types: Embryonic stem cells and Adult stem cells. Stem cells can be isolated and identified based on a distinctive set of cell surface biomarkers. The human stem cell gene biomarkers plate is designed for this purpose. It contains 88 human stem cell gene biomarkers plus 8 endogenous control genes with different expression levels.

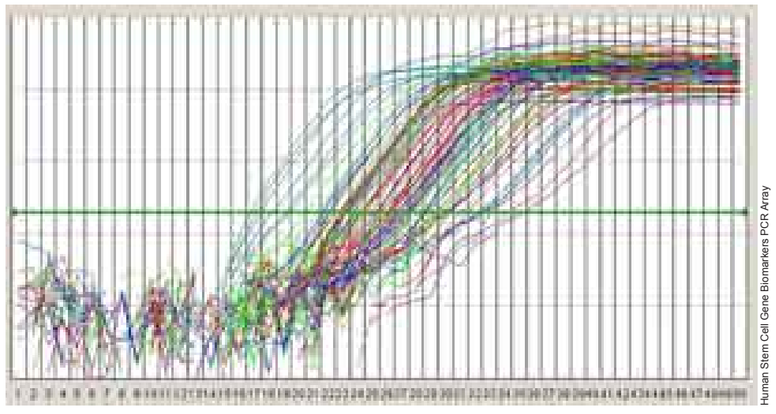
Application:
- Stem cell isolation and identification
- Stem cell differentiation assay
- Stem cell gene expression assay

Reaction Conditions:
95°C, 10 minutes. -> (95°C, 5 seconds. -> 60°C, 30 seconds.) for 50 cycles.

Recommended Storage Conditions: -20°C

Notes:
To achieve accurate quantification, it is highly recommended to do replicates and reduce pipetting error.

Figure 1



Name	Cat #	Size
Human Stem Cell Gene Biomarkers PCR Array	hstem-102	96-well plate containing 88 pathway regulated genes plus 8 endogenous control genes (2 plates)
Human Stem Cell Gene Biomarkers PCR Array	hstem-104	96-well plate containing 88 pathway regulated genes plus 8 endogenous control genes (4 plates)
Human Stem Cell Gene Biomarkers PCR Array	hstem-102S	hstem-102 with 2.5 ml SYBR Green master mix
Human Stem Cell Gene Biomarkers PCR Array	hstem-104S	hstem-104 with 5.0 ml SYBR Green master mix

Figure 2: Gene Information

Symbol	GenBank No.
ABCG2	NM_004827
ACAN	NM_001135
ACTC1	NM_005159
ADAR	NM_001111
ALDH1A1	NM_000689
ALDH2	NM_000690
ALPI	NM_001631
APC	NM_000038
ASCL2	NM_005170
AXIN1	NM_003502
BGLAP	NM_199173
BMP1	NM_006129
BMP2	NM_001200
BMP3	NM_001201
BTRC	NM_033637
CCNA2	NM_001237
CCND1	NM_053056
CCND2	NM_001759
CCNE1	NM_001238
CD30	NM_001243
CD34	NM_001773
CD38	NM_001775
CD3D	NM_000732
CD4	NM_000616
CD44	NM_000610
CD8A	NM_001768
CD8B	NM_004931
CDC2	NM_001786
CDC42	NM_001791
CDH1	NM_004360
CDH2	NM_001792
CDH5	NM_001795
COL1A1	NM_000088
COL2A1	NM_001844
COL9A1	NM_001851
CTNNA1	NM_001903
CXCL12	NM_000609
DHH	NM_021044
DLL1	NM_005618
DLL3	NM_016941
DTX1	NM_004416
DTX2	NM_020892
DVL1	NM_004421
EP300	NM_001429
FGF1	NM_000800
FGF2	NM_002006
FGF3	NM_005247
FGF4	NM_002007
FGFR1	NM_015850

Symbol	GenBank No.
FOXA2	NM_021784
FRAT1	NM_005479
FZD1	NM_003505
GCNSL2	NM_021078
GDF2	NM_016204
GDF3	NM_020634
GJA1	NM_000165
GJB1	NM_000166
GJB2	NM_004004
HDAC2	NM_001527
HSPA9	NM_004134
IGF1	NM_000618
ISL1	NM_002202
JAG1	NM_000214
KRT15	NM_002275
MME	NM_000902
MSX1	NM_002448
MYC	NM_002467
MYOD1	NM_002478
MYST1	NM_032188
MYST2	NM_007067
NCAM1	NM_000615
NEUROG2	NM_024019
NOTCH1	NM_017617
NOTCH2	NM_024408
NUMB	NM_003744
OPRS1	NM_005866
PARD6A	NM_016948
PDX1	NM_000209
PPARD	NM_006238
PPARG	NM_015869
RB1	NM_000321
S100B	NM_006272
SOX1	NM_005986
SOX2	NM_003106
T	NM_003181
TERT	NM_198253
TUBB3	NM_006086
WNT1	NM_005430
18SrRNA*	X03205
ACTB*	NM_001101
B2M*	NM_004048
GAPDH*	NM_002046
HPRT1*	NM_000194
HSP90AB1*	NM_007355
PPIA*	NM_021130
RPLP0*	NM_012423

* Endogenous control genes

Human TGF Beta Signaling PCR Array

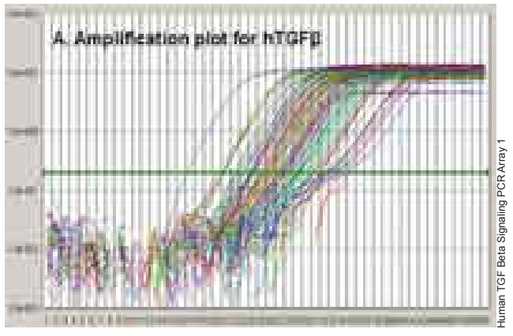
Description:
The Transforming growth factor beta (hTGFbeta) signaling pathway is involved in many cellular processes, such as proliferation, apoptosis, differentiation and migration in both the adult organism and the developing embryo and other cellular functions. TGF² family member, which includes structurally related secreted cytokines, such as TGF²s, activins and bone morphogenetic proteins (BMPs). The TGF² signaling pathway is very heavily regulated. There are a variety of mechanisms that the pathway is modulated both positively and negatively: agonists for ligands and R-SMADs; decoy receptors; and ubiquitination of R-SMADs and receptors.

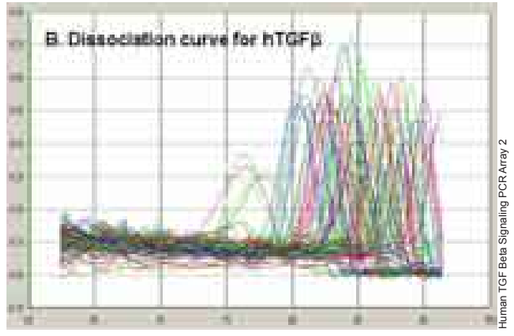
Reaction Conditions:
95°C, 10 minutes. -> (95°C, 5 seconds. -> 60°C, 30 seconds.) for 50 cycles.

Recommended Storage Conditions: -20°C

Notes:
To achieve accurate quantification, it is highly recommended to do replicates and reduce pipetting error.

Figure: Amplification plot
(A) shows that all genes in the human hTGFbeta signaling pathway were expressed (100% call) of our 50 pg of human reference cDNA. (B) The reaction was specific by dissociation curve, and 2% agarose gel.





Name	Cat #	Size
Human TGF Beta Signaling PCR Array	hTGFb-102	96-well plate containing 92 pathway regulated genes plus 4 endogenous control genes (2 plates)
Human TGF Beta Signaling PCR Array	hTGFb-102S	hTGFb-102 with 2.5 ml SYBR Green master mix
Human TGF Beta Signaling PCR Array	hTGFb-104	96-well plate containing 92 pathway regulated genes plus 4 endogenous control genes (4 plates)
Human TGF Beta Signaling PCR Array	hTGFb-104S	hTGFb-104 with 5.0 ml SYBR Green master mix

Figure 2: Gene Information

Symbol	GenBank No.
ACVR1	NM_001105
ACVR2A	NM_001616
ACVR2B	NM_001106
ACVRL1	NM_000020
AMH	NM_000479
AMHR2	NM_020547
BAMBI	NM_012342
BGLAP	NM_199173
BMP1	NM_006129
BMP2	NM_001200
BMP3	NM_001201
BMP4	NM_130851
BMP5	NM_021073
BMP6	NM_001718
BMP7	NM_001719
BMPER	NM_133468
BMPR1A	NM_004329
BMPR1B	NM_001203
BMPR2	NM_001204
CDC25A	NM_001789
CDKN1A	NM_000389
CDKN2B	NM_004936
CER1	NM_005454
CHRD	NM_003741
COL1A1	NM_000088
COL1A2	NM_000089
COL3A1	NM_000090
COMP	NM_000095
CST3	NM_000099
DCN	NM_001920
DLX2	NM_004405
E2F4	NM_001950
ENG	NM_000118
EVI1	NM_005241
FKBP1B	NM_004116
FOS	NM_005252
FST	NM_006350
GDF2	NM_016204
GDF3	NM_020634
GDF5	NM_000557
GDF6	NM_001001557
GDF7	NM_182828
GSC	NM_173849
HIPK2	NM_022740
ID1	NM_002165
ID2	NM_002166
IFNG	NM_000619
IGF1	NM_000618
IGFBP3	NM_000598

Symbol	GenBank No.
IL6	NM_000600
INHA	NM_002191
INHBA	NM_002192
INHBB	NM_002193
ITGB5	NM_002213
ITGB7	NM_000889
JUN	NM_002228
JUNB	NM_002229
LEFTY1	NM_020997
LTBP1	NM_000627
LTBP2	NM_000428
LTBP4	NM_003573
MYC	NM_002467
NBL1	NM_005380
NODAL	NM_018055
NOG	NM_005450
NR0B1	NM_000475
PDGFB	NM_002608
PITX2	NM_000325
PLAU	NM_002658
PPP2CA	NM_002715
RUNX1	NM_001754
SERPINE1	NM_000602
SMAD1	NM_005900
SMAD2	NM_005901
SMAD3	NM_005902
SMAD4	NM_005359
SMAD5	NM_005903
SMURF1	NM_020429
SOX4	NM_003107
STAT1	NM_007315
TGFB1	NM_000660
TGFB1I1	NM_015927
TGFB2	NM_003238
TGFB3	NM_003239
TGFBI	NM_000358
TGFBR1	NM_004612
TGFBR2	NM_003242
TGFBR3	NM_003243
TGFBRAP1	NM_004257
TGIF1	NM_003244
TNF	NM_000594
TSC22D1	NM_006022
GUSB	NM_000181*
RPLP0	NM_001002*
TFRC	NM_003234*
UBC	NM_021009*

* Endogenous control genes

Real-time PCR Primer Sets

Description:
High quality and functionally validated, ready to use for qPCR. Quality guaranteed utilizing our proprietary SYBR Green Master Mix 2x HoTaq Real-time PCR Kit and 2x HotSybr Real-time PCR Kit.
- Functionally validated, ready to use
- Amplicons 50-300 bp
- High specificity and performs up to 1000 reactions/gene set
- Reaction conditions, melting curve and/or gel pictures included
- Primer sequences provided.

Recommended Storage Conditions: -20°C

Figures:
The following two figures indicate that our primer sets from BMP1-7 are very specific using our human reference cDNA and SYBR Green Master Mix.

Figure 1:

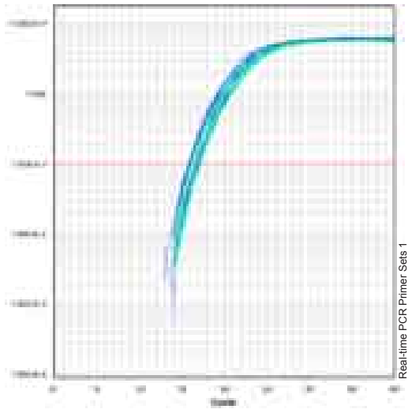


Figure 2:

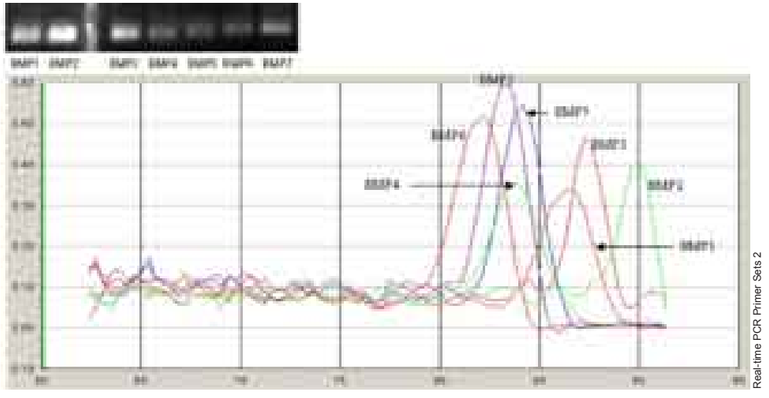
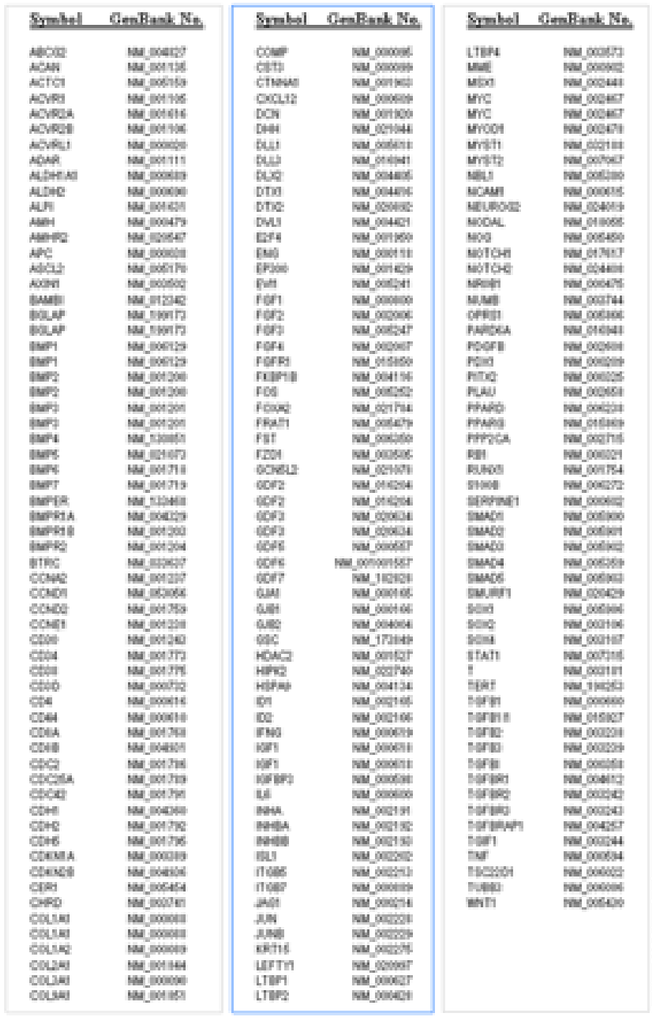


Table: Gene Information



Name	Cat #	Size
Real-time PCR Primer Sets	qHPR-001	1 set
Real-time PCR Primer Sets	qHPR-010	10 sets
Real-time PCR Primer Sets	qHPR-100	100 sets

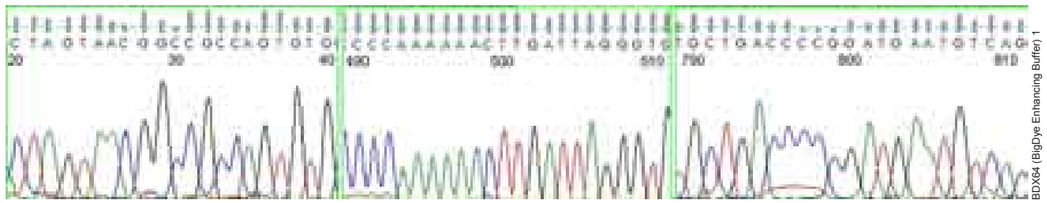
DNA Sequencing, Fragment Analysis and Next-Generation Sequencing

BDX64 (BigDye® Enhancing Buffer)

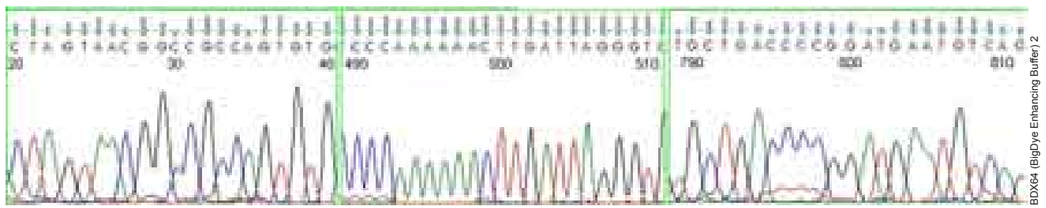
Description:
MCLAB's BDX64 is a BigDye® enhancing buffer. It has the same ion strength as the BigDye® premix 3.1 and 1.1.
Up to 64 (0.12 µl bigdye in 10µl reaction) or more fold dilutions by combining with the 5x dilution buffer.
Enhances the polymerase activity and reduces the extension time from 4 to 1 minute.
Reduces signal decline rate and results in even peak distribution.
Optimizes for use with BigDye® Chemistry (ABI) on 310, 3100, 3130/3130xl & 3730/3730xl.

An Application Example (64 fold):
BDX64: 0.875µl
BigDye®3.1: 0.125µl
5X dilution buffer: 1.5µl (catalog # is SBUF-100)
Template: 100ng
Primer: 3.2pmol
H_2O: 10µl

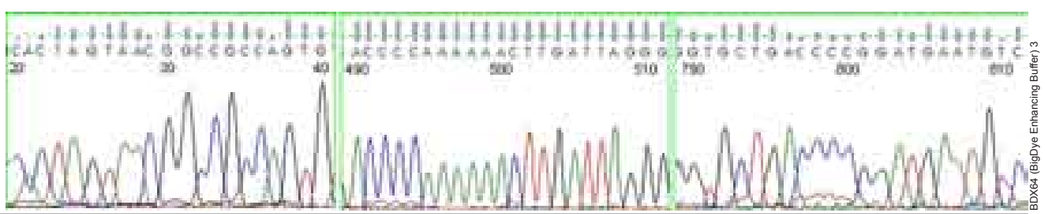
Sequencing Examples:
1. Dilution fold 32X:
1.5µl 5X dilution buffer + 0.750µl BDX64 buffer + 0.250µl BigDye® Terminator 3.1, total reaction volume 10µl



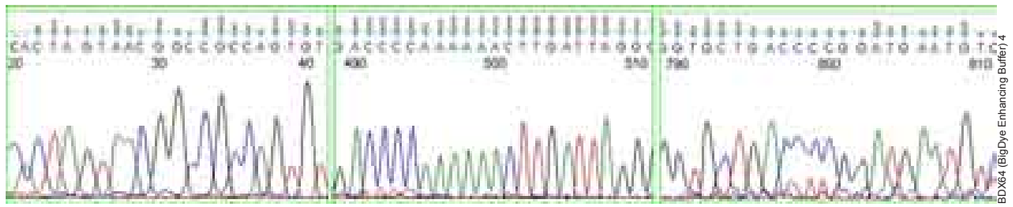
2. Dilution fold 64X:
1.5µl 5X dilution buffer + 0.875µl BDX64 buffer + 0.125µl BigDye® Terminator 3.1, total reaction volume 10µl



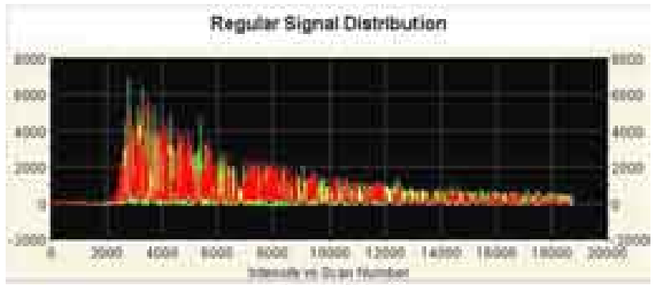
3. Dilution fold 128X:
1.5µl 5X dilution buffer + 0.937µl BDX64 buffer + 0.063µl BigDye® Terminator 3.1, total reaction volume 10µl

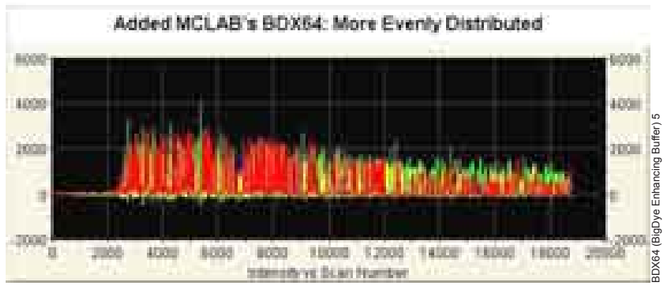


4. Dilution fold 256X:
1.5µl 5X dilution buffer + 0.969µl BDX64 buffer + 0.031µl BigDye® Terminator 3.1, total reaction volume 10µl



Signal Distributions: before and after BDX64 was added





Recommended Cycle Conditions:
96°C, 3 minutes. + 30x (96°C, 10 seconds. 50°C, 5 seconds. 60°C, 2 minutes.)

Recommended Storage Conditions: -20°C

Name	Cat #	Size
BDX64 Buffer	BDX-100	2 x1.25 ml

BigDye® Sequencing Clean Up Kit

Description:
BigDye® Sequencing Clean Up Kit is a magnetic bead-based high-throughput purification of DNA sequencing reaction kits. The kit consists of beads and elution buffer. Each component has been optimized for removing salts and unincorporated dye terminators from DNA sequencing reaction mixtures. The purified DNA products are more stable compared to products purified by using competitors' magnetic beads. The system can be easily adapted in your current system. You may use the same protocol as using CleanSeq® beads.

Recommended Storage Conditions: 4°C

Name	Cat #	Size
BigDye® Cleaning Beads	BCB-100	5 ml
BigDye® Cleaning Beads	BCB-200	50 mL
BigDye® Cleaning Beads	BCB-300	500 mL

BigDye® Terminator 5X Sequencing Buffer

Description:
The BigDye® Terminator 5X Sequencing Buffer reduces sequencing costs without affecting sequence accuracy or read length. Its buffer system enables to use less dye terminator mix.

Application:
DNA sequencing

Recommended Storage Conditions: 4°C

Recommended Protocol:
Prepare sequencing reactions (10µl rxn) according to the following:
- Add dye terminator mix 0.1-0.2µl
- Add 5X Sequencing Buffer 2µl
- Add template (100-500 ng/µl) 1 µl
- Add primer (3 pmol/µl) 1 µl
- Add H_2O to 10 µl

Cycle the reaction according to the following protocol:
30 seconds, 96°C => 15 seconds, 50°C => 4 minutes, 60°C => Cycle 25 times.

Notes:
Other cycle conditions may work well for individual users. These conditions work well for most samples processed in our labs using reduced volume and reduced terminator mix concentrations.

Name	Cat #	Size
BigDye® Terminator 5X Sequencing Buffer	SBUF-100	1 ml
BigDye® Terminator 5X Sequencing Buffer	SBUF-110	28 ml
BigDye® Terminator 5X Sequencing Buffer	SBUF-120	233 ml

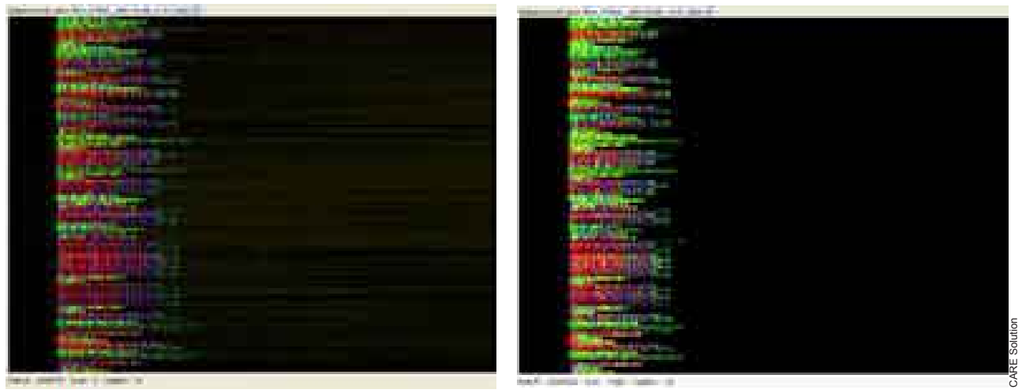
CARE Solution

Description:
MCLAB's CARE solution is designed for inline capillary regeneration. It has been tested on ABI's 310, 3100, 3130xl and 3730xl successfully. Besides capillary arrays, the CARE solution can also clean polymer contacted surfaces (e.g. Pump channels, Polymer block and tubings). The inline capillary regeneration protocol makes system cleaning easier than ever and the regenerated capillary has lower background noise, and longer sequencing reads.

Application:
- Capillary inline rejuvenation
- Pump channels, Polymer block and tubing cleaning
- Yellow haze background removal

Recommended Storage Conditions: 4°C.

Comparisons:
1. Before CARE applied (left) vs. After CARE applied (right)



Name	Cat #	Size
CARE Solution	CR-100	28 ml
CARE Solution	CR-500	5 x 28 ml

CE 10X Running Buffer (with EDTA)

Description:
MCLAB's CE 10X Running Buffer (with EDTA) has been tested by many labs. It is optimized for use with various ABI's Genetic Analyzers, including 310, 3100, 3130xl, 3730, 3730xl.

Application:
- The CE 10X Running Buffer is used with ABI's POP-4, ABI's POP-6, ABI's POP-7 and MCLAB's NanoPOP™ 4.
- DNA sequencing and DNA fragment analysis
- Optimized for use during capillary electrophoresis on all Applied Biosystems Genetic Analyzers, including 310, 3100, 3130xl, 3700, and 3730, 3730xl.

Recommended Storage Conditions:
Room Temperature

Name	Cat #	Size
CE 10X Running Buffer (with EDTA)	RBUF-100	100 ml
CE 10X Running Buffer (with EDTA)	RBUF-500	500 ml

DNA Size Standard

Description:
MCLAB's DNA Size Standard series products are internal lane standards that are intended to be used in assigning sizes to DNA fragments on fluorescence-detecting instruments. Common applications include genotyping and DNA Fragment Analysis. Each of these standards consists of 15 DNA fragments, ranging in 50, 75, 100, 139, 150, 160, 200, 250, 300, 340, 350, 400, 450, 490 and 500 bp. Each band is single-stranded and fluorescence-labeled either with carboxy-x-rhodamine (Rox dye) or MCLAB's proprietary fifth orange dye. Size fragments are evenly distributed and can be used for very accurate size calling.

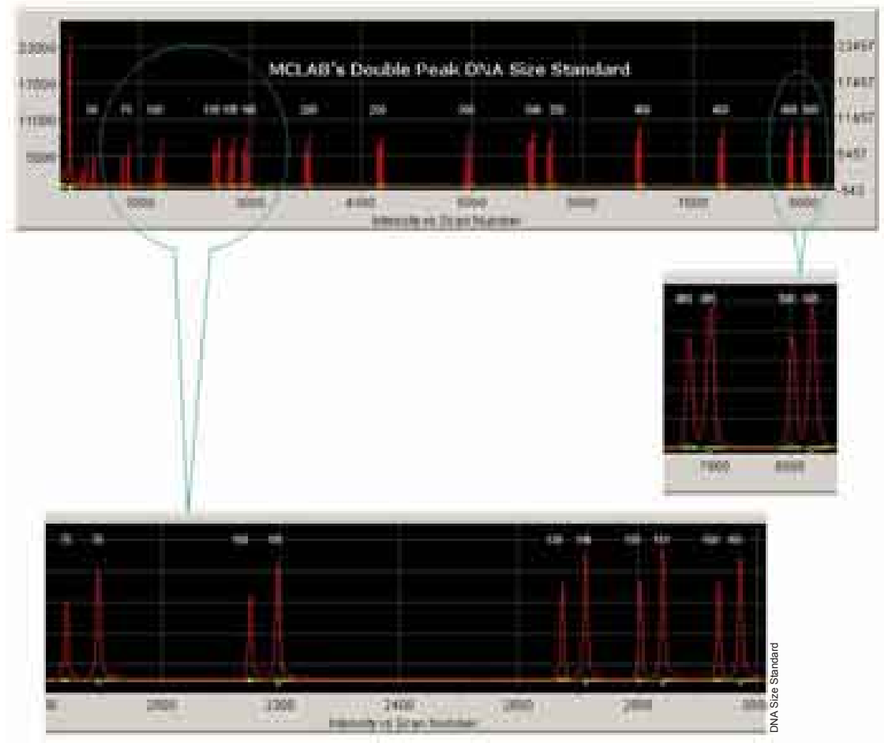
Red DNA Size Standard: has been adapted on DNA fragment analysis software, e.g. GeneMapper™ (ABI) and GeneScan™ (ABI) by using same parameters as ABI's GeneScan™ 500 ROX™ Size Standard.
Orange DNA Size Standard: can be used at the same setting as ABI's GeneScan 500 Liz Size Standard.
Double Peak DNA Size Standard: similar to Red/Orange DNA Size Standard, except every fragment is accompanied by an one-base-plus band. For example, 50 becomes 50 and 51, 75 become 75 and 76, etc. This single base separation is very useful for monitoring the performance of the installed capillary arrays.

Product Formats:
(1) Normal (DSMR-100, DSMO-100, DSMD-100)
(2) Premixed in Super-DI™ Formamide (DSMR-101, DSMO-101, DSMD-101)

Recommended Loading:
(1) Normal: 0.5µl per well
(2) Premixed in Super-DI™ Formamide: 15µl per well
The premixed size standard products are ready-to-use and can be aliquoted into the plate well directly.

Recommended Storage Conditions:
Stable at 4°C or -20°C for 6 months
Avoid repeatedly freeze-thawing

Examples:



Name	Cat #	Size
Red DNA Size Standard	DSMR-100	800 analyses (400µl)
Red DNA Size Standard	DSMR-101	800 analyses (8 x 1.5ml, premixed in Super-DI™)
Orange DNA Size Standard	DSMO-100	800 analyses (400µl)
Orange DNA Size Standard	DSMO-101	800 analyses (8 x 1.5ml, premixed in Super-DI™)
Double Peak DNA Size Standard	DSMD-100	800 analyses (400µl)
Double Peak DNA Size Standard	DSMD-101	800 analyses (8 x 1.5ml, premixed in Super-DI™)

Genotyping Reference Human Genomic DNA

Description:
These are standard human genomic DNA. They can be used in a variety of applications, for instance, genotyping and tissue culture stain identification.

Application:
DNA typing, DNA analysis, human identity testing and tissue culture strain identification

Recommended Storage Conditions: -20°C

Name	Cat #	Size
9947A Genomic DNA	HGD-9947A-100	250ng, 10ng/µl
9948 Genomic DNA	HGD-9948-100	250ng, 10ng/µl
K562 Genomic DNA	HGD-K562-100	250ng, 10ng/µl

Hairpin DNA & GC rich Sequencing Premix for BigDye® 3.1

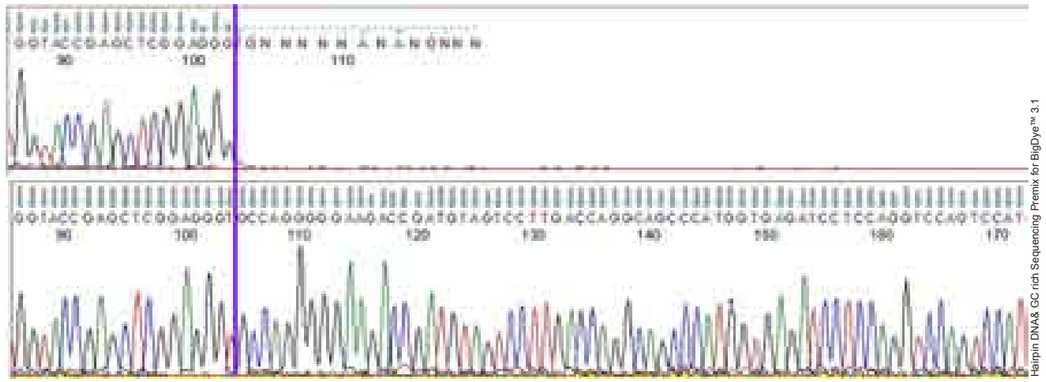
Description:
MCLAB's Hairpin DNA Sequencing Premix is designed to sequence difficult templates containing hairpin structures and high GC contents.

Cycle Condition:
- 1 cycle: 98°C for 3 minutes
- 25 cycles: 98°C for 10 seconds; 50°C for 5 seconds, and 60°C for 2 minutes

The example condition is following:
- Hairpin DNA Sequencing Premix 4µl
- DNA template 100ng
- Primer 3.2pmol
- Add ABI's BigDye® 0.125µl
- Add water to final 10µl

Recommended Storage Conditions: -20°C

Comparisons:
Regular sequencing chemistry vs. MCLAB's Hairpin DNA Sequencing Premix for ABI's BigDye® 3.1



Name	Cat #	Size
Hairpin Premix	BDP-100	1ml, 4µl/rnx

NanoPOP™ Polymers

Description:
NanoPOP™4, NanoPOP™6, and NanoPOP™7 are separation matrixes formulated from nanoparticles based on MCLAB's "Block Copolymer Technology" chemistry. The new matrixes have better coating and separating abilities. They are designed for ABI Genetic Analyzers with different applications. Customers can use their current run modules and protocols without any change. New spectral calibration is not needed.

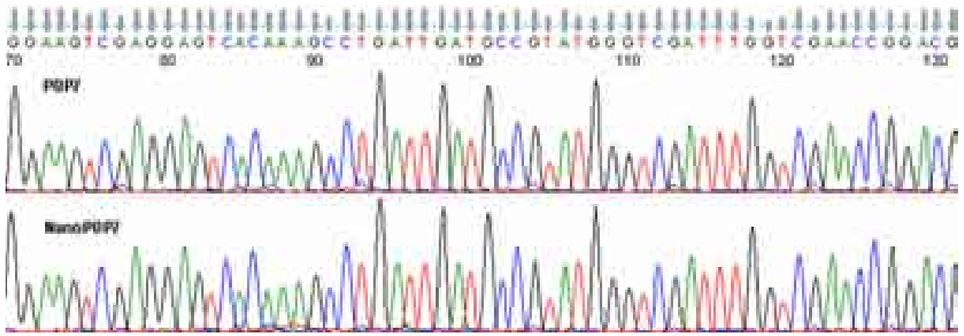
Application:
NanoPOP™4: denaturing DNA fragment analysis such as microsatellite and SNP genotyping
NanoPOP™6: standard and rapid DNA sequencing
NanoPOP™7: DNA sequencing and fragment analysis

Size 5ml, 10ml, for 310, 3100 Genetic Analyzer Accessories.

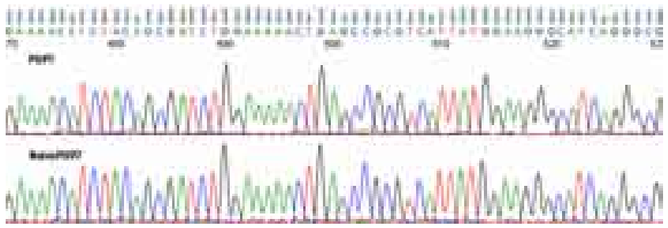
Size 5ml, for 3130/3130xl Genetic Analyzer Accessories.

Size 10ml, 28ml, for 3730/3730xl genetic analyzer accessories.

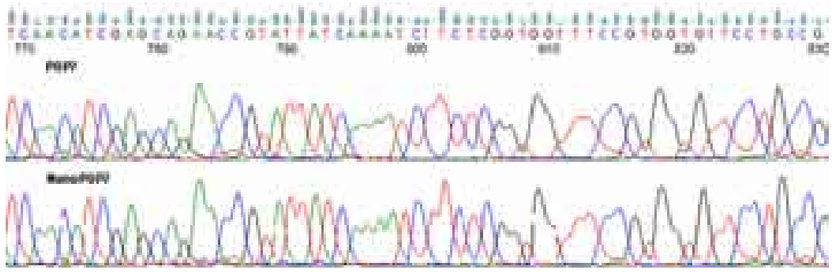
Comparisons:
1. NanoPOP™7 vs POP™7: near 100 bp



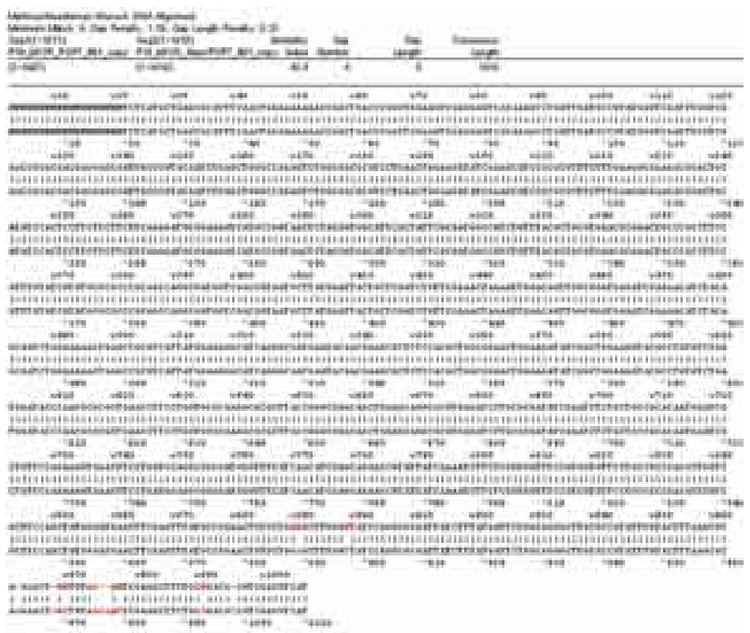
2. NanoPOP™7 vs POP™7: near 500 bp



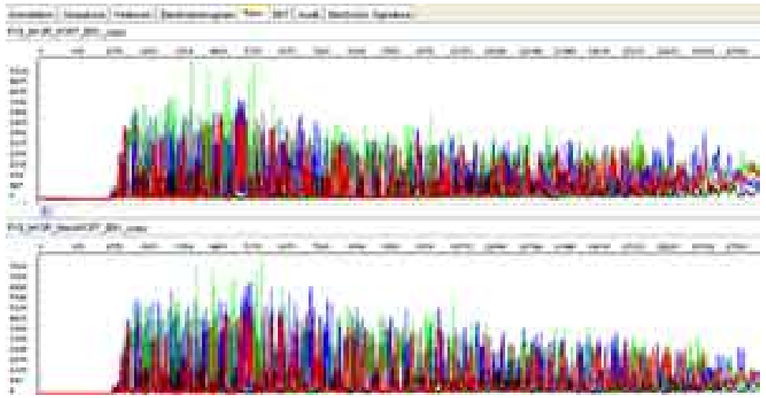
3. NanoPOP™7 vs POP™7: near 800 bp



4. Alignment



5. Raw Data



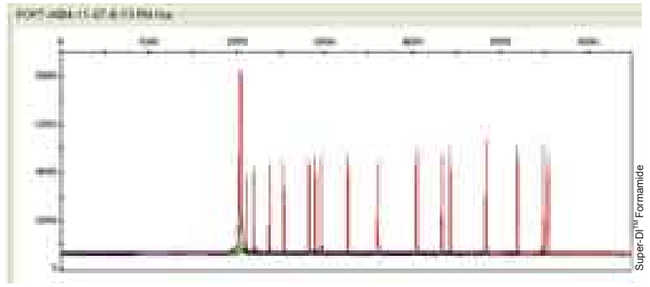
Name	Cat #	Size
NanoPOP™4	NP4-100	3130/3130xl Genetic Analyzers(ABI), 5ml
NanoPOP™4	NP4-101	3130/3130xl Genetic Analyzers(ABI), 10ml
NanoPOP™4	NP4-102	3130/3130xl Genetic Analyzers(ABI), 28ml
NanoPOP™4	NP4-120	310 Genetic Analyzers(ABI), 5ml
NanoPOP™4	NP4-121	310 Genetic Analyzers(ABI), 10ml
NanoPOP™4	NP4-122	310 Genetic Analyzers(ABI), 28ml
NanoPOP™6	NP6-100	3130/3130xl Genetic Analyzers(ABI), 5ml
NanoPOP™6	NP6-101	3130/3130xl Genetic Analyzers(ABI), 10ml
NanoPOP™6	NP6-120	310 Genetic Analyzers(ABI), 5ml
NanoPOP™6	NP6-121	310 Genetic Analyzers(ABI), 10ml
NanoPOP™7	NP7-100	3130/3130xl Genetic Analyzers(ABI), 5ml
NanoPOP™7	NP7-101	3130/3130xl Genetic Analyzers(ABI), 10ml
NanoPOP™7	NP7-300	3130/3130xl, 3730/3730xl Genetic Analyzers(ABI), 28ml
NanoPOP™7	NP7-301	3730/3730xl Genetic Analyzers(ABI), 10 x 28ml
NanoPOP™7	NP7-302	3730/3730xl Genetic Analyzers(ABI), 30 x 28ml

Super-DI™ Formamide

Description:
MCLAB's Super-DI™ Formamide is a newly developed loading solution used for DNA denaturation and electrokinetic injection on capillary electrophoresis systems. It is recommended to be used as sample loading solution for all ABI sequencers (3730, 3130, 3100, 310) to ensure sample preservation and resistance to evaporation.

Application:
Sample loading solution for all ABI sequencers to ensure sample preservation and resistance to evaporation

Example:
MCLAB's Super-DI™ Formamide as loading solution



Features:
Very Stable: remains high signal and excellent performance after storing at 4°C for 6 months.

Recommended Storage Conditions: 4°C.

Name	Cat #	Size
Super-DI™ Formamide	SDI-100	25 ml

310 Capillaries

Description:
310 Capillaries are bare fused silica capillary tubings, 47cm x 50µm (36 cm well-to-read) and 61cm x 50µm (50 cm well-to-read). They are designed and optimized for fragment analysis or sequencing applications on ABI 310 Genetic Analyzer. The capillaries have lower fluorescent background and are very reliable (>100 runs/capillary).

Name	Cat #	Size
310 Genetic Analysis Capillary, 47 cm	CAP-47	5
310 Genetic Analysis Capillary, 61 cm	CAP-61	2

96-well PCR plate with 8-strip Caps

Description:
The 96-well plate accompanied with flat 8-cap strip can be used to ship 96-well plate samples for DNA sequencing and other purposes.

The 96 well plates are a cost effective alternative for use in any Applied Biosystems regular or Real-time PCR thermal cycler. They have a very rigid, extra-stabilized frame, and an elevated skirt. Plates are suited for both automatic loading as well as robotic handling. To improve real-time PCR signal yields, all tubes in this 96-well plate are designed frosted.

The 8-cap strip is the choice of closure for Real-Time PCR, but can also be used in regular cycling experiments. It features an extremely clear flat glass-grade area that equals the performance properties of optical seals. Strip has frosted writing areas at terminal sides.


98-well PCR plate


8-strip caps

Name	Cat #	Size
96-well PCR plate with 8-strip Caps	96P8C-010	10 Sets, each has 10 96-well plates (96 x 0.2ml) and 120 8-cap strips for closure of the plates.

Exo-Resistant Random Primer

Description:
MCLAB´s Exo-Resistant Random Primer is a mixture of single-stranded random oligonucleotides. It can be used in many applications such as highly efficient random priming of various DNA synthesis reactions. The primer in this prodcut has two 3´-terminal phosphorothioate (PTO) modifications that are resistant to the 3´—> 5´ exonuclease activity of proofreading DNA polymerases [1], like Klenow Fragment and phi29 DNA Polymerase. It also has 5´- and 3´-hydroxyl ends. The product is supplied in a ready-to-use, 20x concentrated aqueous solution.

Application:
- Strand displacement amplification of genomic DNA [2], plasmids and phage DNA [3].
- DNA labeling by random primers [4-6].

Concentration:
500 µM (1.1 µg/µl)

Quality Control:
Functionally tested for the efficient priming of DNA synthesis using phi29 DNA Polymerase.

Reference:

1. Skerra, A., Phosphorothioate primers improve the amplification of DNA sequences by DNA polymerases with proofreading activity, Nucleic Acids Res., 20, 3551-3554, 1992.
2. Dean, F.B., et al., Comprehensive human genome amplification using multiple displacement amplification, Proc. Natl. Acad. Sci., 99, 5261-5266, 2002.
3. Dean, F.B., et al., Rapid amplification of plasmid and phage DNA using phi29 DNA polymerase and multiply-primed rolling circle amplification, Genome Res., 11, 1095-1099, 2001.
4. Feinberg, A.P. and Vogelstein, B., A technique for radiolabeling DNA restriction endonuclease fragments to high specific activity, Anal. Biochem., 132, 6-13, 1983.
5. Feinberg, A.P. and Vogelstein, B., A technique for radiolabeling DNA restriction endonuclease fragments to high specific activity, Addendum, Anal. Biochem., 137, 266-267, 1984.
6. Mackey, J., et al., Use of random primer extension for concurrent amplification and nonradioactive labeling of nucleic acids, Anal. Biochem., 212, 428-435, 1993.

Name	Cat #	Size
Exo-Resistant Random Primer	ERRP-100	100µl, 100 reactions, 500 µM (1.1 µg/µl)
Exo-Resistant Random Primer	ERRP-110	1,000µl , 1,000 reactions, 500 µM (1.1 µg/µl)
Exo-Resistant Random Primer	ERRP-120	10,000µl, 10,000 reactions, 500 µM (1.1 µg/µl)

Primers for Sequencing

If you are using MCLAB's DNA sequencering services, you do not need to purchase or submit any primers listed here in your orders. You only need to specify the primer names in your order form and MCLAB will take care of everything related to these primers.

#	Primer	Sequences (5' – 3')	Plasmid	Manufacturer
1	28 gIII	GTATGGGATTTTGCTAAACAAC	Ph.D. gIII	New England Biolabs
1a	-96 gIII	CCCTCATAGTTAGCGTAACG	Ph.D. gIII	New England Biolabs
2	Ac5 Forward	ACACAAAGCCGCTCCATCAG	pAc5.1/V5-His	Invitrogen
3	AD Reverse	AGATGGTGCACGATGCACAG	AD	
4	a-Factor	TACTATTGCCAGCATTGCTGC	Pichia (pMET)	Invitrogen
5	AOX1 Forward	GACTGGTTCCAATTGACAAGC	Pichia	Invitrogen
6	AOX1 Reverse	GCAAATGGCATTCTGACATCC	Pichia	Invitrogen
7	AS HSV Tag Primer	ATCCTCGGGGTCTTCCG	pIEx	Novagen
8	AS SoTag 18mer Primer	GTCCATGTGCTGGCGTTC	pIEx	Novagen
9	AUG1 Forward	CAATTTACATCTTTATTTATTAACG	Pichia	Invitrogen
10	AUG1 Reverse	GAAGAGAAAAACATTAGTTGGC	Pichia	Invitrogen
11	Bac Forward	TTTTACTGTTTTCGTAACAGTTTT	pBlueBac4.5	Invitrogen
12	Bac Reverse	CGGATTTCCTTGAAGAGAGTA	pBlueBacHis2	Invitrogen
13	Baculovirus (+15)Reverse	ACTTCAAGGAGAATTTCC	pMelBac	Invitrogen
14	BGH Reverse	TAGAAGGCACAGTCGAGG	Universal	
15	BK Reverse	ACAGGAAACAGCTATGACCTTG	BK virus	
16	BKRSV	CGCCATTTGACCATTCA	pBK-rsv	
17	Bluescript KS	TCGAGGTCGACGGTATC	pBluescript	Stratagene
18	Bluescript SK	CGCTCTAGAACTAGTGGATC	pBluescript	Stratagene
19	CBDcenA	TCAACGGCACCACCTGCA		Novagen
20	CBDcexlEAD	TAGGTGCAACTGTTGTTCTG		Novagen
21	CBDclos	CAACACCAGTTGTAAATCCA		Novagen
22	cI Forward	GGATAGCGGTCAGGTGTT	pHybcI/HK	Invitrogen
23	Cite primer	GGGGACGTGGTTTTCCTTTG	pCITE	Novagen
24	CMV Forward	CGCAAATGGGCGGTAGGCGTG	Universal	
25	CYC1 Reverse	GCGTGAATGTAAGCGTGAC	Cyc1	Invitrogen
26	DsbA	CGAGTATGCTGATACAGTGA	DsRed	Clontech
27	DsbC	GAATTTCTCGACGAACACCA	DsRed	Clontech
28	DsRed1-C	AGCTGGACATCACCTCCCACAACG	DsRed	Clontech
29	DsRed1-N	GTACTGGAACTGGGGGGACAG	DsRed	Clontech
30	DsRed-C	AAGAAGCCTGTGCAGCTACCAGG	DsRed	Clontech
31	DsRed-N	CGCCTTCTATTTCAAACTCGTGCC	DsRed	Clontech
32	EBV Reverse	GTGGTTTGTCCAAACTCATC	EBV	Invitrogen
33	EF-1a Forward	TCAAGCCTCAGACAGTGGTTC		
34	EGFP-C	CATGGTCCTGCTGGAGTTCGTG	EGFP	Clontech
35	EGFP-N	CGTCGCCGTCCAGCTCGACCAG	EGFP	Clontech
36	GAL1 Forward	AATATACCTCTATACTTTAACGTC	Gal1	Invitrogen
37	Glprimer 1	TGTATCTTATGGTACTGTAACTG		
38	Glprimer 2	CTTTATGTTTTTGGCGTCTTCCA		
39	gp64 promoter	CTACTAGTAAATCAGTCACACC		
40	gp64 Signal primer	GCGCTATTGTTTTATATGTGC		
41	IE1 promoter primer	TGGATATTGTTTCAGTTGCAAG	pIEx, pBIEx	Novagen
42	Lamdagt10For	CTTTTGAGCAAGTTCAGGCCTGGTTAAG	Lambda GT10	Promega

#	Primer	Sequences (5' – 3')	Plasmid	Manufacturer
43	Lamdagt10Rev	GAGGTGGCTTATGAGTATTTCTTCCAGG	Lambda GT10	Promega
44	Lamdagt11For	GGTGGCGACGACTCCTGGAGCCCG	Lambda GT11	Promega
45	Lamdagt11Rev	TTGACACCAGACCAACTGGTAATG	Lambda GT11	Promega
46	M13/pUCR Forward	CCCAGTCACGACGTTGTAAAACG	pUC	PGEM-T
PGEM-				
47	M13/pUCR Reverse	AGCGGATAACAATTTCACACAGGAA	pUC	PGEM-T
48	MT Forward	CATCTCAGTGCAACTAAA	pMT/V5-His	Invitrogen
49	myc-His Reverse	ATGACCGGTATGCATATTCAG		
50	OpIE2 Forward	CGCAACGATCTGGTAAACAC	pMIB/V5-His	Invitrogen
51	OpIE2 Reverse	GACAATACAAACTAAGATTTAGTCAG	pMIB/V5-His	Invitrogen
52	p10 Forward	GTATATTAATTAAAATACTATACTG	pTriEx-2 Hygro	Novagen
53	pBAD Forward	ATGCCATAGCATTTTTATCC	E. coli araBAD	Invitrogen
54	pBAD Reverse	GATTTAATCTGTATCAGG	E. coli araBAD	Invitrogen
55	pCDM8 Reverse	TAAGGTTCCTTCACAAAG	pCDM8	Invitrogen
56	pCEP Forward	AGAGCTCGTTTAGTGAACCG		
57	pCMV Forward	GATCCGGTACTAGAGGAACTGAAAAAC		
58	pDAB Forward	ATGCCATAGCATTTTTATCC		Invitrogen
59	pET Upstream Primer	ATGCGTCCGGCGTAGA (16)		
60	pETBlueDOWN Primer	GTTAAATTGCTAACGCAGTCA		
61	pETBlueUP Primer	TCACGACGTTGTAAAACGAC		
62	pFastBac Forward	GGATTATTCATACCGTCCCA	pFastBac	Invitrogen
63	pFastBac Reverse	CAAATGTGGTATGGCTGATT	pFastBac	Invitrogen
64	pGAP Forward	GTCCCTATTTCAATCAATTGAA	pGAPz	Invitrogen
65	pGENE Forward	CTGCTATTCTGCTCAACCT		
66	pGEX 3'	GAGCTGCATGTGTCAGAGG	Universal	
67	pGEX 5'	GGCAAGCCACGTTTGGTG	Universal	
68	pHook Forward	ACGGTGCATTGGAACGGAC	pHook-2, -3	Invitrogen
69	pHook Reverse	GATTGCGTCGCATCGACCC	pHook-2, -3	Invitrogen
70	pHybLex/Zeo Forward	AGGGCTGGCGGTTGGGGTTATTCGC	pHybLex/Zeo	Invitrogen
71	pHybLex/Zeo Reverse	GAGTCACTTTAAAATTTGTATACAC	pHybLex/Zeo	Invitrogen
72	PinPoint Sequencing primer	CGTGACGCGGTGGAGGGCG	PinPoint Xa-1, -2, -3, PinPoint Xa-1 T-vector	Promega
73	pJET1.2 Forward	CGACTCACTATAGGGAGAGCGGC		
74	pJET1.2 Reverse	AAGAACATCGATTTTCCATGGCAG		
75	pJG4-5 Forward	GATGCCTCCTACCCTTATGATGTGCC	pJG4-5	
76	pJG4-5 Reverse	GGAGACTTGACCAAACCTCTGGCG	pJG4-5	
77	Polyhedrin Forward	AAATGATAACCATCTCGC	pVL1393	Invitrogen
78	Polyhedrin Reverse	GTCCAAGTTTCCCTG (15)	pVL1393	Invitrogen
79	pQE-TriSystem Forward	GTTATTGTGCTGTCTCATC		
80	pQE-TriSystem Reverse	TCGATCTCAGTGGTATTTGTG		
81	pREP Forward	GCTCGATACAATAAAGCCC	pREP4	Invitrogen
82	pRset	CTAGTTATTGCTCAGCGGTGG	pRset	Invitrogen
83	pRH Forward	CTGTCTCTATACTCCCCTATAG	pRH	Invitrogen
84	pRH Reverse	CAAAATTCAATAGTTACTATCGC	pRH	Invitrogen
85	pRSET Reverse	TAGTTATTGCTCAGCGGTGG	pRSET	Invitrogen
86	pTarget Sequencing Primer	TTACGCCAAGTTATTTAGGTGACA	pTarget	Promega
87	pTrcHis Forward	GAGGTATATATTAATGTATCG	pTrcHis	Invitrogen
88	pTrcHis Reverse	GATTTAATCTGTATCAGG	pTrcHis	Invitrogen
89	pTRE 3'	CCACACCTCCCCCTGAAC	pTRE	BD Biosciences
90	pTRE 5'	CGCCTGGAGACGCCATCC	pTRE	
91	pTriplEx 3'	ACTCACTATAGGGCGAATTG	pTriplEx	Clontech
92	pTriplEx 5'	CTCGGGAAGCGCGCCATTGTGTTGGT	pTriplEx	Clontech

#	Primer	Sequences (5' – 3')	Plasmid	Manufacturer
93	pUni Forward	CTATCAACAGGTTGAACTG	pUni	Invitrogen
94	pUni Reverse	CAGTCGAGGCTGATAGCGAGCT	pUni	Invitrogen
95	pYESTrp Forward	GATGTTAACGATACCAGCC	pYESTrp	Invitrogen
96	pYESTrp Reverse	GCGTGAATGTAAGCGTGAC	pYESTrp	Invitrogen
97	QE Promoter	CCGAAAAGTGCCACCTG	pQE	Qiagen
98	QE Reverse	GTTCTGAGGTCATTACTGG	pQE	Qiagen
99	R-20mer Primer	CAGCTATGACCATGATTACG	pSTBlue-1	Novagen
100	RsaA Reverse	GCCGCGCCAGCGACGCGGAGGG	pCX	Invitrogen
101	RVprimer3	CTAGCAAAATAGGCTGTCCC	pGL / pCAT3	Promega
102	Rvprimer4	GACGATAGTCATGCCCCGCG	pGL / pCAT3	Promega
103	SeqL-A (ATTL1)	GCGAGAGTAGGGAACTGC	pENTR	Invitrogen
104	SeqL-B (ATTL2)	AACATCAGAGATTTTGAGACAC	pENTR	Invitrogen
105	STag 18mer Primer	GAACGCCAGCACATGGAC	pIEx-1	Novagen
106	STag Primer	CGAACGCCAGCACATGGACA	pIEx-1	Novagen
107	Sp6 Promoter	GATTTAGGTGACACTATAG	Universal	
108	SV40-pArev	CCTCTACAAATGTGGTATGG	pRL-SV40	
109	SV40-Promoter	GCCCCTAACTCCGCCCATCC	pRL-SV40	
110	T3 Promoter	ATTAACCCTCACTAAAGGGA	Universal	
111	T7 EEV	ATGTCGTAATAACCCCGCCCCG	pAlterMAX, pSI, pCI, pCI-Neo, pCMVTnT, pTnT, phMGFP Vector, HaloTag pHT2, psiCHECK-1, -2	Promega
112	T7 gene 10 Primer	TGAGGTTGTAGAAGTTCCG		
113	T7 Promoter	TAATACGACTCACTATAGGG	Universal	
114	T7 Reverse	TAGTTATTGCTCAGCGGTGG	Universal	
115	T7 Terminator	GCTAGTTATTGCTCAGCGG	Universal	
116	U6 Primer	GGGCAGGAAGAGGGCCTAT		
117	U-19mer Primer	GTTTTCCCAGTCACGACGT	M13mp18, pCITE	Novagen
118	M13 Forward (-20)	GTAAAACGACGGCCAG	Universal	
119	M13 Forward (-40)	GTTTTCCCAGTCACGAC	Universal	
120	M13 Reverse	CAGGAAACAGCTATGAC	Universal	
121	V5 Reverse Primer	ACCGAGGAGAGGGTTAGGGAT	V5 Epitope	Invitrogen
122	VP22 Forward	GGCCACGGCGACTCGA		
123	Xpress Forward	TATGGCTAGCATGACTGGT	Xpress Epitope	Invitrogen
124	VLH	TTGTGTGGAATTGTGAGCGG		

RNA-Seq Library Construction Kit

Description:
MCLAB's RNA-Seq Library Construction Kit is a highly efficient library construction kit for preparing single, paired-end or multiplexed cDNA libraries for high-throughput sequencing. This kit can be used to convert RNA transcripts into cDNA whole transcriptome libraries or small RNA libraries for next-generation sequencing analysis using Illumina® GAIIx™, HiSeq™ 2000 and MiSeq® sequencing platforms. With preserving the complexity of sequencing libraries, the protocol is quicker than the standard method and could be used routinely for RNA sequencing through the Illumina® platform.

Function:
The superior function of MCLAB's RNA-Seq Library Construction Kit depends on our proprietary enzyme systems. Unique improvement to each key enzyme at specific steps in the library construction workflow increases sensitivity, flexibility and speed for next-generation sequencing. The target RNA fragments can be tagged with linkers at both ends by RNA ligases (Cat# T4RL1-100 and T4RL2T-100). Corresponding cDNA can be synthesized by Universal Reverse Transcriptase (Cat# SSII-100). The cDNA library can be enriched by PCR with high fidelity Pfu DNA Polymerase (Cat# AD-100). After gel- or beads-based purification for size selection, final cDNA libraries can hybridize directly to the oligonucleotides on the flow cell surface for cluster generation and sequencing thereafter.

Features:
- Simplified workflow, reducing hands-on time
- Optimized reaction conditions, increasing sensitivity
- Straightforward protocol minimizing prior experience needed
- Strand-specific sequencing data
- Cost-effective with all key enzymes
- High flexibility: multiplex samples and automation friendly
- Functionally validated with Illumina® GAIIx™, HiSeq™ 2000 and MiSeq® sequencing platforms

Components:
Sufficient reagents are supplied in the MCLAB's RNA-Seq Library Construction Kit to prepare cDNA libraries from 8, 24, or 48 RNA samples for Illumina®-compatible next-generation sequencing.
Upon receipt of the kit, immediately store the components at -20°C.
CAT # NGRR-100, RNA-Seq Library Construction Kit (8 reactions):

Box 1:
Pre-Fragmentation Solution, 27µl
Fragmentation Enzyme, 36µl
Linker-A, 13.5µl
Linker-A Enzyme, 18µl
Link Addition Buffer, 18µl
Dimer Inhibitor, 13.5µl
Linker-B, 13.5µl
Linker-B Enzyme, 13.5µl

Box 2:
RT Primer, 22.5µl
RT Enzyme, 22.5µl
PCR Mixture, 225µl
Primer-1, 18µl
Primer-2, 18µl

For larger volume requirements, customization and bulk packaging, please feel free to contact MCLAB. Individual reagents are also available separately to increase flexibility of the kit.

Recommended Storage Conditions: -20°C.

Name	Cat #	Size
RNA-Seq Library Construction Kit	NGRR-100	8 reactions
RNA-Seq Library Construction Kit	NGRR-200	24 reactions
RNA-Seq Library Construction Kit	NGRR-300	48 reactions

Non-Amplification DNA Library Construction

Description:
MCLAB's Non-Amplification DNA Library Construction Kit is a highly efficient library construction kit for preparing paired-end or multiplexed DNA libraries for high-throughput sequencing. This kit can directly construct DNA libraries for next-generation sequencing analysis using Illumina® GAIIx™, HiSeq™ 2000 and MiSeq® sequencing platforms. Preserving the complexity of sequencing libraries, the protocol is quicker than the standard method and provides even coverage data with less duplicate reads and PCR bias for DNA sequencing.

Function:
The superior function of MCLAB's Non-Amplification DNA Library Construction Kit depends on our proprietary ligation system. Using a non-amplification method of library preparation with custom adapters, unamplified, ligated DNA samples can hybridize directly to the oligonucleotides on the flow cell surface. The cluster amplification step (rather than using PCR), enriches the flow cell for fully ligated template strands, reducing the incidence of duplicate sequences, improving read mapping and single nucleotide polymorphism calling. Paired end libraries are compatible with both paired and single-end flow cells.

Features:
- Simplified library preparation for even coverage data
- Multiplex barcode available
- Automation-friendly workflow
- Cost-effective solution

List of Components:
Sufficient reagents are supplied in the MCLAB Non-Amplification DNA Library Construction Kit to prepare DNA libraries for 20 or 100 samples for Illumina®-compatible next-generation sequencing.

Non-Amplification DNA Library Construction Kit (20 reactions):
End Repair EnzymeMix: 110µl
10x End Repair Buffer: 110µl
dA-Tailing Enzyme: 90µl
10x dA-Tailing Buffer: 90µl
DNA Adapter Mix: 25µl
DNA Ligation Enzyme Mix: 90µl
10x DNA Ligation Buffer: 90µl

Non-Amplification DNA Library Construction Kit (100 reactions):
End Repair EnzymeMix: 550µl
10x End Repair Buffer: 550µl
dA-Tailing Enzyme: 440µl
10x dA-Tailing Buffer: 440µl
DNA Adapter Mix: 125µl
DNA Ligation Enzyme Mix: 440µl
10x DNA Ligation Buffer: 440µl

Recommended Storage Conditions: -20°C.

Name	Cat #	Size
Non-Amplification DNA Library Construction	NGDC-100	20 reactions
Non-Amplification DNA Library Construction	NGDC-200	100 reactions

DNA dA-Tailing Kit

Description:
The MCLAB DNA dA-Tailing Kit is used to add an “A” base to the 3´ end of a blunt phosphorylated DNA fragment. This treatment creates compatible overhangs for next step of DNA sample preparation. The kit has been optimized to maximize efficiency and convenience in DNA sample preparation workflow for next-generation sequencing.

Function:
The superior function of MCLAB's DNA dA-Tailing Kit depends on our proprietary enzyme systems. Unique improvement to the key enzyme increases sensitivity, flexibility and speed of next-generation sequencing. Through MCLAB's DNA dA-Tailing Kit, a dAMP can be added to the 3´ end of end repaired blunt DNA fragment. This prepares the DNA fragment for efficient ligation to the adapters or cloning vectors with a single “T” base overhang at their 3’ end, and effectively prevents insert-to-insert ligation as well.

Features:
- Simplified workflow, reducing hands-on time
- Optimized reaction conditions, increasing sensitivity
- Up to 10µg end repaired blunt DNA
- Automation friendly format

Components:
Sufficient reagents are supplied in the MCLAB DNA dA-Tailing Kit to process 20 or 100 DNA samples.

DNA dA-Tailing Kit (20 reactions):
dA-Tailing Enzyme: 110µl
dA-Tailing Buffer: 110µl

DNA dA-Tailing Kit (100 reactions):
dA-Tailing Enzyme: 550µl
dA-Tailing Buffer: 550µl

Recommended Storage Conditions: -20°C.

Name	Cat #	Size
DNA dA-Tailing Kit	NGDT-100	20 reactions
DNA dA-Tailing Kit	NGDT-200	100 reactions

DNA Ligation Kit

Description:
The MCLAB DNA Ligation Kit is used to ligate DNA adapters to dA-Tailed DNA fragments. The kit has been optimized to maximize efficiency and convenience in DNA sample preparation workflow.

Function:
The superior function of MCLAB's DNA Ligation Kit depends on our proprietary enzyme systems. Unique improvement to each key enzyme increases sensitivity, flexibility and speed to next-generation sequencing. Through MCLAB's DNA Ligation Kit, DNA adapters with 5’dT overhang can be ligated efficiently to 3’ dA-Tailed DNA fragments.

Features:
- Simplified workflow, reducing hands-on time
- Optimized reaction conditions, increasing efficiency
- Automation friendly format

Components:
Sufficient reagents are supplied in MCLAB's DNA Ligation Kit to process 20 or 100 DNA samples.

DNA Ligation Kit (20 reactions):
Ligation EnzymeMix: 110µl
Ligation Buffer: 110µl

DNA Ligation Kit (100 reactions):
Ligation EnzymeMix: 550µl
Ligation Buffer: 550µl

Recommended Storage Conditions: -20°C.

Name	Cat #	Size
DNA Ligation Kit	NGDL-100	20 reactions
DNA Ligation Kit	NGDL-200	100 reactions

Fragmented DNA End Repair Kit

Description:
MCLAB's Fragmented DNA End Repair Kit is used for repairing fragmented DNA ends by sonication, nebulization or nucleases. The kit has been optimized to maximize efficiency and convenience in DNA sample preparation workflow for next-generation sequencing (including Illumina® Genomic DNA Sample Prep protocol, Roche 454™ Library Preparation and Life Technologies SOLiD™ Library Preparation).

Function:
The superior function of the Fragmented DNA End Repair Kit depends on MCLAB's proprietary enzyme systems. Unique improvement to each key enzyme increases sensitivity, flexibility and speed to next-generation sequencing. The DNA fragment is converted to the blunt-ended DNA with a 5´-phosphate. DNA repaired by MCLAB's Fragmented DNA End Repair Kit can be used directly for blunt end cloning or blunt-ended adaptor ligation, or be converted to DNA with 3´ dA-tail (MCLAB dA-Tailing kit, Cat #: NGDT-100) for subsequent ligation (MCLAB DNA Ligation kit, Cat #: NGDL-100).

Features:
- Simplified workflow, reducing hands-on time
- Optimized reaction conditions, increasing efficiency
- Up to 10µg fragmented DNA
- Automation friendly format

Components:
Sufficient reagents are supplied in the Fragmented DNA End Repair Kit to convert 20 or 100 fragmented DNA samples to 5´-phosphorylated, blunt ended DNA.

Fragmented DNA End Repair Kit (20 reactions):
End Repair Enzyme Mix: 110µl
End Repair Buffer: 110µl

Fragmented DNA End Repair Kit (100 reactions):
End Repair Enzyme Mix: 550µl
End Repair Buffer: 550µl

Recommended Storage Conditions: -20°C

Name	Cat #	Size
Fragmented DNA End Repair Kit	NGFD-100	20 reactions
Fragmented DNA End Repair Kit	NGFD-200	100 reactions

DNA Storage Buffer (Low Concentration)

Description:
Low concentration solutions of DNA are prone to DNA degradation or other loss. It is critical that optimal methods are employed for DNA suspension and long-term storage. MCLAB DNA Storage Buffer helps to preserve valuable DNA samples. It contains proprietary stabilizers and ingredients preserving high quality of DNA samples and preventing absorption of the target DNA to plastic tubes upon repeated freeze-thaw cycles. DNA Storage Buffer is suitable for small amounts of next generation sequencing (NGS) library long-term storage, which would decrease the cluster numbers over time. It is also appropriate for making highly dilute NGS libraries during quantification assay.
It is recommended to handle MCLAB DNA Storage Buffer with low adhesion/binding pipette tips and tubes for better performance.

Application:
- Library long-term storage
- Making highly dilute NGS libraries during quantification assay

Recommended Storage Conditions: 4°C

Name	Cat #	Size
DNA Storage Buffer	DSB-100	50 ml
DNA Storage Buffer	DSB-200	100 ml

Related Enzymes:

ATP Sulfurylase Yeast
See page 121.

Bst DNA Polymerase (large fragment)
See page 70.

Bst DNA Polymerase (regular)
See page 71.

Pfu DNA Polymerase
See page 74.

Taq DNA Polymerase (regular)
See page 75, 76.

Taq DNA Polymerase (Klenow Fragment)
See page 79.

Taq DNA Polymerase (truncated and exo-)
See page 80.

Poly(A) Polymerase, Yeast
See page 102.

Poly(A) Polymerase, E. coli
See page 101.

T4 DNA Ligase
See page 88.

T4 RNA Ligase 1 (ssRNA Ligase)
See page 89.

T4 RNA Ligase 2 (dsRNA Ligase)
See page 90.

T4 RNA Ligase 2 (truncated) (RNL2)
See page 91.

Universal Reverse Transcriptase
See page 99.

Thermostable Reverse Transcriptase
See page 100.

T4 Polynucleotide Kinase
See page 105.

Firefly luciferase (photinus pyralis)
See page 125.

RNase Inhibitor
See page 126.

DNA/RNA Modifying Enzymes & Other Proteins

Bst DNA Polymerase (large fragment)

Description:
A recombinant E. coli strain carrying the BST DNA Polymerase gene (large fragment).

Application:
- Sequencing through problematic secondary structures

Source:
Bst DNA Polymerase (large fragment) is the portion of the Bacillus stearothermophilus DNA Polymerase protein that contains the 5´–> 3´ polymerase activity, but lacks the 5'–>3' exonuclease domain.

Specific Activity: 120,000 U/mg

Supplied in:
10 mM Tris-HCL
50 mM KCl
1.0 mM Dithiothreitol
0.1 mM EDTA
0.1% Triton X-100
50% Glycerol
pH 7.5 @ 25°C

Supplied with:
10x PCR Buffer II

10x PCR Buffer ll:
200 mM Tris-HCL
100 mM Ammonium Sulfate
100 mM KCl
20 mM $MgSO_4$
1.0% Triton X-100
pH 8.8 @ 25°C

Unit Definition:
1 unit is defined as the amount of polymerase required to convert 10 nmol of dNTPs into acid insoluble material in 30 minutes at 65°C.

Recommended Storage Conditions: -20°C

Reference:
Kiefer, et al. Structure 15 January 1997. 5, 95-108.

Name	Cat #	Size
Bst DNA Polymerase (large fragment)	BPL-100	8,000 units, 8 U/µl
Bst DNA Polymerase (large fragment)	BPL-200	10,000 units, 100 U/µl
Bst DNA Polymerase (large fragment)	BPL-300	50,000 units, 100 U/µl
Bst DNA Polymerase (large fragment)	BPL-400	100,000 units, 100 U/µl
Bst DNA Polymerase (large fragment)	BPL-500	1,000,000 units, 100 U/µl

Bst DNA Polymerase (regular)

Description:
rBst DNA Polymerase is the product of the DNA poll gene of the thermophilic bacterium Bacillus stearothermophilus (Bst). As an enzyme, it contains the 5´–›3´ polymerase activity, but lacks the 5´–›3´ exonuclease domain. It also has optimal activity at 65°C and can be used to synthesize DNA in regions that containing template secondary structure or high GCs where other non-thermostable DNA polymerases may fail in sequencing. Therefore, rBst DNA Polymerase is useful in replicating difficult templates in various applications.

Application:
- Isothermal DNA amplification by the method of:
  · loop-mediated isothermal amplification (LAMP)
  · whole genome amplification (WGA)
  · ramification amplification (RAM)
- Random-primed DNA labeling
- Labeling by fill-in 5'-overhangs of dsDNA

Source:
An E. coli strain that contains the gene from Bacillus stearothermophilus.

Supplied in:
10 mM Tris-HCL
50 mM KCl
1.0 mM Dithiothreitol
0.1 mM EDTA
0.1% Triton X-100
50% Glycerol
pH 7.5 @ 25°C

Supplied with:
10x PCR Buffer II

10x PCR Buffer ll:
200 mM Tris-HCL
100 mM Ammonium Sulfate
100 mM KCl
20 mM $MgSO_4$
1.0% Triton X-100
pH 8.8 @ 25°C

Unit Definition:
1 unit is defined as the amount of polymerase required to convert 10 nmol of dNTPs into acid insoluble material in 30 minutes at 65°C.

Recommended Storage Conditions: -20°C

Reference:
Kiefer, et al. Structure 15 January 1997. 5, 95-108.

Name	Cat #	Size
Bst DNA Polymerase (regular)	BPR-200	8,000 units, 8 U/µl
Bst DNA Polymerase (regular)	BPR-205	20,000 units, 8 U/µl
Bst DNA Polymerase (regular)	BPR-210	50,000 units, 8 U/µl

DNA Polymerase, Thermotoga Neapolitana

Description:
Due to its thermo-stable nature, DNA polymerase (thermotoga neapolitana) was identified[1] as an enzyme able to withstand the protein-denaturing conditions (high temperature) required during PCR[2]. Similar to Escherichia coli DNA polymerase I, but unlike Taq DNA polymerase, Tne DNA polymerase contains both 3′—> 5′ and 5′—> 3′- exonulease activity. Therefore it replaced the DNA polymerase from E. coli originally used in PCR [3]. Taq's optimum temperature for activity is 75-80°C, with a half-life of 9 minutes at 97.5°C, and can replicate a 1000 bp strand of DNA in less than 10 seconds at 72°C[4].
The DNA products have an A (adenine) overhangs at their 3' ends. This may be useful in TA cloning, whereby a cloning vector (such as a plasmid) that has a T (thymine) 3'- overhang is used, which complements with the A overhang of the PCR product, thus enabling ligation of the PCR product into the plasmid vector.

Application:
- PCR (ordinary and high-throughput)
- Primer Extension
- Microarray Analysis
- Denaturing high performance liquid chromatography (DHPLC)

Source:
Thermotoga neapolitana (Tne) DNA polymerase belongs to the DNA polymerase I (Pol I) family.

Recommended Reaction Conditions:
94°C, 1 minute. -> (94°C, 10 seconds. -> 55°C, 30 seconds. ->72°C, 30 seconds.) for 25 cycles.

Recommended Storage Conditions: -20°C

Reference:
1. Chien A, Edgar DB, Trela JM (1976). "Deoxyribonucleic acid polymerase from the extreme thermophile Thermus aquaticus". J. Bact. 127 (3): 1550–7. PMC 232952. PMID 8432.
2.Saiki, RK; et al. (1988). "Primer-directed enzymatic amplification of DNA with a thermostable DNA polymerase.". Science 239 (4839): 487–91. doi:10.1126/science.2448875. PMID 2448875.
3. Saiki, RK; et al. (1985). "Enzymatic amplification of beta-globin genomic sequences and restriction site analysis for diagnosis of sickle cell anemia". Science 230 (4732): 1350–4. doi:10.1126/science.2999980. PMID 2999980.
4. Lawyer FC, et al. (1993). "High-level expression, purification, and enzymatic characterization of full-length Thermus aquaticus DNA polymerase ...". PCR Methods Appl. 2 (4): 275–87. PMID 8324500.

Name	Cat #	Size
DNA Polymerase, Thermotoga Neapolitana	DPTN-100	2,000 units, 5 U/µl
DNA Polymerase, Thermotoga Neapolitana	DPTN-200	4,000 units, 5 U/µl
DNA Polymerase, Thermotoga Neapolitana	DPTN-300	10,000 units, 5 U/µl

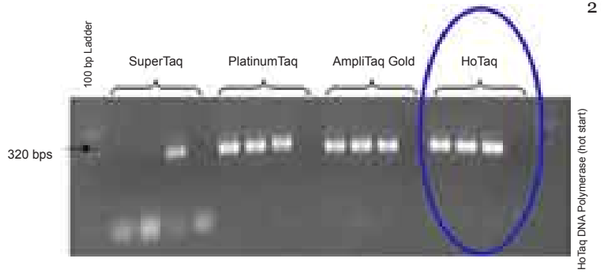
HoTaq DNA Polymerase (hot start)

Description:
HoTaq DNA Polymerase is hot-start Taq DNA Polymerase, which is a modified form of Taq DNA Polymerase. HoTaq DNA Polymerase is provided in an inactive state and has minimum enzymatic activity at ambient temperatures. This prevents the formation of misprimed products during reaction setup and the first denaturation step, leading to high PCR specificity. It is suitable for diagnostic reaction without the miner band. The enzyme is a highly processive 5'-> 3' DNA polymerase that lacks 3'-> 5' exonuclease activity. Each lot of HoTaq DNA polymerase is tested for PCR amplification. The product is a chemically modified form of the Taq enzyme. It will be inactive at room temperature, and become active after 10 minutes at 95°C.

Source:
An E. coli strain that carries the Taq DNA Polymerase gene from Thermus aquaticus (same as Taq DNA Polymerase).

Application:
- Amplification of DNA
- Sequencing ssDNA and dsDNA
- Site-directed mutagenesis

Comparison:
Here is the result of comparing MCLAB's HoTaq with some other leading brands.



Recommended Storage Conditions : -20°C

Recommended Reaction Conditions:
95°C, 10 minutes. -> (95°C, 10 seconds. -> 55°C, 30 seconds. ->72°C, 30 seconds.) for 25 cycles.

Unit Definition:
One unit is defined as the amount of enzyme that will incorporate 10 nmol of dNTP into acid-insoluble material in 30 minutes at 75°C.

Reference:
1. Chien A, Edgar DB, Trela JM (1976). "Deoxyribonucleic acid polymerase from the extreme thermophile Thermus aquaticus". J. Bact. 127 (3): 1550–7. PMC 232952. PMID 8432.
2. Saiki, RK; et al. (1988). "Primer-directed enzymatic amplification of DNA with a thermostable DNA polymerase.". Science 239 (4839): 487–91. doi:10.1126/science.2448875. PMID 2448875.
3. Saiki, RK; et al. (1985). "Enzymatic amplification of beta-globin genomic sequences and restriction site analysis for diagnosis of sickle cell anemia". Science 230 (4732): 1350–4. doi:10.1126/science.2999980. PMID 2999980.
3. Lawyer FC, et al. (1993). "High-level expression, purification, and enzymatic characterization of full-length Thermus aquaticus DNA polymerase ...". PCR Methods Appl. 2 (4): 275–87. PMID 8324500.

Name	Cat #	Size
HoTaq DNA Polymerase (hot start)	HT-200	1 x 500 units, 5 U/µl
HoTaq DNA Polymerase (hot start)	HT-205	5 x 500 units, 5 U/µl
HoTaq DNA Polymerase (hot start)	HT-210	10 x 500 units, 5 U/µl

Pfu DNA Polymerase

Description:
Pfu DNA Polymerase is a highly thermostable DNA polymerase from the hyperthermophilic archaeum Pyrococcus furiosus. The enzyme catalyzes the template-dependent polymerization of nucleotides into duplex DNA in the 5'–›3' direction. Pfu DNA Polymerase also exhibits 3'–›5' exonuclease (proofreading) activity, that enables the polymerase to correct nucleotide incorporation errors. It has no 5'–›3' exonuclease activity.
The main difference between Pfu and alternative enzymes is Pfu's superior thermostability and 'proofreading' properties compared to other thermostable polymerases. Unlike Taq DNA polymerase, Pfu DNA polymerase also possesses 3'- to 5'-exonuclease proofreading activity, resulting in PCR fragments with fewer errors than Taq-generated PCR inserts. Pfu DNA polymerase is efficient for techniques that require high-fidelity DNA synthesis, but can also be used in conjunction with Taq polymerase to obtain the fidelity of Pfu with the speed of Taq polymerase activity.

Application:
- High-fidelity PCR and primer-extension reactions
- Generation of PCR products for cloning and expression
- PCR cloning and blunt-end amplification product generation
- RT-PCR for cDNA cloning and expression
- Site-directed mutagenesis
- Blunt-end PCR cloning

Source:
Thermostable DNA polymerase from hyperthermophilic archaeon pyrococcus furiosus.

Unit Definition:
One unit is defined as the amount of enzyme required to catalyze the incorporation of 10 nmol of dNTPs into acid insoluble material in 30 minutes at 74°C under standard DNA polymerase assay conditions.

Storage Buffer:
20 mM Tris-HCL, pH 8.0, 100 mM KCl, 0.1 mM EDTA, 1 mM DTT, 50% Glycerol, 0.5% Tween 20, and 0.5% NP40.

Heat Inactivation:
95% active after 1-hour incubation at 98°C.

Recommended Reaction Conditions:
1X Pfu buffer, 200 µM each dNTP, 0.1-0.5µM each primer, 2.5 units Pfu DNA polymerase enzyme, 1-100ng plasmid template DNA, or 100-250ng genomic template DNA.

Recommended Storage Conditions: -20°C

Name	Cat #	Size
Pfu DNA Polymerase	AD-200	500 units, 2.5 U/µl
Pfu DNA Polymerase	AD-205	1,000 units, 2.5 U/µl
Pfu DNA Polymerase	AD-210	2,500 units, 2.5 U/µl

Taq DNA Polymerase (regular)

Description:
Taq DNA Polymerase (regular) is a thermally stable, processive, 5'—>3' DNA polymerase. The 94 kDa protein possesses an inherent 5'—>3' nick-translation moiety and lacks a 3'—>5' proofreading function. The DSC formulation contains a novel, nucleic-acid based hot-start additive designed to sequester the polymerase during reaction setup and during low-temperature cycling reaction phases.

Application:
- PCR (ordinary and high-throughput)
- Primer Extension
- Microarray Analysis
- Denaturing high performance liquid chromatography (DHPLC)

Source:
A recombinant E. coli strain carrying the Taq DNA polymerase gene from the thermophilic organism Thermus Aquaticus YT-1.

Supplied in:
20 mM Tris-HCL
100 mM NaCl
1.0 mM Dithiothreitol
0.1 mM EDTA
Stabilizer
50% Glycerol
pH 7.5 @ 25°C

Supplied with:
10x PCR Buffer I

10x PCR Buffer:
100 mM Tris-HCL
500 mM KCl
15 mM MgCl2
pH 8.3 @ 25°C

Unit Definition:
1 unit is defined as the amount of enzyme that will incorporate 10 nmol of dNTP into acid-insoluble material in 30 minutes at 75°C.

PCR Guidelines:
Taq DNA Polymerase is the original and most commonly used PCR enzyme. Taq excels at amplifying shorter (<5 kb) sequences from low-complexity template sources and produces robust yields with little or no optimization of reaction conditions. Consider the following guidelines when designing PCR strategies using Taq DSC 2.0 DNA Polymerase.

1. DNA Template: Although extensive purification of PCR templates is typically not necessary, care should be taken with crude or partially purified DNA sources as handling and chemical agents can adversely affect the PCR process. Exposure to short-wave UV light or other DNA damaging agents should be avoided, as should high ionic strength, detergents such as SDS, loading dyes and phenol. In order to prevent contamination from previous PCR reactions, consider setting up reactions in a positive-pressure hood and with aerosol barrier pipet tips. In a typical 25 cycle PCR, 104 copies of target sequence will yield reproducible amplification product. This corresponds to roughly 0.1-1 ng/ml (final concentration) of plasmid DNA, and 1-10 µg/ml of genomic DNA. The use of lower DNA concentrations typically produces less non-specific product, while higher concentrations can allow for fewer cycles and lower mutation rates.
2. Primer Design: Ideally, oligonucleotide primers are 15-30 bases in length, nearly 50% G+C, and have equal (+/-3°C) annealing temperatures. The use of software to detect self-complementary or hairpin-prone regions is advised and is offered as a service by some synthesis providers. Note that although the 5'-terminus of the primer may contain untemplated sequence, the 3' end must match perfectly. Typical oligonucleotide concentration in the reaction is 0.1-0.5µM.
3. Magnesium: Magnesium is a critical component of the PCR reaction though its concentration can be modulated to promote various effects. Generally, 1.5-2.0mM Mg^{2+} is targeted, but higher concentrations (up to 5mM) may be used to stimulate the yield of reactions at the expense of fidelity. The converse is also true - lower magnesium concentrations will promote higher- fidelity products with a lower overall amplification yield. Note that certain reaction components, in particular template DNA and oligonucleotides, may contribute chelating agents to the reaction which could lower the effective magnesium concentration and starve the reaction.
4. dNTPs: Generally, a final concentration of 100-200µM dNTPs is employed, though higher concentrations may stimulate yields (particularly with longer targets) and lower may offer increases in fidelity. Taq DSC 2.0 DNA Polymerase can also incorporate and read through deoxy Uridine and

Inosine, two analogs used in certain applications.
5. Taq DSC 2.0 Polymerase: 1 unit/50µL reaction (20 U/mL) is typical, though additional enzyme may be added to stimulate yields. Taq DSC 2.0 DNA Polymerase extends a DNA template at approximately 1-2000 nucleotides/minute, so it is recommended that 30-60 seconds of extension time be provided per kb, per cycle. Appropriate extension temperatures range from 68-72°C. Because Taq DSC 2.0 DNA Polymerase exploits the natural affinity of a DNA polymerase for a duplex DNA fragment to promote its hot-start function, it does not require an extensive initial denaturation step to activate the polymerase.

Typical 50µl Reaction:
On ice, prepare each of the following master mixes, combine, and place in heated (to 94°C) thermal cycler:

2x DNA/Oligonucleotide Master Mix:
1.0µl 10 mM dNTPs
1.0µl 10µM Forward Primer
1.0µl 10µM Reverse Primer
1.0µl 500 ng/µl genomic DNA
21µl Type I Water

2x Enzyme/Buffer Master Mix:
5.0µl 10x PCR Buffer I
0.2µl 5 U/µl Taq DSC 2.0 DNA Polymerase
19.8µl Type I Water

Recommended Storage Conditions: -20°C

Name	Cat #	Size
Taq DNA Polymerase (regular)	TR-200	2,000 units, 5,000 U/ml
Taq DNA Polymerase (regular)	TR-205	4,000 units, 5,000 U/ml
Taq DNA Polymerase (regular)	TR-210	10,000 units, 5,000 U/ml

Taq DNA Polymerase (exo+ and polymerase-)

Description:
Taq DNA Polymerase (exo+ and polymerase-) is a thermally stable, processive, 5'—>3' DNA polymerase. The 94 kDa protein possesses an inherent 5'—>3' nick-translation moiety and lacks a 3'—>5' proofreading function. The DSC formulation contains a novel, nucleic-acid based hot-start additive designed to sequester the polymerase during reaction setup and during low-temperature cycling reaction phases.

Application:
- PCR (ordinary and high-throughput)
- Primer Extension
- Microarray Analysis
- Denaturing high performance liquid chromatography (DHPLC)

Source:
A recombinant E. coli strain carrying the Taq DNA polymerase gene from the thermophilic organism Thermus Aquaticus YT-1.

Supplied in:
20 mM Tris-HCL
100 mM NaCl
1.0 mM Dithiothreitol
0.1 mM EDTA
Stabilizer
50% Glycerol
pH 7.5 @ 25°C

Supplied with:
10X PCR Buffer I

10x PCR Buffer:
100 mM Tris-HCL
500 mM KCl
15 mM $MgCl_2$
pH 8.3 @ 25°C

Unit Definition:
1 unit is defined as the amount of enzyme that will incorporate 10 nmol of dNTP into acid-insoluble material in 30 minutes at 75°C.

PCR Guidelines:
Same with Taq DNA Polymerase (regular) see page 73, 74.

Typical 50µl Reaction:
On ice, prepare each of the following master mixes, combine, and place in heated (to 94°C) thermal cycler:

2x DNA/Oligonucleotide Master Mix:
400µM dNTPs
0.4µM Primer
0.4µM Reverse Primer
20 ng/µl genomic DNA

2x Enzyme/Buffer Master Mix:
2x PCR Buffer I
0.04 U/µl Taq DSC 2.0 DNA Polymerase

Recommended Storage Conditions: -20°C

Name	Cat #	Size
Taq DNA Polymerase (exo+ and polymerase-)	TE-100	2,000 units, 5,000 U/ml
Taq DNA Polymerase (exo+ and polymerase-)	TE-200	4,000 units, 5,000 U/ml
Taq DNA Polymerase (exo+ and polymerase-)	TE-300	10,000 units, 5,000 U/ml

Taq DNA Polymerase (full length exo-)

Description:
Taq DNA Polymerase (full length exo-) is a thermally stable, processive, 5'—> 3' DNA polymerase. The 94 kDa protein possesses an inherent 5'—>3' nick-translation moiety and lacks a 3'—>5' proofreading function. The DSC formulation contains a novel, nucleic-acid based hot-start additive designed to sequester the polymerase during reaction setup and during low-temperature cycling reaction phases.

Application:
- PCR (ordinary and high-throughput)
- Primer Extension
- Microarray Analysis
- Denaturing high performance liquid chromatography (DHPLC)

Source:
A recombinant E. coli strain carrying the Taq DNA polymerase gene from the thermophilic organism Thermus Aquaticus YT-1.

Supplied in:
20 mM Tris-HCL
100 mM NaCl
1.0 mM Dithiothreitol
0.1 mM EDTA
Stabilizer
50% Glycerol
pH 7.5 @ 25°C

Supplied with:
10x PCR Buffer I

10x PCR Buffer:
100 mM Tris-HCL
500 mM KCl
15 mM $MgCl_2$
pH 8.3 @ 25°C

Unit Definition:
1 unit is defined as the amount of enzyme that will incorporate 10 nmol of dNTP into acid-insoluble material in 30 minutes at 75°C.

PCR Guidelines:
Same with Taq DNA Polymerase (regular) see page 73, 74.

Typical 50µl Reaction:
On ice, prepare each of the following master mixes, combine, and place in heated (to 94°C) thermal cycler:

2x DNA/Oligonucleotide Master Mix:
1.0µl 10 mM dNTPs
1.0µl 10µM Forward Primer
1.0µl 10µM Reverse Primer
1.0µl 500 ng/µl genomic DNA
21µl Type I Water

2x Enzyme/Buffer Master Mix:
5.0µl 10x PCR Buffer I
0.2µl 5 U/µl Taq DSC 2.0 DNA Polymerase
19.8µl Type I Water

Recommended Storage Conditions: -20°C

Name	Cat #	Size
Taq DNA Polymerase (full length exo-)	TF-100	2,000 units, 5,000 U/ml
Taq DNA Polymerase (full length exo-)	TF-200	4,000 units, 5,000 U/ml
Taq DNA Polymerase (full length exo-)	TF-300	10,000 units, 5,000 U/ml

Taq DNA Polymerase (Klenow Fragment)

Description:
Taq DNA Polymerase (Klenow Fragment) is a thermally stable, processive, 5'—>3' DNA polymerase. The 94 kDa protein possesses an inherent 5'—>3' nick-translation moiety and lacks a 3'—>5' proofreading function. The DSC formulation contains a novel, nucleic-acid based hot-start additive designed to sequester the polymerase during reaction setup and during low-temperature cycling reaction phases.

Application:
- PCR (ordinary and high-throughput)
- Primer Extension
- Microarray Analysis
- Denaturing high performance liquid chromatography (DHPLC)

Source:
A recombinant E. coli strain carrying the Taq DNA polymerase gene from the thermophilic organism Thermus Aquaticus YT-1.

Supplied in:
20 mM Tris-HCL
100 mM NaCl
1.0 mM Dithiothreitol
0.1 mM EDTA
Stabilizer
50% Glycerol
pH 7.5 @ 25°C

Supplied with:
10x PCR Buffer I

10x PCR Buffer:
100 mM Tris-HCL
500 mM KCl
15 mM MgCl2
pH 8.3 @ 25°C

Unit Definition:
1 unit is defined as the amount of enzyme that will incorporate 10 nmol of dNTP into acid-insoluble material in 30 minutes at 75°C.

PCR Guidelines:
Same with Taq DNA Polymerase (regular) see page 73, 74.

Typical 50 µl Reaction:
On ice, prepare each of the following master mixes, combine, and place in heated (to 94°C) thermal cycler:

2x DNA/Oligonucleotide Master Mix:
1.0 µl 10 mM dNTPs
1.0 µl 10 µM Forward Primer
1.0 µl 10 µM Reverse Primer
1.0 µl 500 ng/µl genomic DNA
21 µl Type I Water

2x Enzyme/Buffer Master Mix:
5.0 µl 10X PCR Buffer I
0.2 µl 5 U/µl DSC 2.0 TaqDNA Polymerase
19.8 µl Type I Water

Recommended Storage Conditions: -20°C

Name	Cat #	Size
Taq DNA Polymerase (Klenow Fragment)	TK-100	2,000 units, 5,000 U/ml
Taq DNA Polymerase (Klenow Fragment)	TK-200	4,000 units, 5,000 U/ml
Taq DNA Polymerase (Klenow Fragment)	TK-300	10,000 units, 5,000 U/ml

Taq DNA Polymerase (truncated and exo-)

Description:
Taq DNA Polymerase (truncated and exo-) is a thermally stable, processive, 5'—>3' DNA polymerase. The 94 kDa protein possesses an inherent 5'—>3' nick-translation moiety and lacks a 3'—>5' proofreading function. The DSC formulation contains a novel, nucleic-acid based hot-start additive designed to sequester the polymerase during reaction setup and during low-temperature cycling reaction phases.

Application:
- PCR (ordinary and high-throughput)
- Primer Extension
- Microarray Analysis
- Denaturing high performance liquid chromatography (DHPLC)

Source:
A recombinant E. coli strain carrying the Taq DNA polymerase gene from the thermophilic organism Thermus Aquaticus YT-1.

Supplied in:
20 mM Tris-HCL
100 mM NaCl
1.0 mM Dithiothreitol
0.1 mM EDTA
Stabilizer
50% Glycerol
pH 7.5 @ 25°C

Supplied with:
10x PCR Buffer I

10x PCR Buffer:
100 mM Tris-HCL
500 mM KCl
15 mM MgCl2
pH 8.3 @ 25°C

Unit Definition:
1 unit is defined as the amount of enzyme that will incorporate 10 nmol of dNTP into acid-insoluble material in 30 minutes at 75°C.

PCR Guidelines:
Same with Taq DNA Polymerase (regular) see page 73, 74.

Typical 50 µl Reaction:
On ice, prepare each of the following master mixes, combine, and place in heated (to 94°C) thermal cycler:

2x DNA/Oligonucleotide Master Mix:
1.0 µl 10 mM dNTPs
1.0 µl 10 µM Forward Primer
1.0 µl 10 µM Reverse Primer
1.0 µl 500 ng/µl genomic DNA
21 µl Type I Water

2x Enzyme/Buffer Master Mix:
5.0 µl 10x PCR Buffer I
0.2 µl 5 U/µl Taq DSC 2.0 DNA Polymerase
19.8 µl Type I Water

Recommended Storage Conditions: -20°C

Name	Cat #	Size
Taq DNA Polymerase (truncated and exo-)	TT-100	2,000 units, 5,000 U/ml
Taq DNA Polymerase (truncated and exo-)	TT-200	4,000 units, 5,000 U/ml
Taq DNA Polymerase (truncated and exo-)	TT-300	10,000 units, 5,000 U/ml

DNA Polymerase I

Description:
DNA Polymerase I is a mesophilic DNA polymerase that exhibits 5′–›3′ DNA synthesis activity in addition to both 3′–›5′ and 5′–›3′ exonuclease activities. The combination of DNA synthesis and 5′–›3′ nuclease characteristics enable nick-translation during DNA synthesis.

Application:
- Nick translation of DNA to obtain probes with a high specific activity
- Second strand synthesis of cDNA

Source:
A recombinant E. coli strain carrying the PolA gene.

Specific Activity: 6,850U/mg

Supplied in:
25 mM Tris-HCL
0.1 mM EDTA
1.0 mM Dithiothreitol
50% Glycerol
pH 7.4 @ 25°C

Supplied with:
10x Blue Buffer

10x Blue Buffer:
500 mM NaCl
100 mM Tris-HCL
100 mM MgCl2
10 mM DTT
pH 7.9 @ 25°C

Unit Definition:
1 unit is defined as the amount of polymerase required to convert 10 nmol of dNTPs into acid insoluble material in 30 minutes at 37°C.

Recommended Storage Conditions: -20°C

Name	Cat #	Size
DNA Polymerase I	DPI-100	5,000 units, 10,000 U/ml
DNA Polymerase I	DPI-200	10,000 units, 10,000 U/ml
DNA Polymerase I	DPI-300	50,000 units, 10,000 U/ml

Klenow DNA Polymerase

Description:
Klenow (3′–›5′ exo-) is a mesophilic DNA polymerase deficient in both proofreading (3′–›5′) and nick-translation (5′–›3′) nuclease activities, and that displays a moderate strand displacement activity during DNA synthesis. The protein is expressed as a truncated product of the E. coli PolA gene and contains the D355A and E357A mutations.

Specific Activity:
5,000U/mg

Application:
- Random priming labeling
- DNA sequencing by the Sanger dideoxy method
- Second strand cDNA synthesis
- Second strand synthesis in mutagenesis protocols

Supplied in:
20 mM Tris-HCL
1 mM Dithiothreitol
0.1 mM EDTA
50% Glycerol
pH 7.5 @ 25°C

Supplied with: 10x Blue Buffer

10x Blue Buffer :
500 mM NaCl
100 mM Tris-HCL
100 mM MgCl2
10 mM DTT
pH 7.9 @ 25°C

Unit Definition:
1 unit is defined as the amount of polymerase required to convert 10 nmol of dNTPs into acid insoluble material in 30 minutes at 37°C.

Recommended Storage Conditions: -20°C

Name	Cat #	Size
Klenow Fragment (3′–5′ exo–)	KPIM-100	10,000 units, 50,000 U/ml
Klenow Fragment (3′–5′ exo–)	KPIM-200	20,000 units, 50,000 U/ml
Klenow Fragment (3′–5′ exo–)	KPIM-300	50,000 units, 50,000 U/ml

Phi29 DNA Polymerase

Description:
Phi29 DNA Polymerase is responsible for the replication of the Bacillus Subtilis phage phi29[1]. The enzyme is a highly processive DNA polymerase (up to 70,000 base insertions per binding event) with a powerful strand displacement activity[2] and a 3′–›5′ proofreading exonuclease function[3].

Specific Activity: 83,333U/mg

Application:
- Catalyzes the removal of 5´-mononucleotides from duplex DNA
- Replication requiring a high degree of strand displacement and/or processive synthesis
- High fidelity replication at moderate temperatures

Source:
A recombinant E. coli strain carrying the Phi29 DNA Polymerase gene from bacteriophage phi29.

Supplied in:
10 mM Tris-HCL
100 mM KCl
0.1 mM EDTA
1 mM Dithiothreitol
0.5% Tween-20
0.5% NP-40
50% Glycerol
pH 7.4 @ 25°C

Supplied with:
1x phi29 DNA Polymerase Reaction Buffer

1x phi29 DNA Polymerase Buffer
500 mM Tris-HCL
100 mM $(NH_4)_2SO_4$
40 mM Dithiothreitol
100 mM $MgCl_2$
pH 7.5 @ 25°C

Unit Definition:
1 unit is defined as the amount of polymerase required to convert 0.5 pmol of dTTP into acid insoluble material in 10 minutes at 30°C.

Recommended Storage Conditions: -20°C

Reference:
1. Blanco, L. and Salas, M. (1984) Proc. Natl. Acad. Sci. USA, 81, 5325-5329.
2. Blanco, L. et al. (1989) J. Biol. Chem., 264, 8935-8940.
3. Garmendia, C. et al. (1992) J. Biol. Chem., 267, 2594-2599.

Name	Cat #	Size
Phi29 DNA Polymerase	PP-100	2,000 units, 10,000 U/ml
Phi29 DNA Polymerase	PP-200	5,000 units, 10,000 U/ml
Phi29 DNA Polymerase	PP-300	10,000 units, 10,000 U/ml
Phi29 DNA Polymerase	PP-400	25,000 units, 10,000 U/ml

T4 DNA Polymerase

Description:
T4 DNA Polymerase catalyzes the extension of a primed DNA template in the 5′–›3′ direction. This enzyme exhibits a powerful 3′–›5′ exonuclease activity, while lacking any inherent 5′–›3′ exonuclease or strand displacement functions.

Specific Activity: 5,555U/mg

Application:
- 3´-overhang removal to form blunt ends
- 5´-overhang fill-in to form blunt ends
- Single strand deletion for sub-cloning
- Second strand synthesis in site-directed mutagenesis
- Probe labeling using replacement synthesis

Source:
Purified from a strain of E. coli that expresses the recombinant T4 DNA Polymerase gene.

Supplied in:
100 mM KPO4
1.0 mM Dithiothreitol
0.1 mM EDTA
50% Glycerol
pH 6.5 @ 25°C

Supplied With: 10x Blue Buffer

10x Blue Buffer:
500 mM NaCl
100 mM Tris-HCL
100 mM MgCl2
10 mM DTT
pH 7.9 @ 25°C

Unit Definition:
One unit is defined as the amount of enzyme that will incorporate 10 nmol of dNTP into acid-precipitable material in 30 minutes at 37°C.

Recommended Storage Conditions: -20°C

Reference:
1. Tabor, S. and Struhl, K. (1989) In DNA-Dependent DNA Polymerases. F. M. Ausebel, R. Brent, R. E. Kingston, D. D. Moore, J. G. Seidman, J. A. Smith and K. Struhl (Eds.), Current Protocols in Molecular Biology, pp. 3.5.10-3.5.12. 2. Sambrook, J., Fritsch, E.F. and Maniatis, T. (1989) Molecular Cloning: A Laboratory Manual, (2nd Ed.), 5.44-5.47.
2. Dale, R., McClure, B. and Houchins, J. (1985) Plasmid, 13, 31-40.
3. Kunkel, T.A., Roberts, J.D. and Zakour, R.A. (1987) R. Wu and L. Grossman (Eds.), Methods Enzymol., 154, pp. 367-382. San Diego: Academic Press.
4. Panet, A., van de Sande, J.H., Loewen, P.C. and Khorana, H.G. (1973) Biochemistry, 12, 5045-5050.

Name	Cat #	Size
T4 DNA Polymerase	T4DP-100	3,000 units, 3,000 U/ml
T4 DNA Polymerase	T4DP-200	6,000 units, 3,000 U/ml
T4 DNA Polymerase	T4DP-300	12,000 units, 3,000 U/ml

T7 DNA Polymerase

Description:
T7 DNA Polymerase is the mesophilic, highly processive, and replicative DNA polymerase from bacteriophage T7. It is responsible for the rapid and accurate replication of the virus genome during its infection cycle. T7 DNA Polymerase is a two subunit protein that consists of a polymerase domain (gene 5 from the T7 bacteriophage) and a processivity factor (E. coli trxA gene thioredoxin) [1, 2]. The enzyme possesses a powerful (3'–›5') nuclease activity that acts on both single and double stranded DNA and appears to be responsible for the high fidelity of this enzyme and prevents strand displacement synthesis[3,4,5].

Specific Activity: 10,000U/mg

Application:
Second strand synthesis in site-directed mutagenesis protocols

Source:
A recombinant E. coli strain carrying the bacteriophage T7 gene 5.

Unit Definition:
1 unit is defined as the amount of polymerase required to convert 10 nmol of total dNTPs into acid insoluble material in 30 minutes at 37°C.

Supplied in:
50 mM KPO4
0.1 mM EDTA
1.0 mM Dithiothreitol
50% Glycerol
pH 7.0 @ 25°C

Supplied with:
10x T7 DNA Polymerase Buffer

10x T7 DNA Polymerase Buffer:
400 mM Tris-HCL
200 mM MgCl2
500 mM NaCl
pH 7.5 @ 25°C

Recommended Storage Conditions: -20°C

Reference:
1. Grippo, P. et al. (1971) J. Biol. Chem. 246, 6867-6873.
2. Modrich, P. et al. (1975) J. Biol. Chem. 250, 5515-5522.
3. Adler, S. et al. (1979) J. Biol. Chem. 254, 11605-11614
4. Hori, K., et al. (1979) J. Biol. Chem. 254, 11598-11604.
5. Lechner, R. L. et al. (1983) J. Biol. Chem. 258, 11185-11196.

Name	Cat #	Size
T7 DNA Polymerase	T7DP-100	5,000 units, 10,000 U/ml
T7 DNA Polymerase	T7DP-200	10,000 units, 10,000 U/ml
T7 DNA Polymerase	T7DP-300	25,000 units, 10,000 U/ml

E. coli DNA ligase

Description:
E. coli DNA Ligase is an NAD^+-dependent enzyme that catalyzes the formation of phosphodiester bonds between complementary 3´-hydroxyl and 5´-phosphoryl termini of dsDNA. The enzyme works best with cohesive dsDNA ends and is also active on nicked DNA. Blunt ends can be ligated in the presence of condensing reagents such as polyethylene glycol or Ficoll®. A 10x Reaction Buffer is provided with the enzyme.

Source:
E. coli strain containing an overproducing clone of E. coli DNA Ligase.

Specific Activity: 6000 U/mg

Application:
- Ligation for cloning
- Okayama and Berg cDNA cloning

Unit Definition:
One unit of E. coli DNA Ligase is defined as the amount of enzyme required to provide ligation (>50%) of Hind III digested phage lambda DNA (5´-DNA termini concentration of 0.12 µM, 300 µg/ml) in 30 minutes at 16°C under standard assay conditions.

Reaction Conditions:
1x E. coli DNA Ligase Reaction Buffer
Incubate at 16°C

10x E. coli DNA Ligase Reaction Buffer:
30 mM Tris-HCL
4 mM MgCl2
26 µM NAD
1 mM Dithiothreitol
50 µg/ml BSA
pH 8.0 @ 25°C

Recommended Storage Conditions: -20°C

Reference:
1. Zimmerman, S. B. and Pheifer, B. H. (1983) Proc. Natl. Acad. Sci., USA 80, 5852-5856.
2. Okayama, H. and Berg, P. (1982) Mol. Cell. Biol. 2, 161-170.

Name	Cat #	Size
E. coli DNA ligase	EDLA-100	2,500 units, 10,000 U/ml
E. coli DNA ligase	EDLA-200	5,000 units, 10,000 U/ml
E. coli DNA ligase	EDLA-300	10,000 units, 10,000 U/ml

T3 DNA Ligase

Description:
T3 DNA Ligase joins blunt end and cohesive end termini as well as repairs single-stranded nicks in duplex DNA. In the absence of 20-30% PEG 6000, T3 DNA Ligase displays a very low efficiency for blunt-ended ligation[1]. T3 DNA Ligase displays a higher efficiency for joining A/T overhangs than C/G matched ends[1]. T3 DNA Ligase retains 95% of its activity in 1.0 M NaCl or KCl, with an optimal concentration of 300 mM[1].

Application:
Catalyzes the formation of a phosphodiester bond between a 5′ -phosphate and a 3′ -hydroxyl termini in duplex DNA.

Source:
A recombinant E. coli strain carrying the T3 DNA Ligase gene.

Specific Activity: 3,000,000 U/mg

Supplied in:
20 mM Tris-HCL
300 mM NaCl
1 mM Dithiothreitol
0.1 mM EDTA
50% Glycerol
pH 7.5 @ 25°C

Supplied with:
2x Rapid Ligation Buffer

2x Rapid Ligation Buffer:
132 mM Tris-HCI
20 mM MgCl2
2 mM Dithiothreitol
2 mM ATP
15% PEG 8000
pH 7.6

Unit Definition:
1 unit is defined as the amount of T3 DNA Ligase required to ligate 50% of 100 ng DNA fragments with cohesive termini in 30 minutes at 23°C.

Recommended Storage Conditions: -20°C

Reference:
1. Cai, Liang, et al. (2004) J. Biochem. 135, 397-403

Name	Cat #	Size
T3 DNA Ligase	T3DL-100	900,000 units, 2 mg/ml
T3 DNA Ligase	T3DL-200	2,000,000 units, 2 mg/ml
T3 DNA Ligase	T3DL-300	10,000,000 units, 2 mg/ml

T4 DNA Ligase

Description:
T4 DNA Ligase catalyzes the formation of a phosphodiester bond between the terminal 5′ -phosphate and 3′ -hydroxyl groups of duplex DNA or RNA. The enzyme efficiently joins blunt and cohesive ends and repairs single-stranded nicks in duplex DNA, RNA or DNA/RNA hybrids[1].

Application:
- Cloning of restriction fragments
- Joining linkers and adapters to blunt-ended DNA

Source:
A recombinant E. coli strain carrying the cloned T4 DNA Ligase gene.

Specific Activity: 300,000 U/mg

Supplied In:
10 mM Tris-HCL
50 mM NaCl
1 mM Dithiothreitol
0.1 mM EDTA
50% Glycerol
pH 7.5 @ 25°C

Supplied With:
10x T4 DNA Ligase Buffer
10x T4 DNA Ligase Buffer
500mM Tris-HCI
100 mM MgCl2
50 mM Dithiothreitol
10 mM ATP
pH 7.6 @ 25°C

Unit Definition:
One unit of the enzyme catalyzes the conversion of 1 nmol of [32PP] into Norit-adsorbable form in 20 min at 37°C (Weiss unit). One Weiss unit is equivalent to approximately 200 cohesive-enc ligation units.
One cohesive-end ligation unit is defined as the amount of enzyme required to give 50% ligation of Hind lll fragments of lambda DNA in 30 minutes at 16°C in 20µl of the assay mixture: 50 mM Tris-HCL(pH 7.5), 10 mM MgCl2, 10 mM DTT, 1 mM ATP, 25µg/ml BSA and 0.12µM (300µg/ml) 5'-DNA termini.

Recommended Storage Conditions: -20°C

Reference:
1. Engler, M.J. and Richardson, C.C. (1982) P.D. Boyer (Eds.), The Enzymes, 5, pp. 3. San Diego: Academic Press.

Name	Cat #	Size
T4 DNA Ligase	TL-100	20,000 units, 400 cohesive end units/µl
T4 DNA Ligase	TL-200	20,000 units, 2,000 cohesive end units/µl
T4 DNA Ligase	TL-300	100,000 units, 400 cohesive end units/µl
T4 DNA Ligase	TL-400	100,000 units, 2,000 cohesive end units/µl

T4 RNA Ligase 1 (ssRNA Ligase)

Description:
T4 RNA Ligase 1 catalyzes the ligation of a 5' -phosphoryl-terminated nucleic acid donor to a 3' -hydroxyl-terminated nucleic acid acceptor through the formation of a 3'–›5' phosphodiester bond, with hydrolysis of ATP to AMP and PPi. Substrates include single-stranded RNA and DNA as well as dinucleoside pyrophosphates.

Application:
- Labeling of 3'-termini of RNA with 5'-[32P] pCp
- Inter- and intramolecular joining of RNA and DNA molecules
- Synthesis of single-stranded oligodeoxyribo-nucleotides
- Incorporation of unnatural amino acids into proteins
- Ligation of ss-RNA and DNA

Source:
An E. coli strain that carries the T4 RNA Ligase 1 gene.

Specific Activity: 16,800U/mg

Supplied With:
ATP (10 mM)
PEG 8000 (50 %)
T4 RNA Ligase Reaction Buffer (1x)

1x T4 RNA Ligase Reaction Buffer:
50 mM Tris-HCL
10 mM MgCl2
1 mM Dithiothreitol
pH 7.5 @ 25°C

Heat Inactivation:
65°C for 15 minutes
Heat inactivation by boiling for 2 minutes.

Reaction Conditions:
1x T4 RNA Ligase Reaction Buffer
Supplemented with 1 mM ATP
Incubate at 37°C.

Unit Definition:
One unit is defined as the amount of enzyme required to convert 1 nmol of 5´-[32P]rA16 into a phosphatase-resistant form in 30 minutes at 37°C.

Unit Assay Conditions:
1x T4 RNA Ligase reaction buffer, supplemented with 1 mM ATP, is mixed with the RNA substrate (10µM of 5´-[32P]rA16) and varying amounts of enzyme. Incubation is at 37°C for 15 minutes.

Concentration:
10,000 units/ml

Storage Conditions:
10 mM Tris-HCL
50 mM KCl
1 mM Dithiothreitol
0.1 mM EDTA
50% Glycerol
pH 7.5 @ 25°C

Recommended Storage Conditions: -20°C

Name	Cat #	Size
T4 RNA Ligase 1 (ssRNA Ligase)	T4RL1-100	10,000 units, 20,000 U/ml
T4 RNA Ligase 1 (ssRNA Ligase)	T4RL1-200	20,000 units, 20,000 U/ml
T4 RNA Ligase 1 (ssRNA Ligase)	T4RL1-300	50,000 units, 20,000 U/ml

T4 RNA Ligase 2 (dsRNA Ligase)

Description:
T4 RNA Ligase 2, also known as T4 Rnl2 (gp24.1), has both intermolecular and intramolecular RNA strand joining activity. Unlike T4 RNA Ligase 1, T4 RNA Ligase 2 is much more active on joining nicks on double stranded RNA than on joining the ends of single-stranded RNA. The enzyme requires an adjacent 5´-phosphate and 3´-OH for ligation. The enzyme can also ligate the 3´-OH of RNA to the 5´-phosphate of DNA in a double stranded structure.

Source:
An E. coli strain that carries the T4 RNA Ligase 2 gene (I. Schildkraut).

Specific Activity: 40,000U/mg

Application:
- Ligates a nick in dsRNA
- Ligates the 3´-OH of RNA to the 5´-phosphate of DNA in a double stranded structure

Reagents Supplied:
T4 Rnl2 Reaction Buffer

Reaction Conditions:
1x T4 Rnl2 Reaction Buffer
Incubate at 37°C.

10x T4 RNA Ligase 2 Reaction Buffer:
500 mM Tris-HCL
20 mM $MgCl_2$
10 mM DTT
4 mM ATP
pH 7.5 @ 25°C

Unit Definition:
One unit is defined as the amount of enzyme required to ligate 0.4 µg of an equimolar mix of a 23-mer and 17-mer RNAs in a total reaction volume of 20 µl in 30 minutes at 37°C.

Unit Assay Conditions:
1x T4 Rnl2 Reaction Buffer and 0.4 µg of an equimolar mix of the 23-mer and 17-mer RNAs. After incubation at 37°C for 30 minutes, the ligated product is detected on a 15% polyacrylamide gel.

Storage Conditions:
10 mM Tris-HCL
50 mM KCl
35 mM (NH4)2SO4
0.1 mM DTT
0.1 mM EDTA
50% Glycerol
pH 7.5 @ 25°C

Recommended Storage Conditions: -20°C

Name	Cat #	Size
T4 RNA Ligase 2 (dsRNA Ligase)	T4RL2-100	500 units, 10,000 U/ml
T4 RNA Ligase 2 (dsRNA Ligase)	T4RL2-200	1,000 units, 10,000 U/ml
T4 RNA Ligase 2 (dsRNA Ligase)	T4RL2-300	4,000 units, 10,000 U/ml

T4 RNA Ligase 2 (truncated) (RNL2)

Description:
MCLAB's truncated T4 RNA Ligase 2 was developed specifically for demanding Next-Generation RNA Sequencing applications. The truncated ligase 2 specifically ligates the adenylated 5´-end of an adapter to the 3´-end of RNA. The enzyme does not require ATP for ligation but does need an adenylated substrate. By not having extra ATP in the reaction, the amount of ligation between random RNA molecules is dramatically reduced. Unlike the full length T4 RNA ligase 2, the truncated ligase does not ligate the phosphorylated 5´-end of RNA or DNA without the adenylated substrate, making it an excellent choice for small RNA library preparation. Whether your plan to sequence miRNAs or to perform directional mRNA-Seq, the truncated ligase 2 will help to enhance your library preparations.

Features:
- Developed for Next-Generation RNA Sequencing applications
- Efficiency of ligation at nearly 100%
- Increase ability to identify miRNAs

Source:
Purified from an E. coli strain carrying T4 RNA Ligase 2 truncated (1-249) overproducing plasmid.

Specific Activity: 20,000 U/mg

Heat Inactivation: 65°C for 20 minutes

Reaction Conditions:
1x T4 RNA Ligase Reaction Buffer
Incubate at 25°C.

1x T4 RNA Ligase Reaction Buffer:
50 mM Tris-HCL
10 mM MgCl2
1 mM Dithiothreitol
pH 7.5 @ 25°C

Storage Conditions:
10 mM Tris-HCL(pH 7.5)
100 mM NaCl
0.1 mM EDTA
0.1 mM DTT and 50% Glycerol

Unit Definition:
One unit is defined as the amount of the enzyme required to give 50% ligation of a 17-mer adenylated oligonucleotide to a purified control RNA template in 30 minutes at 37°C.

Recommended Storage Conditions: -20°C

Quality Control:
Enzyme preparations are routinely assessed for relative purity, activity and absence of RNase and DNase

Reference:
1. Jayaprakash, A. D., Jabado O., Brown, B. D. and Sachidanandam, R. (Sept 2, 2011), Nuc Acid Res, 1–12.
2. Ho, C.K. et al. (2004) Structure, 12, 327-339.
3. Ho, C.K. and Shuman, S. (2002) Proc. Natl.Acad.Sci. USA, 99, 12709-12714.

Name	Cat #	Size
T4 RNA Ligase 2 (truncated)	T4RL2T-100	100,000 U, 200 U/ul
T4 RNA Ligase 2 (truncated)	T4RL2T-200	200,000 U, 200 U/ul
T4 RNA Ligase 2 (truncated)	T4RL2T-300	1,000 KU, 200 U/ul

T7 DNA Ligase

Description:
T7 DNA Ligase catalyzes the formation of a phosphodiester bond between a 5′ -phosphate and a 3′ -hydroxyl termini in duplex DNA. The enzyme will join blunt ends and cohesive ends termini as well as repair single-stranded nicks in duplex DNA.

Application:
- Joining of Okazaki fragments during replication
- Completing short-patch DNA synthesis occurring in DNA repair process

Source:
A recombinant E. coli strain carrying the T7 DNA Ligase gene.

Specific Activity: 3,000,000 U/mg

Supplied in:
20 mM Tris-HCL
300 mM NaCl
1 mM Dithiothreitol
0.1 mM EDTA
50% Glycerol
pH 7.5 @ 25°C

10x Rapid Ligation Buffer:
600 mM Tris-HCL
100 mM $MgCl_2$
10 mM Dithiothreitol
10 mM ATP
75% PEG 6000
pH 7.6 @ 25°C

Unit Definition:
1 unit is defined as the amount of T7 DNA Ligase required to ligate 50% of 100 ng DNA fragments with cohesive termini in 30 minutes at 23°C.

Recommended Storage Conditions: -20°C

Reference:
Doherty, A. et al. J.Biol. Chem (1996) V.271, No.19, 11083-11089.

Name	Cat #	Size
T7 DNA Ligase	T7DL-100	900,000 units, 3,000,000 U/ml
T7 DNA Ligase	T7DL-200	1,800,000 units, 3,000,000 U/ml
T7 DNA Ligase	T7DL-300	9,000,000 units, 3,000,000 U/ml

Taq DNA Ligase

Description:
Taq DNA Ligase catalyzes the formation of a phosphodiester bond in duplex DNA containing adjacent 5'-phosphoryl and 3'-hydroxyl termini, using NAD^+ as a cofactor.

Application:
- Allele-specific gene detection using Ligase Detection Reaction and Ligase Chain Reaction
- Mutagenesis by incorporation of a phosphorylated oligonucleotide during primer extension amplification

Source:
A recombinant E. coli strain carrying the cloned Taq DNA Ligase gene.

Specific Activity: 400,000 U/mg

Supplied in:
10 mM Tris-HCL
50 mM KCl
1 mM Dithiothreitol
0.1 mM EDTA
0.1% TWEEN 20
50% Glycerol
pH 7.5 @ 25°C

Supplied with:
10x Taq DNA Ligase Buffer

10x Taq DNA Ligase Buffer:
200 mM Tris-HCI
250 mM Potassium Acetate
100 mM Magnesium Acetate
5 mM NAD^+
0.1% Triton X-100
pH 7.6 @ 25°C

Unit Definition:
1 unit is defined as the amount of Taq DNA Ligase required to join 50% of 1 µg of the 12-base cohesive ends of Lambda DNA cut with Hind III in 50 µl 1x Taq DNA Ligase Buffer following a 10 minute incubation at 45°C.

Recommended Storage Conditions: -20°C

Name	Cat #	Size
Taq DNA Ligase	TDL-100	20,000 units, 40,000 U/ml
Taq DNA Ligase	TDL-200	40,000 units, 40,000 U/ml
Taq DNA Ligase	TDL-300	250,000 units, 40,000 U/ml

E. coli SSB

Description:
Single-Stranded DNA Binding Protein (SSB) preferentially binds single-stranded DNA, forming a tetramer of four identical 18.9 kDa subunits which protects 8-16 nucleotides, while not binding well to double-stranded DNA. In nature, SSB participates in DNA replication, recombination, and repair functions. In vitro, SSB has been found to stimulate certain DNA polymerase-mediated reactions by relaxing DNA secondary structure and enhancing enzyme processivity.

Application:
- effective in fluorescence polarization assays
- eliminates pausing when sequencing through strong secondary structures
- helps obtain longer read lengths in pyrosequencing for SNP analysis

Source:
A recombinant E. coli strain carrying the E. coli SSB gene.

Supplied in:
50 mM Tris-HCL
200 mM NaCl
1.0 mM Dithiothreitol
0.1 mM EDTA
50% Glycerol
pH 7.5 @ 25°C

Recommended Storage Conditions: -20°C

Name	Cat #	Size
E. coli SSB	ESSB-100	1.0 mg, 5.0 mg/ml
E. coli SSB	ESSB-200	2.0 mg, 5.0 mg/ml
E. coli SSB	ESSB-300	5.0 mg, 5.0 mg/ml

Extreme Thermostable SSB (ET SSB)

Description:
Extreme Thermostable SSB is a single-stranded DNA binding protein isolated from a hyperthermophilic microorganism. It remains fully active after incubation at 95°C for up to 60 minutes. Due to its ability to withstand extremely high temperature environments, ET SSB can be used in applications that require extremely high temperature conditions, such as nucleic acid amplification and sequencing.

Source:
Purified from an E. coli strain that overexpresses the SSB gene isolated from a hyperthermophilic microorganism.

Application:
- Improves the yield of multiplex PCR and multiplex HAD
- Increases the yield and processivity of RT during RT-PCR[1,2]
- Increases the yield and specificity of PCR reactions[3-7]
- Improves the processivity of DNA polymerase[8]
- Stabilization and marking of ssDNA structure [9]
- Improves DNA sequencing through regions with strong secondary structure[6]
- Enhances the RecA activity for ssDNA binding and strand transfer [10,11]

Unit Definition:
Sold by mass of pure protein as determined by OD_{280}.

Recommended Storage Conditions: -20°C

Reference:
1. Baugh, L. R., Hill, A. A., Brown, E. L. & Hunter, C. P. (2001) Nucleic Acids Res 29, E29.
2. Villalva, C., Touriol, C., Seurat, P., Trempat, P., Delsol, G. & Brousset, P. (2001) Biotechniques 31, 81-3, 86.
3. Schwarz, K., Hansen-Hagge, T. & Bartram, C. (1990) Nucleic Acids Res 18, 1079.
4. Chou, Q. (1992) Nucleic Acids Res 20, 4371.
5. Oshima, R. G. (1992) Biotechniques 13, 188.
6. Rapley, R. (1994) Mol Biotechnol 2, 295-8.
7. Olszewski, M., Rebala, K., Szczerkowska, Z. & Kur, J. (2005) Mol Cell Probes 19, 203-5.
8. Myers, T. W. & Romano, L. J. (1988) J Biol Chem 263, 17006-15.
9. Delius, H., Mantell, N. J. & Alberts, B. (1972) J Mol Biol 67, 341-50.
10. Reddy, M. S., Vaze, M. B., Madhusudan, K. & Muniyappa, K. (2000) Biochemistry 39, 14250-62.
11. West, S. C., Cassuto, E. & Howard-Flanders, P. (1982) Mol Gen Genet 186, 333-8.

Name	Cat #	Size
Extreme Thermostable SSB	ETSSB-100	50µg, 500µg/ml
Extreme Thermostable SSB	ETSSB-200	100µg, 500µg/ml
Extreme Thermostable SSB	ETSSB-300	500µg, 500µg/ml

RecA Protein, E. coli

Description:
RecA Protein (E. coli) is necessary for genetic recombination, reactions involving DNA repair and UV-induced mutagenesis. RecA promotes the autodigestion of the LexA repressor, umuD protein and lambda repressor. Cleavage of LexA derepresses more than 20 genes[1]. In vitro studies indicate that in the presence of ATP, RecA promotes the strand exchange of single-strand DNA fragments with homologous duplex DNA. The reaction has three distinct steps: (i) RecA polymerizes on the single-strand DNA, (ii) the nucleoprotein filament binds the duplex DNA and searches for a homologous region, (iii) the strands are exchanged[2].

Source:
An E. coli strain ER2502 that carries an overexpressed RecA gene from E. coli.

Application:
- Visualization of DNA structures with electron microscopy[3]
- D-loop mutagenesis[4]
- Screening libraries using RecA-coated probes[5,6]
- Cleavage of DNA at any single predetermined site [7,8,9]
- RecA mediated affinity capture for full length cDNA cloning[10, 11]

Supplied in:
10 mM Tris-HCL
1 mM Dithiothreitol
0.1 mM EDTA
50% Glycerol
pH 7.5 @ 25°C

Supplied with:
10x RecA Reaction Buffer

10x RecA Reaction Buffer:
700 mM Tris-HCL
100 mM MgCl2
50 mM DTT
pH 7.6 @ 25°C

Unit Definition:
Sold by mass of pure protein determined at OD_{280} (A_{280} = 0.516 at 1 mg/mL, 1cm).

Recommended Storage Conditions: -20°C

Reference:
1. West, S.C. (1992) Ann. Rev. Biochem., 61, 603-640.
2. Zhumabayeva, B. et al. (1990) Biotechniques, 27, 834-845.
3. Zhumabayeva, B. et al. (2001) Biotechniques, 30, 512-520.
4. Radding, C.M. (1991) J. Biol. Chem., 266, 5355-5358.
5. Wasserman, S.A. and Cozzarelli, N.R. (1985) Proc. Natl. Acad. Sci. USA, 82, 1079-1083.
6. Shortle, D. et al. (1980) Proc. Natl. Acad. Sci. USA, 77, 5375-5379.
7. Honigberg, S.M. et al. (1986) Proc. Natl. Acad. Sci. USA, 83, 9586-9590.
8. Rigas, B. et al. (1986) Proc. Natl. Acad. Sci. USA, 83, 9591-9595.
9. Ferrin, L.J. and Camerini-Otero, R.D. (1991) Science, 254, 1494-1497.
10. Koob, M. et al. (1992) Nucl. Acids Res., 20, 5831-5836.
11. Koob, M. (1992) R. Wu (Eds.), Methods in Enzymology, 216, pp. 321-329. San Diego: Academic Press.

Name	Cat #	Size
RecA Protein, E. coli	RPEC-100	1,000 µg, 1 mg/ml
RecA Protein, E. coli	RPEC-200	3.0 mg, 1 mg/ml
RecA Protein, E. coli	RPEC-300	10 mg, 1 mg/ml

RecA Protein, Tth

Description:
RecA Protein (Tth) is a RecA homolog isolated from Thermus thermophilus. It has a ssDNA-dependent ATPase activity at an optimal temperature between 65 to 75°C.
The extreme thermostability makes Tth RecA ideal for molecular biology applications that require an elevated temperature condition, such as nucleic acid amplification and sequencing.

Source:
Purified from an E. coli strain carrying a plasmid that overexpresses the recA gene from Thermus thermophilus.

Application:
- Visualization of DNA structures for electron microscopy [1]
- Site-directed mutagenesis through D-loop [2,3]
- Screening of DNA libraries using RecA-probe filaments [4,5]
- Targeted cleavage of DNA [6]
- Improvement of PCR specificity and yield [7]

Storage Buffer:
10 mM Tris-HCL
100 mM KCl
0.1 mM EDTA
1 mM DTT
0.1% Triton X-100
50% Glycerol
pH7.5 @ 25°C

Unit Definition:
Sold by mass of pure protein as determined by OD_{280}.

Recommended Storage Conditions: -20°C

Reference:
1. Radding, C. M. (1991) J Biol Chem 266, 5355-8.
2. Wasserman, S. A. & Cozzarelli, N. R. (1985) Proc Natl Acad Sci U S A 82, 1079-83.
3. Biet, E., Maurisse, R., Dutreix, M. & Sun, J. (2001) Biochemistry 40, 1779-86.
4. Shortle, D., Koshland, D., Weinstock, G. M. & Botstein, D. (1980) Proc Natl Acad Sci U S A 77, 5375-9.
5. Rigas, B., Welcher, A. A., Ward, D. C. & Weissman, S. M. (1986) Proc Natl Acad Sci U S A 83, 9591-5.
6. Honigberg, S. M., Rao, B. J. & Radding, C. M. (1986) Proc Natl Acad Sci U S A 83, 9586-90.
7. Koob, M., Burkiewicz, A., Kur, J. & Szybalski, W. (1992) Nucleic Acids Res 20, 5831-6.

Name	Cat #	Size
RecA protein, Tth	RPTT-100	1 mg, 1mg/ml
RecA protein, Tth	RPTT-200	2 mg, 1mg/ml
RecA protein, Tth	RPTT-300	10 mg, 1mg/ml

DnaK (HSP70) E. coli Recombinant
See page 151.

GroEL
See page 152.

GroES
See page 153.

PDI1 (yeast)
See page 154.

Universal Reverse Transcriptase

Description:
Universal Reverse Transcriptase is a mutation that reduces RNase H activity, and increases thermal stability. It can be used to synthesize first strand cDNA at higher temperatures than the wild type M-MuLV. Universal Reverse Transcriptase is active at 42°C for higher cDNA yields. This enzyme can be used for regular reverse transcriptase, Real-time PCR and RNA sequence, etc.

Source:
The gene encoding a mutant M-MuLV Reverse Transcriptase (RNase H–) is expressed in E. coli and purified to near homogeneity.

Unit Definition:
One unit is defined as the amount of enzyme that will incorporate 1 nmol of dTTP into acid-insoluble material in a total reaction volume of 50 µl in 10 minutes at 37°C using poly(rA)•oligo(dT)18 as template.

Unit Reaction Conditions:
50 mM Tris-HCL(pH 8.3), 75 mM KCl, 6 mM MgCl2, 10 mM Dithiothreitol, 0.01% IGEPAL CA-630, 0.5 mM dTTP, 0.4 mM poly(rA)•oligo(dT)18.

Storage Conditions:
20 mM Tris-HCL
100 mM NaCl
1 mM Dithiothreitol
0.1 mM EDTA
50% Glycerol
0.01% IGEPAL® CA-630
pH 7.5 @ 25°C

Recommended Storage Conditions: -20°C

Name	Cat #	Size
Universal Reverse Transcriptase	SSII-100	5,000U
Universal Reverse Transcriptase	SSII-200	10,000U
Universal Reverse Transcriptase	SSII-300	50,000U

Thermostable Reverse Transcriptase

Description:
Thermostable Reverse Transcriptase is a mutation that reduces RNase H activity, and increases thermal stability. It can be used to synthesize first strand cDNA at higher temperatures than the wild type M-MuLV. Thermostable Reverse Transcriptase is active at 50°C for difficult RNA transcription and higher cDNA yields.

Source:
The gene encoding a mutant M-MuLV Reverse Transcriptase (RNase H–) is expressed in E. coli and purified to near homogeneity.

Unit Definition:
One unit is defined as the amount of enzyme that will incorporate 1 nmol of dTTP into acid-insoluble material in a total reaction volume of 50 µl in 10 minutes at 37°C using poly(rA)•oligo(dT)18 as template.

Unit Reaction Conditions:
50 mM Tris-HCL(pH 8.3), 75 mM KCl, 6 mM MgCl2, 10 mM Dithiothreitol, 0.01% IGEPAL CA-630, 0.5 mM dTTP, 0.4 mM poly(rA)•oligo(dT)18.

Storage Conditions:
20 mM Tris-HCL
100 mM NaCl
1 mM Dithiothreitol
0.1 mM EDTA
50% Glycerol
0.01% IGEPAL® CA-630
pH 7.5 @ 25°C

Recommended Storage Conditions: -20°C

Name	Cat #	Size
Thermostable Reverse Transcriptase	SSIII-100	5,000U
Thermostable Reverse Transcriptase	SSIII-200	10,000U
Thermostable Reverse Transcriptase	SSIII-300	50,000U

Poly(A) Polymerase, E. coli

Description:
Poly(A) Polymerase catalyzes the addition of AMP from ATP to the 3' -hydroxyl of RNA. The reaction requires Mg^{2+} and is template independent.

Application:
- Labeling of RNA with ATP or cordycepin
- Poly(A) tailing of RNA for cloning or affinity purification
- Enhances translation of RNA transferred into eukaryotic cells

Source:
The gene encoding E. coli Poly(A) Polymerase expressed from a plasmid in E. coli.

Supplied in:
25 mM Tris-HCL
500 mM NaCl
1 mM MgCl2
0.1 mM Dithiothreitol
0.1 mM EDTA
50% Glycerol
pH 8.0 @ 25°C

Supplied with:
10x Poly(A) Polymerase Reaction Buffer
10 mM ATP Solution

10x Poly(A) Polymerase Reaction Buffer:
500 mM Tris-HCL
2.5 mM NaCl
100 mM MgCl2
pH 7.9 @ 25°C

Unit Definition:
1 unit is defined as the amount of enzyme that will incorporate 1 nmol of ATP into acid-insoluble material in 10 minutes at 37°C.

Recommended Storage Conditions: -20°C

Name	Cat #	Size
Poly (A) Polymerase, E. coli	PAP-10	1,000 units, 5,000 U/ml
Poly (A) Polymerase, E. coli	PAP-25	2,000 units, 5,000 U/ml
Poly (A) Polymerase, E. coli	PAP-50	5,000 units, 5,000 U/ml

Poly(A) Polymerase, Yeast

Description:
Poly(A) Polymerase catalyzes the template independent of the addition of AMP from ATP to the 3´-end of RNA. Poly(A) works more competently than E. coli poly(A) polymerase for RNA oligonucleotide-labeling and poly(A) tailing. Less incubation time is required for the yeast enzyme. This enzyme labels both long and short substrates. Poly(A) polymerase preferentially labels longer RNA-molecules whereas short RNA-molecules are labeled more efficiently by T4 RNA ligase. The reaction requires Mn^{2+} or Mg^{2+}, ATP as substrates, and any RNA containing 3' -hydroxyl termini as primers. Longer RNA molecules are somewhat better primers than short oligomers. Substitution of cordycepin-5'-triphosphate (3'-dATP) for ATP results in the addition of a single 3'-dA residue to the ends of the RNA, a useful technique for labeling RNA at the 3' -end.

Application:
- Labeling the 3' -ends of RNA with ATP or cordycepin
- Poly(A) tailing of RNA for cloning or affinity purification
- Preparing a priming site for cDNA synthesis using oligo-dT
- Enhancing translation of RNA transferred into eukaryotic cells

Source:
An E. coli strain that carries the cloned Poly(A) Polymerase gene from (Saccharomyces cerevisiae).

Specific Activity: >20,000 U/mg

Unit Definition:
One unit is the amount of enzyme which incorporates 1 pmol AMP into acid-insoluble material at 37°C in 1 min.

5x Poly(A) Polymerase Reaction Buffer:
100 mM Tris-HCL, pH 7.0, 3.0 mM $MnCl_2$, 0.1 mM EDTA, 1 mM DTT, 500 µg/ml Acetylated BSA, 50% Glycerol.

Storage Buffer:
20 mM Tris-HCL(pH 8.0), 50 mM KCl, 0.5 mM DTT, 50% Glycerol.

Assay Conditions:
1x Poly(A) Polymerase Reaction Buffer, 1 mM rATP and 500 ng 5´ -FAM labeled poly A 20-mer RNA in a 20 µl reaction. After incubation at 37°C for 10 min, acid insoluble radioactivity is determined either by gel electrophoresis or with an automated capillary DNA sequencer. In this assay 5 units of enzyme add approximatley 60 to 80 adenosines to the RNA primer. In these conditons 20 units of enzyme will deplete the rATP.

Heat Inactivation: 65°C for 20 minutes

Recommended Storage Conditions: -20°C

Reference:
1. Sippel, A. E. (1973) Eur. J. Biochem. 37, 31-40.
2. Edmonds, M. (1982) in The Enzymes, 3rd edition, ed. P. D. Boyer (Academic Press, New York) 15, 217-244.
3. Gething, M. J., Bye, J., Skehel, J. and Waterfield, M. (1980) Nature 287, 301-306.
4. Sano, H. and Feix, G. (1976) Eur. J. Biochem. 71, 577-583.

Name	Cat #	Size
Poly (A) Polymerase, Yeast	PAPY-30	1,000 units, 5,000 U/ml
Poly (A) Polymerase, Yeast	PAPY-40	2,000 units, 5,000 U/ml
Poly (A) Polymerase, Yeast	PAPY-50	5,000 units, 5,000 U/ml

T7 RNA Polymerase

Description:
T7 RNA Polymerase is a DNA-dependent RNA polymerase derived from the T7 bacteriophage which exhibits a high recognition specificity to the T7 promoter and terminator sequences and catalyzes the 5′—›3′ synthesis of RNA starting at a T7 promoter sequence[1,2].

Specific Activity: 312,500 U/mg

Application:
- Radiolabeled RNA probe preparation
- RNA generation for in vitro translation
- RNA generation for studies of RNA structure, processing and catalysis
- Expression control via anti-sense RNA

Source:
Purified from a strain of E. coli that expresses the recombinant T7 RNA Polymerase gene.

Supplied in:
50 mM Tris-HCL
100 mM NaCl
1 mM Dithiothreitol
1 mM EDTA
50% Glycerol
0.1% Triton X-100
pH 7.9 @ 25°C

Supplied with:
10x T7 RNA Polymerase Buffer
400 mM Tris-HCL
60 mM MgCl2
100 mM Dithiothreitol
20 mM Spermidine
pH 7.9 @ 25°C

Unit Definition:
One unit is defined as the amount of enzyme that will incorporate 1 nmol of ATP into acid-precipitable material in 1 hour at 37°C.

Recommended Storage Conditions: -20°C

Reference:
1. Chamberlin, M, et al. (1973) J. Biol. Chem. 248, 2235-2244, 2245-2250.
2. Chamberlin, M. et al. (1982) in The Enzymes, 3rd edition, ed. P. D. Boyer (Academic Press, New York.) 15, 87-108.

Name	Cat #	Size
T7 RNA Polymerase	RP-100	50,000 units, 50,000 U/ml
T7 RNA Polymerase	RP-200	100,000 units, 50,000 U/ml
T7 RNA Polymerase	RP-300	500,000 units, 50,000 U/ml
T7 RNA Polymerase	RP-400	1,000,000 units, 50,000 U/ml

Pyruvate Kinase I (pykF)

Description:
Pyruvate kinase is an enzyme involved in glycolysis. It catalyzes the transfer of a phosphate group from phosphoenolpyruvate (PEP) to ADP, yielding one molecule of pyruvate and one molecule of ATP. ELISA and western blot analysis assure its specificity and reactivity. However, since application varies, each investigation should be titrated by the reagent to obtain optimal results. Recommended dilution range for western blot analysis is 1:250 ~ 1000. Recommended starting dilution is 1:250.

Application:
Catalyzes the transfer of a phosphate group from phosphoenolpyruvate (PEP) to ADP

Source:
An allosteric enzyme from Bacillus stearothermophilus.

Recommended Storage Conditions: -20°C

Name	Cat #	Size
Pyruvate Kinase I (pykF)	PKI-100	10µg
Pyruvate Kinase I (pykF)	PKI-200	50µg

T4 Polynucleotide Kinase

Description:
T4 Polynucleotide Kinase (PNK) catalyzes the transfer and exchange of the terminal gamma position phosphate of ATP to the 5′-hydroxyl terminus of double- and single-stranded DNA, RNA and nucleoside 3′-monophosphate molecules[1]. T4 PNK also exhibits 3′-phosphatase and 2′,3′cyclic phosphodiesterase activities.[2-6]

Specific Activity: 133,333 U/mg

Application:
- End-labeling DNA or RNA for probes and DNA sequencing
- Addition of 5´-phosphates to oligonucleotides to allow subsequent ligation
- Removal of 3´-phosphoryl groups

Source:
Purified from a strain of E. coli that expresses the recombinant T4 Polynucleotide Kinase gene.

Supplied in:
10 mM Tris-HCL
50 mM KCl
0.1 µM ATP
1.0 mM Dithiothreitol
0.1 mM EDTA
50% Glycerol
pH 7.4 @ 25°C

Supplied with:
10x T4 Polynucleotide Kinase Buffer

10x Polynucleotide Kinase Buffer:
700 mM Tris-HCL
100 mM MgCl2
50 mM DTT
pH 7.6 @ 25°C

Unit Definition:
One unit is defined as the amount of enzyme catalyzing the incorporation of 1 nmol of [32P] (ATP donor) in 30 minutes at 37°C in 1x T4 Polynucleotide Kinase Reaction Buffer.

Recommended Storage Conditions: -20°C

Reference:
1. Richardson, C.C. (1981) P.D. Boyer (Eds.), The Enzymes, 14, pp. 229-314. San Diego: Academic press.
2. Morse, D. P. et al. (1997) Biochemistry 36, 8429-8434.
3. Cameron, V. et al. (1977) Biochemistry 16, 5120-5126.
4. Wand, L. K. et al. (2002) Nucl. Acids Res. 30, 1073-1080.
5. Galburt, E., et al. (2002) Structure 10, 1249-1260.
6. Wang, L. K., et al. (2002) EMBO J. 21, 3873-3880.

Name	Cat #	Size
T4 Polynucleotide Kinase	T4PK-100	10,000 units, 10,000 U/ml
T4 Polynucleotide Kinase	T4PK-200	20,000 units, 10,000 U/ml
T4 Polynucleotide Kinase	T4PK-300	100,000 units, 10,000 U/ml

APE 1

Description:
APE 1, also known as HAP 1 or Ref-1, acts as an AP lyase by hydrolyzing the phosphodiester backbone at the 5′ -end of an apurinic (AP) site, generating a 1 base gap in the DNA duplex and leaving 3′-hydroxyl and 5′-deoxyribose phosphate termini. Evidence suggests that APE 1 may exhibit weak DNA 3′-diesterase, 3′ to 5′ -exonuclease and RNase H activities [1-4].

Specific Activity: 2,000,000 U/mg

Application:
- Single cell gel electrophoresis (Comet assay)
- Alkaline elution
- Alkaline unwinding
- Modified nick translation

Source:
An E. coli strain which carries the cloned human APE 1 gene.

Supplied in:
10 mM Tris-HCL
50 mM NaCl
1 mM Dithiothreitol
0.1 mM EDTA
50% Glycerol
pH 8.0 @ 25°C

Supplied with:
10x Green Buffer

10x Green Buffer:
200 mM Tris-Acetate
500 mM Potassium Acetate
10 mM Dithiothreitol
100 mM Magnesium Acetate
pH 7.9 @ 25°C

Unit Definition:
One unit is defined as the amount of enzyme required to cleave 20 pmol of a 34-mer oligonucleotide duplex containing a single AP site in 1 hour at 37°C.

Recommended Storage Conditions: -20°C

Reference:
1. Demple, B. et al. (1991) Proc. Natl. Acad. Sci. USA, 88, 11450-11454.
2. Barzilay, G. et al. (1995) Nucl. Acids Res., 23, 1544-1550.
3. Barzilay, G. et al. (1995) Nature Struc. Biol., 2, 451-468.
4. Unpublished observations (See “Notes” Section)

Name	Cat #	Size
APE 1	APE-100	5,000 units,10,000 U/ml
APE 1	APE-105	10,000 units, 10,000 U/ml
APE 1	APE-110	25,000 units, 10,000 U/ml

Endonuclease IV, E. coli

Description:
Endonuclease IV (E. coli) is a class II apurinic/apyrimidic (AP) enzyme that cleaves 5’ to an AP site by hydrolysis, leaving a hydroxyl group at the 3´ terminus and a deoxyribose 5´-phosphate at the 5´-terminus. Endo IV can be used in vivo to repair free radical damage in DNA.

Application:
- DNA structure research
- Studies of DNA damage and repair
- Single cell electrophoresis (comet assay)
- Anti-tumor drug studies

Source:
E. coli cells with a cloned nfo gene.

Unit Definition:
One unit of the enzyme relaxes 1µg of partially depurinated, covalently closed supercoiled plasmid DNA in 30 min at 37°C

Storage Buffer:
Supplied in 50% Glycercol, 50 mM Tris-HCL(pH 7.5), 1mM DTT, 0.1 M NaCl, 0.1% Triton X-100

Quality Control:
Endonuclease IV is tested in degradation of dsDNA and is free of detectable RNase and double-stranded exonuclease activities.

Recommended Storage Conditions: -20°C

Reference:
1. Izumi, T. et al. (1992) J. Bacteriol. 174, 7711.
2. Levin, J.D. and Demple, B. (1996) Nucleic Acids Res. 24, 885.

Name	Cat #	Size
Endonuclease IV, E. coli	EIV-100	250 units, 2 U/µl
Endonuclease IV, E. coli	EIV-200	1,250 units, 2 U/µl

T4 Endonuclease V

Description:
Also known as T4 PDG, the enzyme has DNA glycosylase and apurinic/apyrimidinic lyase (AP lyase) activity. The protein recognizes cis-syn- cyclobutane pyrimidine dimers caused by UV light. T4 Endonuclease V binds to pyrimidine dimers in double-stranded DNA, then cleaves the glycosyl bond of the 5'-pyrimidine dimer and cleaves the phosphodiester bond 3' to the resulting basic site.

Application:
- Used in single cell gel eletrophoresis
- Studies of DNA damage by UV

Source:
Purified from an E. coli strain carrying a plasmid encoding T4 denV gene.

Unit Definition:
One unit converts 1µg of UV irradiated supercoiled DNA to nicked plasma in 30 minutes at 37°C.

Storage Buffer:
Supplied in 50% Glycercol, 50 mM Tris-HCL(pH 7.5), 0.1 mM EDTA, 1 mM DTT, 100 mM NaCl, 0.1% Triton X-100

Recommended Storage Conditions: -20°C

Name	Cat #	Size
T4 Endonuclease V	T4EV-100	10,000 units, 10,000 U/ml
T4 Endonuclease V	T4EV-200	20,000 units, 10,000 U/ml
T4 Endonuclease V	T4EV-300	50,000 units, 10,000 U/ml

T4 Endonuclease VII

Description:
T4 Endonuclease VII is a DNA junction specific endonuclease (also referred to as a resolvase or a cleavase). T4 Endonuclease VII functions in vivo to resolve branched DNA structures in newly synthesized DNA. It also recognizes mismatches, insertion or deletion loops, gaps, and apurinic/apyrimidinic sites, and creates nicks in the DNA strands at these sites. The wide variety of substrates accepted suggests that T4 Endonuclease VII recognizes changes in the structure or conformation of DNA rather than binding to a specific sequence. It has also been crystallized as a dimer.

Application:
- Enzymatic mutation detection technology (EMD)
- SNP detection
- Resolve Holliday structures in vitro
- Ideal for cleaving DNA heteroduplexes on one strand

Source:
E. coli strain containing an overproducing clone of the T4 Endonuclease VII protein.

Recommended Reaction Conditions:
50 mM Tris-HCL(pH 7.8 @ 25°C), 10 mM $MgCl_2$, 10 mM DTT 37°C for 30 minutes.

Recommended Storage Conditions:
-20°C. Avoid repeated freeze-thaw.

Reference:
1. Kosak, C., Lee, S., Kemper, B. W. (1998) J Biol Chem, 273(48):31637-31639
2. Kosak H. G., Kemper B. W. (1990) Eur J Biochem. 194(3):779-784

Name	Cat #	Size
T4 Endonuclease VII	TS-100	50 ku, 500 U/µl
T4 Endonuclease VII	TS-200	100 ku, 500 U/µl
T4 Endonuclease VII	TS-300	500 ku, 500 U/µl

Topoisomerase I (Vaccinia)

Description:
Topoisomerase I, derived from Vaccinia virus, is a type I eukaryotic topoisomerase that removes both positive and negative superhelical turns (also called right- and left-handed supercoils) from covalently closed DNA. The product of the reaction is a covalently closed, circular DNA with fewer positive or negative superhelical turns. DNA Topoisomerase I does not absolutely require Mg^{2+} to function, although low concentrations of Mg^{2+} may increase activity. Ideal for relax positively and negatively supercoiled DNA in presence of EDTA.

Application:
- Studying chromatin reconstitution in vitro
- Determining the degree of supercoiling of naturally occurring DNA
- Detecting mutant plasmids that differ in length by only one base-pair
- Increasing restriction endonuclease digestion of resistant DNA substrates by "unwinding" the DNA coils to expose restriction sites

Source:
Topoisomerase I, derived from Vaccinia virus, is a type I eukaryotic topoisomerase.

Unit Definition:
One unit of DNA Topoisomerase I, Vaccinia, will convert 1µg of supercoiled DNA (Form I) to relaxed closed circular DNA (Form II) in 1 hour at 37°C under standard assay conditions.

Recommended Reaction Conditions:
37 °C for 30 minutes

Recommended Storage Conditions:
This product should be stored at -20°C. Avoid repeated freeze-thaw.

Reference:
Shuman, S. et al. (1989), PNAS. 86: 3489-3493.

Name	Cat #	Size
Topoisomerase I (Vaccinia)	TP-200	1,000 Units, 10 U/µl
Topoisomerase I (Vaccinia)	TP-205	2,000 Units, 10 U/µl
Topoisomerase I (Vaccinia)	TP-210	5,000 Units, 10 U/µl

Exonuclease I (E. coli)

Description:
Exonuclease I cleaves single-stranded DNA in the 3′–›5′ direction, releasing 5′ -mono/di-nucleotides and leaving double-stranded DNA molecules and the 5'-terminus intact. The enzyme is processed through digestion and is inhibited by the presence of a 3′ -terminal phosphate. Exonuclease I is tolerant of a wide-range of buffer conditions and can typically be added to reactions containing magnesium[1-3].

Specific Activity: 185,000 U/mg

Application:
- Removal of residual ssDNA, including oligos, from reaction mixes

Source:
Purified from a strain of E. coli that expresses the recombinant Exonuclease I gene.

Supplied in:
10 mM Tris-HCL
100 mM NaCl
1 mM Dithiothreitol
0.5 mM EDTA
50% Glycerol
pH 7.5 @ 25°C

Unit Definition:
One unit is defined as the amount of enzyme required to produce 10 nmol of acid-soluble total nucleotide in 30 minutes at 37°C.

Recommended Storage Conditions: -20°C

Reference:
1. Lehman, I.R. and Nussbaum, A.L. (1964) J. Biol. Chem. 239, 2628.
2. Kushner, S.R. et al. (1971) Proc. Natl. Acad. Sci. USA 68, 824.
3. Kushner, S.R. et al. (1972) Proc. Natl. Acad. Sci. USA 69, 1366.

Name	Cat #	Size
Exonuclease I, E. coli	NI-200	30,000 units, 20,000 U/ml
Exonuclease I, E. coli	NI-205	60,000 units, 20,000 U/ml
Exonuclease I, E. coli	NI-210	250,000 units, 20,000 U/ml

Exonuclease III (E. coli)

Description:
Exonuclease III (E. coli) is a 3′–› 5′ exonuclease which acts by digesting one strand of a dsDNA duplex at a time or digesting the RNA strand of an RNA-DNA heteroduplex[1,2]. Exonuclease III (E. coli) breaks phosphodiester bonds on the 5′- side of AP sites in both dsDNA and ssDNA[3]. It removes 3′- terminal groups on dsDNA[3], increases MutY turnover[4], and efficiently degrades 3′ -recessed but not 3′ protruding DNA ends (creating 5′ -overhangs)[5]. Exonuclease III (E. coli) removes a limited number of nucleotides per binding event, resulting in coordinated progressive deletions within the population of DNA molecules[1].

Specific Activity: 150,000 U/mg

Application:
Degrades excess single-stranded primer oligonucleotide from a reaction mixture containing double-stranded extension products.

Source:
Purified from a strain of E. coli that expresses the recombinant Exonuclease III gene.

Supplied in:
25 mM Tris-HCL
50 mM KCl
1.0 mM DTT
0.1% MM EDTA
50% Glycerol
pH 8.0 @ 25°C

Supplied with: 10x Yellow Buffer

10x Yellow Buffer
100 mM Bis-Tris-Propane
100 mM MgCl2
10 mM Dithiothreitol
pH 7.0 @ 25°C

Unit Definition:
One unit is defined as the amount of enzyme required to produce 1 nmol of acid-soluble total nucleotide in 30 minutes at 37°C.

Recommended Storage Conditions: -20°C

Reference:
1. Linn, S. M. (1982) Nucleases, pp. 291-309, Cold Spring Harbor Laboratory Press.
2. Shida, T., et al. (1996) Nucl. Acids Res. 24 (22), 4572-4576.
3. Doetsch, P. W. (1990) Mutat. Res. 236 (2-3), 173-201.
4. Pope, M. A., et al. (2002) J. Biol. Chem. 277 (25), 22605-22615.
5. Henikoff, S. (1984) Gene 28, 351-359.

Name	Cat #	Size
Exonuclease III, E. coli	EIII-100	50,000 units, 100,000 U/ml
Exonuclease III, E. coli	EIII-200	100,000 units, 100,000 U/ml
Exonuclease III, E. coli	EIII-300	250,000 units, 100,000 U/ml

FEN1 (AFU)

Description:
FEN1 (AFU) is a highly purified recombinant flap endonuclease-1 (FEN-1) protein from the E. coli containing FEN1 Gene of hyperthermophilic Archaea strain, Archaeoglobus fulgidus. The FEN1 removes 5' -overhanging flaps in DNA repair and processes the 5' -ends of Okazaki fragments in lagging strand DNA synthesis.

Application:
FEN1 removes 5' overhanging flaps in DNA repair and processes the 5' ends of Okazaki fragments in lagging strand DNA synthesis.

Source: Escherichia Coli.

Concentration: 0.5 mg/ml

Storage buffer:
10 mM Tris, Ph 7.8
50 mM KCl
1 mM DTT
50% Glycerol

5x reaction buffer:
50 mM MOPS, PH7.5
16% PEG 8000

Recommended Storage Conditions: -20°C

Name	Cat #	Size
FEN1 (AFU)	AFU-100	100µg, 0.5 mg/ml
FEN1 (AFU)	AFU-200	500µg, 0.5 mg/ml

Lambda Exonuclease

Description:
Lambda Exonuclease is a highly processive exonuclease which selectively degrades the 5′-phosphorylated strand of double-stranded DNA via the stepwise 5′ to 3′ release of mononucleotides from duplex DNA. Lambda Exonuclease is inactive against 5′-hydroxyl termini[1], and will not initiate excision at a nick or gap[2], though it will degrade a 5′-overhanging tail from duplex DNA at a greatly reduced rate.

Specific Activity: 100,000 U/mg

Application:
Catalyzes the removal of 5′-mononucleotides from duplex DNA.

Source:
Purified from a strain of E. coli that overexpresses the exonuclease gene from bacteriophage Lambda.

Supplied in:
25 mM Tris-HCL
50 mM NaCl
1.0 mM Dithiothreitol
0.1% mM EDTA
50% Glycerol
pH 7.5 @ 25°C

Supplied with:
10x Lambda Exo Reaction Buffer

10x Lambda Exo Reaction Buffer :
670 mM Glycine
25 mM MgCl2
pH 9.4 @ 25°C

Unit Definition:
One unit is defined as the amount of enzyme required to produce 10 nmol of acid-soluble deoxyribonucleotide from double-stranded substrates in 30 minutes at 37°C.

Recommended Storage Conditions: -20°C

Reference:
1. Ausubel, F. M.,et al. (1987) Current Protocols in Molecular Biology (John Wiley and Sons, Inc.)
2. Little, J.W. (1981) Gene Amp. Anal., 2, 135-145

Name	Cat #	Size
Lambda Exonuclease	LE-100	10,000 units, 5,000 U/ml
Lambda Exonuclease	LE-200	20,000 units, 5,000 U/ml
Lambda Exonuclease	LE-300	50,000 units, 5,000 U/ml

T7 Exonuclease

Description:
T7 Exonuclease is similar to Lambda Exonuclease in that it catalyzes the stepwise hydrolysis of duplex DNA from the 5' -termini, liberating 5' -mononucleotides. However, unlike Lambda Exonuclease, the enzyme has low processivity and it will remove both 5' -hydroxyl and 5' -phosphoryl termini. T7 Exonuclease hydrolyzes duplex DNA non-processively in the 5'–›3' direction from both 5'-phosphoryl or 5' -hydroxyl nucleotides by liberating oligonucleotides, as well as mononucleotides, until about 50% of the DNA is acid soluble.

Source:
Purified from an E. coli strain containing a TYB12 intein fusion.

Application:
- Controlled stepwise digestion of double-stranded DNA from the 5'-termini.
- Generating ssDNA templates for sequencing via the chain-termination method.

Unit Definition:
One unit is the amount of enzyme required to release 1 nmol of acid soluble nucleotide in 15 min at 37°C under standard assay conditions.

Recommended Storage Conditions: -20°C

Reference:
1. Kerr, C. and Sadowski, P. D. (1972) J. Biol. Chem. 247, 311-318.
2. Thomas, K. R. and Olivera, B. M. (1978) J. Biol. Chem. 253, 424-429.
3. Ausubel, F. M., Brent, R., Kingston, R. E., Moore, D. D., Seidman, J. G., Smith, J. A. and Struhl, K., (1987) Current Protocols in Molecular Biology (John Wiley and Sons, Inc.
4. Shon, M., Germino, J. and Bastia, D. (1982) J. Biol. Chem. 257, 13823-13827.
5. Nikiforov, T. T., Rendle, R. B., Goelet, P., Rogers, Y. H., Kotewicz,
6. M. L., Anderson, S., Trainor, G. L. and Knapp, M. R. (1994) Nucl. Acids Res 22, (20), 4167-4175.
7. Kornberg, A. and Baker, T. (1991) DNA Replication, Second Edition, 591.

Name	Cat #	Size
T7 Exonuclease	T7G6E-100	5,000 units, 10,000 U/ml
T7 Exonuclease	T7G6E-200	20,000 units, 10,000 U/ml
T7 Exonuclease	T7G6E-300	100,000 units, 10,000 U/ml

RNase H, E. coli

Description:
RNase H(rnh, E. coli) is an endoribonuclease which degrades the RNA strand of RNA/DNA hybrid molecules. RNase H digestion produces ribonucleotide molecules with 5'-phosphate and 3'-hydroxyl termini. RNAse H is nearly inactive against single or double-stranded RNA molecules.

Specific Activity: 625,000 U/mg

Application:
- Removal of poly(A) tails of mRNA hybridized to poly(dT)
- Removal of mRNA during second strand cDNA synthesis

Source:
A recombinant E. coli strain carrying the RNAse H (rnh) gene from E. coli.

Supplied in:
20 mM Tris-HCL
100 mM KCl
10 mM MgCl2
0.1 mM EDTA
0.1 mM Dithiothreitol
50% Glycerol
pH 7.9 @ 25°C

Supplied with:
10x RNAse H Buffer

10x RNAse H Buffer:
500 mM Tris-HCL
750 mM KCl
30 mM MgCl2
100 mM Dithiothreitol
pH 8.3 @ 25°C

Unit Definition:
1 unit is defined as the amount of enzyme that will hydrolyze 1 nmol of RNA from an 3H-labeled DNA:RNA hybrid molecule into acid-soluble material in 20 minutes at 37°C.

Recommended Storage Conditions: -20°C

Name	Cat #	Size
RNase H, E. coli	RNHE-100	5000 units, 5,000 U/ml
RNase H, E. coli	RNHE-200	10,000 units, 5,000 U/ml
RNase H, E. coli	RNHE-300	25,000 units, 5,000 U/ml

RNase I, E. coli

Description:
RNase I catalyzes the hydrolysis of single-stranded RNA to nucleoside 3'-monophosphates via 2', 3' cyclic monophosphate intermediates. Note: The enzyme is inactivated by heating at 70°C for 15 minutes, eliminating phenol extractions to remove the enzyme.

Application:
- Degradation of single-stranded RNA to mono-, di- and trinucleotide
- Used in ribonuclease protection assays

Source:
An E. coli strain containing a genetic fusion of the RNase I gene (rna) from E. coli and the gene coding for maltose-binding protein (MBP).

Unit Definition:
One unit of enzyme required to catalyze the degradation of 100 ng of E. coli ribosomal RNA per second into acid-soluble nucleotides at 37°C.

Storage Buffer:
Supplied in 50% Glycerol, 50 mM Tris-HCL(pH 7.5), 100 mM NaCl, 0.01 mM EDTA.

Recommended Storage Conditions: -20°C

Name	Cat #	Size
RNase I, E. coli	RNIE-100	25,000 units, 50,000 U/ml
RNase I, E. coli	RNIE-200	50,000 units, 50,000 U/ml
RNase I, E. coli	RNIE-300	250,000 units, 50,000 U/ml

Rnase III, E. coli

Description:
Ribonuclease III (Rnase III) is an endoribonuclease that cleaves double-stranded DNA, resulting in 12-15 bp with 2-base, 3'-overhangs.

Source:
Ribonuclease III (RNase III) from E. coli is an endoribonuclease that specifically digests dsRNA to dsRNA fragments that have two-base, 3´ overhangs.

Application:
- Digestion of dsRNA to short fragments
- RNA structure, processing, and maturation studies

Unit Definition:
One unit of enzyme that will cleave 1 nmol of ribonucleotides in 30 minutes at 37°C.

Storage Buffer:
Supplied in 50% Glycerol, 50 mM Tris-HCL(pH 7.5),100 mM NaCl, 0.1 mM EDTA.

Recommended Storage Conditions: -20°C

Name	Cat #	Size
Rnase III, E. coli	RN3E-100	50 units, 1 U/µl
Rnase III, E. coli	RN3E-200	100 units, 1 U/µl
Rnase III, E. coli	RN3E-300	500 units, 1 U/µl

RNase-Free DNase I

Description:
RNase-free DNase I is an endonuclease that hydrolyzes phosphodiester linkages in DNA to produce mono- and oligodeoxyribonucleotides with 5'-phosphate and 3'-OH groups.

Source:
An E. coli strain that carries an MBP fusion clone of Bovine Pancreatic DNase I.

Application:
- Preparation of DNA-free RNA prior to RT-PCR
- Removal of template DNA from RNA in transcription reactions
- DNA labeling by nick-translation when used with DNA Polymerase I
- Studies of DNA-protein interactions by DNase I footprinting

Unit Definition:
One unit is the amount of enzyme required to completely degrade 1µg of plasmid DNA to oligodeoxynucleotides in 10 minutes at 37°C.

Storage Buffer:
Supplied in 10 mM Tris-HCL(pH 7.5), 10 mM $CaCl_2$, 10 mM $MgCl_2$ and 50% Glycerol.

Recommended Storage Conditions: -20°C

Name	Cat #	Size
RNase-Free DNase I	RNFD-100	5,000 units, 2,000 U/ml
RNase-Free DNase I	RNFD-200	10,000 units,2,000 U/ml
RNase-Free DNase I	RNFD-300	50,000 units, 2,000 U/ml

Thermostable RNase H

Description:
Thermostable RNase H has optimal activity above 65°C and can be used up to 95°C. The enzyme degrades RNA in a DNA:RNA hybrid, maximizing sensitivity and selectivity without affecting DNA or unhybridized RNA.

Application:
- High hybridization stringency
- Specific hydrolysis of RNA in a DNA:RNA hybrid
- Diagnostic assay of DNA sequences by isothermal probe amplification
- Mapping of mRNA structures

Source:
A recombinant protein purified from E. coli, cloned the gene encoding the Thermus thermophilus RNase H.

Unit Definition:
One unit of the enzyme results in the acid-solubilization of 1 nmol of polyadenylic acid in the presence of an equimolar concentration of polythymidylic acid in 20 minutes at 45°C in 50 mM Tris-HCL(pH 7.5), 100 mM NaCl, and 10 mM MgCl2. Note: The unit assay is performed at 45°C because this is optimal for the Tm of poly(dT):poly(A). The optimal temperature for many applications may be considerably higher.

Storage Buffer :
Supplied in 50% Glycerol containing 50 mM Tris-HCL(pH 7.5), 0.1 M NaCl, 1.0 mM DTT, 0.1 mM EDTA, and 0.1% Triton X-100.

Recommended Storage Conditions: -20°C

Name	Cat #	Size
Thermostable RNase H	HTRH-100	500 units, 5 U/µl
Thermostable RNase H	HTRH-200	1,000 units, 5 U/µl
Thermostable RNase H	HTRH-300	5,000 units, 5 U/µl

ATP Sulfurylase Yeast

Description:
Adenosine 5' -Triphosphate Sulfurylase Yeast Recombinant produced in E. coli is a non-glycosylated, polypeptide chain containing 511 amino acids and having a Mw of 57.7 kDa. Adenosine 5' -Triphosphate Sulfurylase Yeast Recombinant catalyzes the activation of sulfate by transferring sulfate to the adenine monophosphate moiety of ATP to form adenosine 5´-phosphosulfate (APS) and pyrophosphate (PPi). The reaction is reversible: ATP is formed from APS and PPi. Adenosine 5' -Triphosphate Sulfurylase is purified by proprietary chromatographic techniques.

Application:
- Synthesizes adenosine 5' -sul-phatophosphate from ATP and inorganic SO42-
- Catalyzes the activation of sulfate by transferring sulfate to the adenine monophosphate moiety of ATP to form adenosine 5´-phosphosulfate (APS) and pyrophosphate (PPi)

Source:
Escherichia Coli containing Yeast adenosine 5' -Triphosphate Sulfurylase gene

Unit Definition:
One unit is the amount of enzyme which incorporates 1 pmol AMP into acid-insoluble material at 37°C in 1 minute.

Unit Assay Conditions:
115 mM Tris-HCL(pH 8.0), 0.58 mM b-NADP, 2.4 mM Mg acetate, 34 mM D-glucose, 0.3 mM adenosine 5´-phosphosulfate, 3.4 mM pyrophosphate, 0.75 units/ml hexokinase and 0.5 units/ml glucose 6-phosphate dehydrogenase.

Recommended Storage Conditions: -20°C

Name	Cat #	Size
ATP sulfurylase Yeast	ATPSY0010	50 units, 300 U/ml
ATP sulfurylase Yeast	ATPSY0050	100 units, 300 U/ml
ATP sulfurylase Yeast	ATPSY0150	500 units, 300 U/ml

Inorganic Pyrophosphatase, E. coli

Description:
Inorganic pyrophosphatase (PPase) is ubiquitous in nature and plays an important role in energy metabolism, providing a thermodynamic pull for biosynthetic reactions such as protein, RNA, and DNA synthesis. Escherichia coli K-12 gene ppa encoding inorganic pyrophosphatase (PPase) was cloned and sequenced. The 5' -end of the ppa mRNA was identified by primer extension mapping.

Source:
E. coli strain carrying a plasmid encoding pyrophosphatase from Escherichia coli K-12.

Application:
- Role in protein, RNA, and DNA synthesis
- Catalyzing the reaction PPi + H_2O —> 2Pi

Unit Definition:
One unit will release 1.0 µmole of inorganic orthophosphate per minute at pH 9 at 25 °C.

Recommended Storage Conditions: -20°C

Reference:
Kornberg, A. 1962. On the metabolic significance of phosphorolytic and pyrophosphorolytic reactions, p. 251-264. In H. Kasha and P. Pullman (ed.), Horizons in biochemistry. Academic Press, New York.

Name	Cat #	Size
Inorganic Pyrophosphatase, E. coli	IPE-100	0.25 mg, 1 mg/ml
Inorganic Pyrophosphatase, E. coli	IPE-200	0.5 mg, 1 mg/ml
Inorganic Pyrophosphatase, E. coli	IPE-300	1 mg, 1 mg/ml

Inorganic Pyrophosphatase, yeast

Description:
The Pyrophosphatase, Inorganic (PPase) catalyzes the hydrolysis of inorganic pyrophosphate to two orthophosphates. The enzyme requires a divalent metal cation, with Mg^{2+} conferring the highest activity.

Application:
- High yield synthesis of RNA by in vitro transcription[1,2]
- DNA polymerization reactions: preventing accumulation of pyrophosphate[3, 4]
- Removal of contaminant PPi in reagents used for SNP genotyping by methods based on the detection of pyrophosphate[5]

Source:
E. coli cells with a cloned ppa gene of Sacharomyces cerevisiae.

Unit Definition:
One unit is the amount of enzyme that will generate 1 µmol of phosphate per minute from inorganic pyrophosphate under standard reaction conditions (a 10 minute reaction at 25°C in 100 mM Tris-HCL, [pH 7.2], 2 mM MgCl2 and 2 mM PPi in a reaction volume of 0.5 ml).

Storage Conditions:
20 mM Tris-HCL
100 mM KCl
1 mM Dithiothreitol
0.1 mM EDTA
50% Glycerol
pH 8.0 @ 25°C

Recommended Storage Conditions: -20°C

Reference:
1. Cooperman, B.S., The mechanism of action of yeast inorganic pyrophosphatase, Meth. Enzymol., 87, 526-548, 1982.
2. Cunningham, P.R. and Ofengand, J., Use of inorganic pyrophostase to improve the yield of in vitro transcription reactions catalyzed by T7 RNA polymerase, Biotechniques, 9, 713-714, 1990.
3. Tabor, S., Richardson, C.C., DNA sequence analysis with a modified bacteriophage T7 DNA polymerase. Effect of pyrophosphorolysis and metal ions, J. Biol. Chem., 265, 8322-8328, 1990.
4. Dean, B.F., et al., Rapid amplification of plasmid and phage DNA using phi29 DNA polymerase and multiply-primed Rolling Circle amplification, Genome Res., 11, 1095-1099, 2001.
5. Zhou, G.H., et al., Quantitative detection of single nucleotide polymorphisms for a pooled sample by a bioluminometric assay coupled with modified primer extension reactions (BAMPER), Nucleic Acids Res., 29, E93, 2001.

Name	Cat #	Size
Inorganic Pyrophosphatase, yeast	PI-100	10 units, 100 U/ml
Inorganic Pyrophosphatase, yeast	PI-200	50 units, 100 U/ml
Inorganic Pyrophosphatase, yeast	PI-300	100 units, 100 U/ml

Inorganic Pyrophosphatase,Thermostable

Description:
Inorganic pyrophosphatase (PPase) catalyzes the hydrolysis of inorganic pyrophosphate to form orthophosphate. It retains 100% activity after incubation at 100°C for 4 hours.

Application:
- Optimizes PCR through the elimination of pyrophosphate
- Catalyzes the conversion of inorganic pyrophosphate to orthophosphate
- Removes inhibiting amounts of pyrophosphates in the reaction

Source:
A E. coli strain carrying a plasmid encoding pyrophosphatase from the extreme thermophile Thermococcus litoralis.

Unit Definition:
One unit is the amount of enzyme that will generate 1 µmol of phosphate per minute from inorganic pyrophosphate under standard reaction conditions (a 10 minute reaction at 75°C in 50 mM Tricine [pH 8.5] , 1 mM MgCl2, 0.32 mM PPi, reaction volume of 0.5 ml).

Buffer:
20 mM Tris-HCL
100 mM KCl
1 mM Dithiothreitol
0.1 mM EDTA
50% Glycerol
pH 8.0 @ 25°C

Recommended Storage Conditions: -20°C

Reference:
Heinonen, J.K. and Lahti, R.J. (1981) Analytical Biochemistry, 113, 313-317.

Name	Cat #	Size
Inorganic Pyrophosphatase, Thermostable	TI-100	250 units, 2,000 U/ml
Inorganic Pyrophosphatase, Thermostable	TI-200	1,250 units, 2,000 U/ml
Inorganic Pyrophosphatase, Thermostable	TI-300	5,000 units, 2,000 U/ml

Firefly luciferase (photinus pyralis)

Description:
Catalyses the oxidation of luciferin to oxyluciferin in an ATP-dependent process generating chemiluminescence at 560 nm (pH 7.8):

$$\text{luciferin} + \text{ATP} + O_2 \xrightarrow{Mg^{2+},\ \text{luciferase}} \text{oxyluciferin} + \text{AMP} + \text{pyrophosphate} + CO_2 + \text{light}$$

Application:
- Assesses the transcriptional activity in cells
- Detects the level of cellular ATP in cell viability assays

Source:
E. coli recombinant enzyme prepared from a thermostable mutant.

Unit Definition:
One light unit produces a biometer peak height equivalent to 0.02 µCi of 14C in PPO/POPOP cocktail. Light units measured in 50 µl assay mixture containing 5 pmol ATP and 7.5 nmol luciferin in Tris-glycine buffer, pH 7.6, at 25 °C.

Buffer:
10% Glycerol
50 mM Tris-HCL
1 mM DTT
1 mM EDTA

Storage Conditions:
10 mM Tris-HCL
PH 7.8
100 mM NaCl
0.1 mM DTT
0.1 mM EDTA
50% Glycerol

Heat Inactivation:
Active at 42°C for 24 hours (with < 5% loss of activity)

Recommended Storage Conditions: -20°C

Reference:
Kricka UJ. (1988) "Clinical and biochemical applications of luciferases and luciferins", Anal Biochem. 175 (1): 14-21

Name	Cat #	Size
Firefly luciferase	FL0001	1mg
Firefly luciferase	FL0002	2x1mg
Firefly luciferase	FL00010	10x1mg

RNAse Inhibitor

Description:
RNAse Inhibitor is an acidic, 52 kDa protein that is a potent, non-competitive inhibitor of pancreatic-type ribonucleases such as RNase A, RNase B, and RNase C. The enzyme is provided as a fusion of the porcine RNAse Inhibitor gene with a proprietary, 22.5 kDa protein tag.

Application:
- Inhibits ribonucleases (RNases) A, B and C

Source:
A recombinant E. coli strain carrying the porcine RNAse Inhibitor gene.

Supplied in:
20 mM Hepes-KOH
50 mM KCl
8 mM Dithiothreitol
50% Glycerol
pH 7.5 @ 25°C

Unit Definition:
One unit is defined as the amount of enzyme required to inhibit 50% the hydrolysis of cytidine 2',3'-cyclic monophosphate by 5 ng of RNAse A.[1]

Recommended Storage Conditions: -20°C

Reference:
1. Blackburn, P., 1979. Ribonulcease Inhibitor from Human Placenta: Rapid Purification and Assay. The Journal of Biological Chemistry, Vol. 254, No. 24 pp 12484-12487.

Name	Cat #	Size
RNAse Inhibitor	RNIN-100	20,000 units, 40,000 U/ml
RNAse Inhibitor	RNIN-200	40,000 units, 40,000 U/ml
RNAse Inhibitor	RNIN-300	250,000 units, 40,000 U/ml

T4 DNA helicase

Description:
T4 replication helicase (gp41) and polymerase (gp43) can be assembled onto a loading site located near the end of a long double-stranded DNA template in the presence of a macro-molecular crowding agent. This coupled “two-protein” system can carry out ATP-dependent strand displacement DNA synthesis at physiological rates (400 to 500 bp per sec), with high processivity in the absence of other T4 DNA replication proteins.

Source:
An enzyme from the gene of the bacteriophage T4 phage.

Application:
DNA helicase is an enzyme that aids in DNA synthesis by 'unzipping' the two strands of a DNA helix so that DNA polymerase can access the DNA to add nucleotides and effect copying.

Recommended Storage Conditions: -20°C

Name	Cat #	Size
T4 DNA helicase	T4DH-100	10ug, 0.5 mg/ml
T4 DNA helicase	T4DH-200	25ug, 0.5 mg/ml

T4 Lysozyme

Description:
Bacteriophage T4 Lysozyme breaks down bacterial cell walls. The enzyme attacks the peptidoglycans in the cell walls of bacteria and hydrolyzes the β-1,4 linkages between N-acetylmuramic acid and N-acetylglucosamine. Specific activity of T4 lysozyme is significantly greater than egg white lysozyme when assayed with Micrococcus lysodeikticus and Escherichia coli.

Application:
- Bacterial lysis for nucleic acid extraction
- Bacterial lysis for recombinant protein extraction

Source:
A recombinant E. coli strain carrying the cloned bacteriophage T4 lysozyme gene.

Unit Definition:
One unit of T4 lysozyme produces a decrease in A_{350} of 0.008 per second at 23 °C with a 0.5 mg/ml suspension of lyophilized M. lysodeikticus in 0.02 M phosphate buffer (pH 6.7).

Recommended Storage Conditions: -20°C

Reference:
Tsugita, A., and Inouye, M. Purification of Bacteriophage T4 Lysozyme. The Journal of Biological Chemistry, 243, 391-397. (1968)

Name	Cat #	Size
T4 Lysozyme	T4LY-100	1 mg, 1mg/ml
T4 Lysozyme	T4LY-200	5 mg, 1mg/ml
T4 Lysozyme	T4LY-300	15 mg, 1mg/ml

Restriction Endonucleases

Bgl II

Recognition site:
A^GATCT

Source:
Purified from a strain of E. coli that bears the cloned Bgl II gene.

Storage Buffer:
50 mM Tris-HCL(pH 7.4), 150 mM KCl, 1mM EDTA, 0.5 mg.ml BSA, 50% (v/v) Glycerol.

Reaction Conditions:
Buffer at 37°C.

Typical Ligation/Recut Assay Results:
Bgl II-cleaved λ DNA is ≥95% ligated after 1 h. Of the ligated fragments, 100% are cleaved (recut) by Bgl II.

Recommended Storage Conditions: -20°C.

Comments:
Does not cleave DNA when the C residue is 5-methylcytosine, but cleaves DNA when the 3'A residue is N6 –methyladenine. Resistant to heat inactivation (10 minutes, 65°C).

Name	Cat #	Size
Bgl II	BGL-100	2,000 units (8-12 units/µl)
Bgl II	BGL-200	6,000 units (8-12 units/µl)
Bgl II	BGL-300	2,000 units (50 units/µl)

Csp68KVI

Recognition site: CG^CG

Source:
Purified from a strain of E. coli that bears the cloned Csp68KVI gene.

Storage Buffer:
10 mM Tris-HCL(pH 7.5 at 25°C), 50 mM KCl, 1 mM DTT, 0.1 mM EDTA, 0.2 mg/ml BSA and 50% (v/v) Glycerol.

Reaction conditions:
- 1X Buffer: 10 mM Tris-HCL(pH 8.5 at 37°C), 10 mM MgCl2, 100 mM KCl and 0.1 mg/ml BSA.
- Incubate at 37°C.

Typical ligation/recut assay results:
After 50-fold overdigestion with Bsh1236I, more than 95% of the DNA fragments can be ligated and recut.

Recommended storage condition: -20°C.

Isoschizomers:
Search for commercial isoschizomers using REsearch™.

Name	Cat #	Size
Csp68KVI	CSP-100	1,000 units (10,000 units/ml)
Csp68KVI	CSP-200	5,000 units (10,000 units/ml)

EcoR I

Recognition site: G^AATTC

Source:
Purified from a strain of E. coli that bears the cloned EcoR I gene.

Storage Buffer:
50 mM Tris-HCL(pH 7.2), 300 mM NaCl, 5 mM EGTA, 0.5 mM EDTA, 5 mM 2-mercaptoethanol, 0.5 mg/ml BSA, 50% (v/v) Glycerol, 0.2% (w/v) Triton X-100.

Reaction Condition:
Buffer at 37°C.

Typical Ligation/Recut Assay Results:
EcoR I –cleaved λ DNA is ≥95% ligated after 1 h. Of the ligated fragments, 100% are cleaved (recut) by EcoR I.

Recommended Storage Conditions: -20 °C.

Comments:
Does not cleave DNA when either the 3' A or the C residue is N6-methyladenine or 5-methylcytosine, respectively. Partially resistant to heat inactivation (10 minutes, 65 °C). Glycerol concentrations >5% (v/v), low-salt, or high-pH conditions may alter specificity.

Name	Cat #	Size
EcoR I	ECOR-100	10,000 units (20 units/µl)
EcoR I	ECOR-200	60,000 units (20 units/µl)
EcoR I	ECOR-300	10,000 units (100 units/µl)
EcoR I	ECOR-400	60,000 units (100 units/µl)

Hind III

Recognition site: A^AGCTT

Source:
Purified from a strain of E. coli that bears the cloned Hind III gene.

Storage Buffer:
10 mM Tris-HCL(pH 7.4), 200 mM NaCl, 0.5 mM EDTA, 1mM DTT, 0.5 mg/ml BSA, 50% (v/v) Glycerol.

Reaction Conditions:
Buffer at 37°C.

Typical Ligation/Recut Assay Results:
Hind III-cleaved λ DNA is ≥95% ligated after 1 h. Of the ligated fragments, 100% are cleaved (recut) by Hind III.

Recommended Storage Conditions: -20°C.

Comments:
Does not cleave DNA when either the 5'A or the C residue is N6 –methyladenine or 5-methylcytosine, respectively. Resistant to heat inactivation (10 minutes, 65°C).

Name	Cat #	Size
Hind III	HIND-100	10,000 units (20 units/µl)
Hind III	HIND-200	60,000 units (20 units/µl)
Hind III	HIND-300	10,000 units (200 units/µl)
Hind III	HIND-400	60,000 units (200 units/µl)

HpyA V

Recognition Site: CCTTC(6/5)

Source:
Purified from a strain of E. coli that bears the cloned HpyA V gene.

Storage Buffer:
10 mM Tris-HCL, 300 mM NaCl, 0.5 mM NiSO4, 1 mM DTT, 0.1 mM EDTA, 200 µg/ml BSA, 50% Glycerol, pH 7.4 @ 25°C.

Reaction Conditions:
- 1X NEBuffer: Supplemented with 1 X Bovine Serum Albumin
- Incubate at 37°C.

Ligation and Re-cutting:
After a 2-fold overdigestion with HpyAV, approximately 50% of the DNA fragments can be ligated with T4 DNA Ligase (at a 5' termini concentration of 1-2 µM) at 16°C. Of these ligated fragments, approximately 50% can be recut with HpyAV.

Recommended Storage Conditions: -20°C.

Name	Cat #	Size
HpyA V	HPYA-100	100 units (2,000 units/ml)
HpyA V	HPYA-200	500 units (2,000 units/ml)

NgoA III

Recognition site: CCGC^GG

Source:
Purified from E. coli strain that bears the cloned NgoA III gene.

Storage Buffer:
10 mM Tris-HCL(pH 7.4), 50 mM NaCl, 0.1 mM EDTA, 1 mM DTT, 0.5 mg/ml BSA, 50% (v/v) Glycerol.

Reaction Conditions:
Buffer at 37°C.

Typical Ligation/Recut Assay Results:
NgoA III-cleaved Ad-2 DNA is ≥95% ligated after 1 h. Of the ligated fragments, 100% are cleaved (recut) by NgoA III.

Recommended Storage Conditions: -20 °C.

Comments:
Resistant to heat inactivation (10 minutes, 65 °C). Does not show a marked site preference like Nae I and NgoM I [1].

Isoschizomers: Nae I, NgoM I.

Reference:
1. Hu, A. (1993) Focus 15,42.

Name	Cat #	Size
NgoA III	NGOA-100	1,000 units (8-12 units/µl)

Pst I

Recognition site: CTGCA^G

Source:
Purified from a strain of E. coli that bears the cloned Pst I gene.

Storage Buffer:
10 mM Tris-HCL(pH 7.4), 50 mM NaCl, 0.1 mM EDTA, 1 mM DTT, 50% (v/v) Triton X-100.

Reaction Conditions:
Buffer at 37°C.

Typical Ligation/Recut Assay Results:
Pst I-cleaved λ DNA is ≥95% ligated after 1 h. Of the ligated fragments, 100% are cleaved (recut) by Pst I.

Recommended Storage Conditions: -20°C.

Comments:
Does not cleave DNA when either the A or the 5' C residue is N6 –methyladenine or 5-methylcytosine, respectively. Partially resistant to heat inactivation (10 minutes, 65°C). Glycerol concentrations >5% (v/v) may alter specificity.

Name	Cat #	Size
Pst I	PST-100	10,000 units (20 units/µl)
Pst I	PST-200	60,000 units (20 units/µl)
Pst I	PST-300	10,000 units (200 units/µl)
Pst I	PST-400	60,000 units (200 units/µl)

Protein Expression and Purification

TrenX™ PAGE Gels

Description:
MCLAB's TrenX™ PAGE Gels are precast polyacrylamide gels with a select range of acrylamide percentages. The precast gels are designed for high performance and provide a wide range of protein separation. In contrast to traditional Tris-glycine SDS-PAGE gels, TrenX™ PAGE gels are set at a neutral pH environment that results in longer shelf-life and minimizes protein modification when running under denaturing conditions. This unique formulation offers reliable separation and excellent resolution of the protein bands.

Key Features:
- High Resolution: Novel formulation allowing for excellent protein band resolution.
- Wide Protein Separation: Low molecular weight or high molecular weight proteins can be separated with the use of high or low molecular weight running buffer.
- Fast Run Time: 45 minutes or less.

Recommended Storage Conditions: 4°C.

Instructions:
1. Remove TrenX™ gel from packet and position into the gel running apparatus*.
2. Pour 200ml of 1X running buffer into the inner gel tank to the rim, and add in 1ml of 200x Redox running buffer agent for reduced samples. Fill sufficient amount of 1X running buffer into the outer gel tank. Total volume should take up ~1000 mL.
3. Be sure to flush the wells out thoroughly with a transfer pipette or syringe to displace any air bubbles and any storage buffers.
4. Load prepared protein samples into wells. Optimal sample amount must be established through trials.
5. Place gel apparatus cover onto gel tank and connect electrodes into power supply. Run gel at constant voltage of 200V for 40 to 50 minutes or until front dye reaches near the bottom of the gel.
6. Once running the gel is complete, insert a metal spatula into the side of the gel cassette to crack open plastic. Remove gel and proceed to gel staining or transferring.
*Refer to gel systems' manuals for setting up.

Name	Cat #	Size
TrenX™ PAGE Gels	TPG10-20	15- 160kDa (High molecular weight running buffer) or 3.5- 160kDa (Low molecular weight running buffer), 10% Acrylamide, 15 wells, 20µl per well, 10/pk
TrenX™ PAGE Gels	TPG10-30	15- 160kDa (High molecular weight running buffer) or 3.5- 160kDa (Low molecular weight running buffer), 10% Acrylamide, 12 wells, 30µl per well, 10/pk
TrenX™ PAGE Gels	TPG10-40	15- 160kDa (High molecular weight running buffer) or 3.5- 160kDa (Low molecular weight running buffer), 10% Acrylamide, 10 wells, 40µl per well, 10/pk
TrenX™ PAGE Gels	TPG12-20	3.5- 40kDa (Low molecular weighr running buffer) or 10- 80kDa (High molecular weight running buffer), 12% Acrylamide, 15 wells, 20µl per well, 10/pk
TrenX™ PAGE Gels	TPG12-30	3.5- 40kDa (Low molecular weight running buffer) or 10- 80kDa (High molecular weight running buffer), 12% Acrylamide, 12 wells, 30µl per well, 10/pk
TrenX™ PAGE Gels	TPG12-40	3.5- 40kDa (Low molecular weight running buffer) or 10- 80kDa (High molecular weight running buffer), 12% Acrylamide, 10 wells, 40µl per well, 10/pk
TrenX™ PAGE Gels	TPG412-20	15-260kDa (High molecular weight running buffer) or 3.5- 160kDa (Low molecular weight running buffer), 4-12% Acrylamide, 15 wells, 20µl per well, 10/pk
TrenX™ PAGE Gels	TPG412-30	15-260kDa (High molecular weight running buffer) or 3.5- 160kDa (Low molecular weight running buffer), 4-12% Acrylamide, 12 wells, 30µl per well, 10/pk
TrenX™ PAGE Gels	TPG412-40	15-260kDa (High molecular weight running buffer) or 3.5- 160kDa (Low molecular weight running buffer), 4-12% Acrylamide, 10 wells, 40µl per well, 10/pk

Name	Cat #	Size
TrenX™ PAGE Gels	TPG8-20	30-180kDa (High molecular weight running buffer) or 3.5- 160kDa (Low molecular weight running buffer), 8% Acrylamide, 15 wells, 20µl per well, 10/pk
TrenX™ PAGE Gels	TPG8-30	30-180kDa (High molecular running buffer) or 3.5- 160kDa (Low molecular weight running buffer), 8% Acrylamide, 12 wells, 30µl per well, 10/pk
TrenX™ PAGE Gels	TPG8-40	30-180kDa (High molecular weight running buffer) or 3.5- 160kDa (Low molecular weight running buffer), 8% Acrylamide, 10 wells, 40µl per well, 10/pk

200x Redox Running Buffer Agent

Description:
MCLAB's Redox Running Buffer Agent is used to maintain proteins in a reduced state during electrophoresis. When performing SDS-PAGE under reducing conditions, Redox Running Buffer Agent should be added to the upper (cathode) buffer chamber. This reagent is optimized for TrenX™ gels, which are set at a neutral pH.

Recommended Storage Conditions: 4°C.

Name	Cat #	Size
200x Redox Running Buffer Agent	TPA-15	30ml

4x Sample Buffer

Description:
4x Sample Buffer is used to prepare protein samples for electrophoresis on TrenX™ gels. A protein sample is mixed with 4x sample buffer (3:1) and heated for 2-5 minutes in boiling water. The SDS denatures the protein and gives it an overall negative charge. The 2-mercaptoethanol reduces disulfide bonds of the protein. The bromophenol blue dye serves as a dye front. Preparation using MCLAB Sample Buffer allows protein samples to be separated based on size during electrophoresis.

Recommended Storage Conditions: 4°C.

Name	Cat #	Size
4x Sample Buffer	TPS-10	10 ml
4x Sample Buffer	TPS-250	250 ml

Protein Ladder (10 – 99kDa)

Description:
MCLAB's Protein Ladder contains a mixture of 6 highly purified proteins, which are used as a size standard for SDS-PAGE to calculate the molecular weight of the protein of interest. The Protein Ladder becomes clearly visible bands from 10-99 kDa when analyzed by SDS-PAGE and stained with Coomassie Brilliant Blue.

Recommended Load: 10µl

Supplied In:
33 mM NaCl
70 mM Tris-HCL
40 mM DTT
1 mM Na2EDTA
10% Glycerol
0.01% Bromophenol Blue
2% SDS (w/v)
pH 6.8 @ 25°C

Recommended Storage Conditions: -20°C

Name	Cat #	Size
Protein Ladder	TPL-250	250µl
Protein Ladder	TPL-500	500µl

Quik-Stain

Description:
MCLAB's premixed proprietary coomassie blue solution allows the user to perform fast staining on SDS-PAGE gels for protein analysis. This staining solution is non-hazardous and does not require the use of methanol and acetic acid for destaining. Protein bands become visible within minutes and the whole process takes approximately 30 minutes.

Recommended Storage Conditions: 4°C.

Instructions:
- Soak gel in a microwavable container with water and microwave for 3 minutes
- Discard the hot water and repeat until dye front becomes faded or disappears.
- Remove water and add in 50 mL of Quik-Stain (or enough to completely cover the gel).
- Microwave for 1 minute and repeat until protein bands become visible.
- Discard the staining solution and replace with water for destaining.
- Place a kimwipe on top of gel and microwave for 3 minutes.
- Replace with new water and repeat process until desired destaining results has been met.

Name	Cat #	Size
Quik-Stain	TPQ-1L	1 L
Quik-Stain	TPQ-3L	3.5 L

SDS High Molecular Weight Running Buffer

Description:
SDS High Molecular Weight Running Buffer is formulated for separating medium- to large-sized protein on TrenX™ gels. Our pre-mixed running buffers are convenient to use and ensure high-quality results. SDS High Molecular Weight Running Buffer allows proteins to run slower compare to SDS Low Molecular Weight Running Buffer.

Recommended Storage Conditions:
Room Temperature

Name	Cat #	Size
High Molecular Weight Running Buffer	TPR-H1	500 ml
High Molecular Weight Running Buffer	TPR-H2	1 L
High Molecular Weight Running Buffer	TPR-H3	5 L

SDS Low Molecular Weight Running Buffer

Description:
SDS Low Molecular Weight Running Buffer is formulated for separating small- to medium-sized protein on TrenX™ gels. Our pre-mixed running buffers are convenient to use and ensure high-quality results. SDS Low Molecular Weight Running Buffer allows proteins to run faster compare to SDS High Molecular Weight Running Buffer.

Recommended Storage Conditions:
Room Temperature

Name	Cat #	Size
Low Molecular Weight Running Buffer	TPR-L1	500 ml
Low Molecular Weight Running Buffer	TPR-L2	1 L
Low Molecular Weight Running Buffer	TPR-L3	5 L

Heparin Agarose Beads

Description:
Heparin Agarose Beads is widely used in affinity purification. Various heparin-binding proteins and ligands, such as antithrombin III, DNA binding proteins and lipoproteins can be Heparin-beads. MCLAB's Heparin agarose is designed for excellent binding capacity and purity of protein-specific purifications.

Recommended Storage Conditions: -20°C.

Protocol:
1. Wash 1 mL of Heparin agarose with ddH_2O in a purification column.
2. Wash the purification column with 5x bead volume of PBS, pH 7.4.
3. Dilute protein sample with a 1:1 ratio PBS, pH 7.4.
4. Add sample into purification column.
5. Collect solution and repeat step 4-5 several times if necessary.
6. Wash purification column with 15x bead volume of PBS, pH 7.4.
7. Elute bound proteins by applying high salt buffer (PBS pH 7.4 added with NaCl to 1.5 N).
8. Wash purification column with 20x bead volume of ddH_2O to regenerate beads.
9. Equilibrate purification column with PBS pH 7.4.
10. Store purification column at 4˚C in PBS pH 7.4, 0.3 N NaCl added with 0.01% (w/v) Thimerosal as a preservative.

Name	Cat #	Size
Heparin Agarose Beads	HBB-100	10 ml
Heparin Agarose Beads	HBB-200	25 ml
Heparin Agarose Beads	HBB-300	100 ml

Glutathione Agarose Beads

Description:
Glutathione S-transferase (GST) gene fusion systems have been widely used for obtaining large amounts of desirable protein in Escherichia coli. The fusion protein, which contains a GST tail can then be purified through affinity chromatography. MCLAB's glutathione agarose is designed for the specific purification of GST recombinant proteins and other glutathione-binding proteins. Glutathione agarose is uniquely formulated for excellent binding capacity and purity of the protein of interest.

Protocol:
The following instructions for GST-fusion protein purification can be scaled up or down depending on the user's preference. This manual exemplifies sample preparation from a specific amount of starting material and purification using 1 ml resin.
1. Centrifuge sample after cell lysis to remove undissolved membranes and cellular debris before applying to purification column.
2. Wash purification column with 10x bead volume of Binding Buffer to remove azide.
3. Dilute an appropriate amount sample with a 1:1 ratio of Binding Buffer before applying to purification column.
4. Wash the purification column with 10x bead volume of Binding Buffer or until no proteins can be detected in the washes.
5. Elute bound protein of interest with 5x bead volume of Elution Buffer.
6. GST agarose beads can be saved for later use by washing the purification column with Binding Buffer containing 3 M NaCl. After a thorough wash, the purification column should be equilibrated in Binding Buffer containing 2 mM sodium azide and stored at 4˚C.

GST-fusion proteins are generally eluted from glutathione agarose beads with the use of excess glutathione. Alternatively, GST-fusion protein can be encoded with a cleavage site between the GST and the protein, allowing the desirable protein to be eluted with the use of a protease.

Recommended Storage Conditions: -20°C.

Binding Buffer:
50 mM Tris pH 7.8
0.15 M NaCl
2 mM Benzanidine Hydrochloride
1 mM EDTA
1 mM DTT

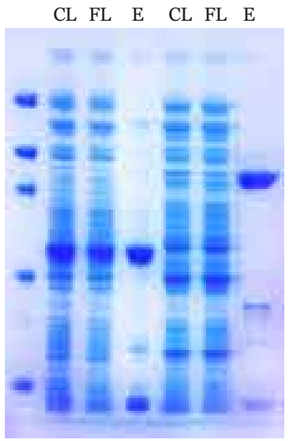
Elution Buffer:
50 mM Tris pH 7.8
0.15 M NaCl
1 mM EDTA
1 mM DTT

Name	Cat #	Size
Glutathione Agarose Beads	GAB-100	10 ml
Glutathione Agarose Beads	GAB-200	25 ml
Glutathione Agarose Beads	GAB-300	100 ml

Ni-NTA Agarose

Description:
Ni-NTA Agarose provides high binding capacity and minimal nonspecific binding for His-tagged proteins. This material has excellent handling properties for most scales of batch applications and column purification.

Application:
- For His-tag protein purification
- High capacity and high affinity (up to 60 mg/ml)
- Simply replace your current Ni-NTA products, no optimization or protocol changes necessary
- Purification under native and denaturing conditions
- Suitable for small proteins and large protein complexes, proteins with low expression rates



CL: Crude Lysate
FL: Flow-through of Crude Lysate
E: Eluate of His-Tagged protein of interest

Name	Cat #	Size
Ni-NTA Agarose	NINTA-200	25ml nickel-charged resin (50ml total volume with 50% suspension)
Ni-NTA Agarose	NINTA-300	100ml nickel-charged resin (200ml total volume with 50% suspension)
Ni-NTA Agarose	NINTA-400	500ml nickel-charged resin (1000ml total volume with 50% suspension)

Q Sepharose High Performance

Description:
Q Sepharose High Performance is a highly successful anion and cation ion exchange media for purifying a wide range of biomolecules. Their high resolution generates distinct, high purity separations and their high capacity and ease-of-use encourages preparative use and scaleup, primarily in intermediate and final purification.

Feature:
- High-resolution, high-capacity separations with high recovery
- Excellent flow rates
- Reliable and reproducible
- High chemical stability for effective CIP/sanitization
- Available in convenient HiLoad™ and HiTrap™ prepacked columns plus laboratory packs
- Easy to scale up

Name	Cat #	Size
Q Sepharose High Performance	Qsep-100	75ml
Q Sepharose High Performance	Qsep-200	5L
Q Sepharose High Performance	Qsep-300	10L

SP Sepharose Big Beads

Description:
SP Sepharose Big Beads are strong ion exchangers designed for industrial applications. The large particle size (100-300 µm) and excellent physical stability of the base matrix ensures maintained speed, even with viscous samples. SP Sepharose Big Beads are therefore the ultimate ion exchange media for initial purifications when high viscosity precludes the use of ion exchangers with smaller bead size, such as Sepharose Fast Flow ion exchangers. The unique flow characteristics are also invaluable when adsorption needs to be done quickly.

Feature:
- Easy to scale-up
- High flow rates
- High chemical resistance for effective cleaning-in-place (CIP)
- Easy maintenance

Product Specification	
Ion exchanger type	Sulfopropyl strong cation
Ionic capacity	0.18-0.25 mmol (H+)/ml
Dynamic capacity	70 mg RNase/ml medium
Pressure/flow spec.	400-700 cm/h, 100 kPa, XK 50/30 column, bed height 15 cm
Average particle size	90 µm (45-165 µm)
Matrix	Highly cross-linked agarose, 6%
pH stability	3-14 (short term), 4-13 (long term)
Chemical stability	Stable in all common aqueous buffers: 8 M urea, 6 M guanidine HCL, 70% ethanol, 1 M NaOH*, and 1 M acetic acid*.
Storage	20% ethanol (Q, DEAE, ANX, CM), 0.2 M sodium acetate in 20% ethanol (SP)
Storage temperature	4°C to 30°C

Name	Cat #	Size
SP Sepharose Big Beads	SPS-100	1L

DnaK (HSP70) E. coli Recombinant

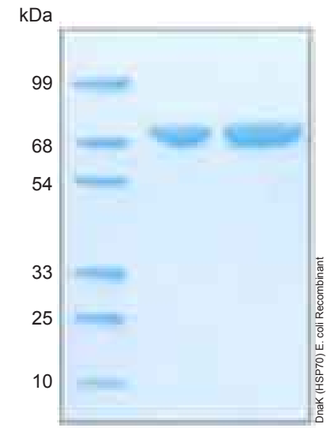
Description:
DnaK, originally identified for its DNA replication by bacteriophage l in E. coli is the bacterial hsp70 chaperone. This protein is involved in the folding and assembly of newly synthesized polypeptide chains and in preventing the aggregation of stress-denatured proteins.

Application:
- Highest transformation efficiency
- General cloning
- Blue-white selection
- Plasmid isolation

Recommended Storage Conditions:
This product should be stored at -80°C. Thaw on ice only before use. Do not re-freeze.

Genotype:
F- 80dlacZ M15 (lacZYA-argF) U169 recA1 endA1hsdR17(rk-, mk+) phoAsupE44 -thi-1 gyrA96 relA1

Reference:
Woodcock, D.M., Crowther, D.M., Doherty, J., Jefferson,S., DeCruz, E., Noyer-Weidner, M., Smith, S.S., Michael, M.Z., and Graham, M.W., Nucl. Acids Res. (1989) 17, 3469-3478



Concentration: 1.2 mg/ml
1:1 (Loading Buffer: Sample)

Name	Cat #	Size
DnaK (HSP70) E. coli Recombinant	DNAK-100	1mg, 1mg/ml
DnaK (HSP70) E. coli Recombinant	DNAK-200	50mg, 1mg/ml

GroEL

Description:
GroEL protein is a member of the chaperonin family that is required for proper protein folding. GroEL consists of 14 subunits with a total molecular weight of 57.3kDA. The recombinant full length protein was overexpressed in E. coli and purified by chromatography.

Application:
- SDS-PAGE

Source: Escherichia coli

Recommended Storage Conditions:
-20°C. Avoid repeated freeze-thaw cycles.

GroEL-Q-column 01-25-2012

Name	Cat #	Size
GroEL	GEL-100	1 mg, 1 mg/ml
GroEL	GEL-200	25 mg, 1 mg/ml

GroES

Description:
GroES protein is a chaperonin family protein that works in conjunction with GroEL to facilitate proper protein folding. GroES consists of 7 subunits with a molecular weight of 10.4kDA. The recombinant full length protein was overexpressed in E. coli and purified by chromatography.

Application: SDS-PAGE

Source:
Escherichia coli

Recommended Storage Conditions:
-20°C. Avoid repeated freeze-thaw cycles.

GroES-Ni-column 01-05-2012

Name	Cat #	Size
GroES	GES-100	1 mg, 1 mg/ml
GroES	GES-200	25 mg, 1 mg/ml

PDI1 (yeast)

Description:
Recombinant yeast Protein Disulfide Isomerase is produced in E. coli as a single, non-glycosylated, polypeptide chain, containing 503 amino acids and having a molecular mass of 62.4 kDa. The PDI is fused to a 12 amino acid His-tag (515 a.a. total) at N-terminal and purified by proprietary chromatographic techniques.
Recombinant Yeast Protein Disulfide Isomerase is involved in disulphide-bond formation and isomerization, as well as the reduction of disulphide bonds in proteins. Recombinant PDI has been found to have moderate effects (25-fold) on the rate of oxidative folding of proteins in vitro.

Source:
Escherichia Coli.

Recommended Storage Conditions: -20°C.

Physical Appearance:
Sterile Filtered liquid form or lyophilized powder

Formulation:
The PDI protein (10mg/ml)solution was lyophilized from PBS pH-7.

Solubility:
It is recommended to reconstitute the lyophilized PDI in sterile 18MΩ-cm H2O (not less than 100µg/ml), which can then be further diluted to other aqueous solutions.

Stability:
Lyophilized Protein Disulfide Isomerase, although stable at room temperature for 3 weeks, should be stored desiccated below -18°C. Upon reconstitution Human PDI should be stored at 4°C between 2-7 days and for future use below -18°C. For long term storage it is recommended to add a carrier protein (0.1% HSA or BSA).
Please avoid freeze-thaw cycles.

Purity:
Greater than 99.0% as determined by RP-HPLC.

Reductase Activity:
0.001 650nm/ min-2. By measuring the turbidity increase at 650 nm due to insulin reduction (Holmgren, A. (1979) J. Biol. Chem. 254, 96279632). The activity is expressed as the ratio of the slope of a linear part of the turbidity curve to the lag time (Mart´nez-Galisteo, E., Padilla, C. A., Garcia-Alfonso, C., Lo´pez-Barea, J., and Barcena, J. A. (1993) Biochimie (Paris) 75, 803809).

Isomerase Activity:
0.5 µmol active RNase A min-1 µmol PDI-1. According to the re-activation of reduced and denatured RNase A (Lyles, M. M. and Gilbert, H. F. (1991) Biochemistry 30, 613-619).

Name	Cat #	Size
PDI Yeast (Liquid)	PDI-100	10 mg, 10 mg/ml
PDI Yeast (Liquid)	PDI-200	50 mg, 10 mg/ml
PDI Yeast (Liquid)	PDI-300	500 mg, 10 mg/ml
PDI Yeast (Liquid)	PDI-400	1 g, 10 mg/ml
PDI Yeast (Lyophilized)	PDI-600	10 mg, 10 mg/ml
PDI Yeast (Lyophilized)	PDI-700	50 mg, 10 mg/ml
PDI Yeast (Lyophilized)	PDI-800	500 mg, 10 mg/ml
PDI Yeast (Lyophilized)	PDI-900	1 g, 10 mg/ml

SUMO Protease

Description:
SUMO (small ubiquitin-like modifiers) Protease is a highly purified recombinant yeast (Saccharomyces cerevisiae) that modulates protein structure and function by covalently binding to the lysine side chains of the target proteins. It has the capabilities to cleave a variety of SUMO fusions vigorously and with flawless precision.

Application:
- Removal of fusion tags from recombinant proteins
- Highly dynamic and precise cleavage capabilities
- Purification of proteins and peptides

Source:
E. coli derived from S. cerevisiae.

Label: His

Quality Control:
SUMO Protease has greater than 95% single-band purity with no non-specific protease contamination. It is functionally tested for the absence of any non-specific protease activity.

Unit Definition:
One unit of SUMO Protease is defined as the amount of enzyme needed to cleave 85% of 2µg of substrate protein at 30°C in one hour.

Recommended Storage Conditions: -80°C

Name	Cat #	Size
Sumo Protease	SP-100	5,000 U, 50 U/µl, 100µl
Sumo Protease	SP-200	10,000 U, 50 U/µl, 200µl
Sumo Protease	SP-300	50,000 U, 50 U/µl, 1 ml

TEV Protease

Description:
TEV (Tobacco Etch Virus) Protease is a highly site-specific cysteine protease that recognizes the cleavage site of Glu-Asn-Leu-Tyr-Phe-Gln-Gly and cleaves between Gln and Gly. TEV protease is a very useful enzyme for cleaving fusion proteins due to its high specificity and its high activity rate.

Application:
- Removal of fusion tags from recombinant proteins
- Highly dynamic and precise cleavage capabilities
- purification of proteins and peptides

Source:
E. coli derived from Tobacco Etch Virus.

Label: His

Reaction Conditions:
TEV protease is maximally active at 34 °C, but its recommended to perform digests at room temperature (20°C) or 4 °C. The activity of TEV protease is approximately 3-fold TEV Protease FAQ, 4 of 7 greater at 20 °C than at 4 °C.

Reaction Buffer:
50 mM Tris-HCL(pH 8.0), 0.5 mM EDTA and 1mM DTT

Recommended Storage Conditions: -20°C

Name	Cat #	Size
TEV Protease	TEP-100	1mg, 1mg/ml
TEV Protease	TEP-200	10mg, 1mg/ml
TEV Protease	TEP-300	25mg, 1mg/ml

TurboTEV Protease

Description:
TurboTEV (Tobacco Etch Virus) Protease is a highly enhanced site-specific cysteine protease that recognizes the cleavage site of Glu-Asn-Leu-Tyr-Phe-Gln-Gly and cleaves between Gln and Gly. TurboTEV protease is resistant to auto-inactivation under normal reaction conditions and works as a better catalyst than the wild-type enzyme. It is a very useful enzyme for cleaving fusion proteins due to its high specificity and its high activity rate without the requirements of specialized buffer. It has both His tags and GST, which allows it to be removed by Ni-chelating or GSH resin.

Application:
- Removal of fusion tags from recombinant proteins
- Highly dynamic and precise cleavage capabilities
- Purification of proteins and peptides

Source:
E. coli derived from Tobacco Etch Virus.

Label: His and GST

Reaction Conditions:
Turbo TEV protease is maximally active at 34°C, but its recommended to perform digests at room temperature (20°C) or 4°C. The activity of TEV protease is approximately 3-fold greater at 20 °C than at 4°C.

Reaction Buffer:
50 mM Tris-HCL(pH 8.0), 0.5 mM EDTA and 1mM DTT

Recommended Storage Conditions: -20°C

Name	Cat #	Size
TurboTEV Protease	TTP-100	1mg, 2mg/ml
TurboTEV Protease	TTP-200	10mg, 2mg/ml
TurboTEV Protease	TTP-300	25mg, 2mg/ml

E. coli (DH5a) Cell Lysate

Application:
Protein Array Blocking Reagent.

Recommended Storage Conditions:
Store at room temperature.

Name	Cat #	Size
E. coli (DH5a) Cell Lysate	ECCL-100	1 Kit (10 tubes)

Electrophoresis Products

Precast Agarose Gels

Description:
MCLAB's Precast Agarose Gels are designed for DNA fragment separation for most gel electrophoresis application. These gels are cast in different concentrations and well formats in order to offer the best separation and resolution access for nucleic acid analysis.

Precast Agarose Gels Resolution:
1% Gel, reproducible resolution of DNA or RNA fragments for 500pb – 5kb.
2% Gel, reproducible resolution of DNA or RNA fragments for 200-300pb – 1kb.
3% Gel, reproducible resolution of DNA or RNA fragments for 50bp – 500bp.
4% Gel, reproducible resolution of DNA or RNA fragments for <50bp.

MCLAB'S Precast Agarose Gels are packaged 10 gels/box. 20 wells gels are packaged 5 gels/box.

Recommended Storage Conditions: 4° C.

Name	Cat #	Size
Precast Agarose Gels	PG1-A10	1.0%, TAE, 10 wells, 10 gels/box
Precast Agarose Gels	PG1-A12	1.0%, TAE, 12 wells, 10 gels/box
Precast Agarose Gels	PG1-A20	1.0%, TAE, 15 wells, 10 gels/box
Precast Agarose Gels	PG1-AE10	1.0%, TAE, EB buffer, 10 wells, 10 gels/box
Precast Agarose Gels	PG1-AE12	1.0%, TAE, EB buffer, 12 wells, 10 gels/box
Precast Agarose Gels	PG1-AE20	1.0%, TAE, EB buffer, 15 wells, 10 gels/box
Precast Agarose Gels	PG1-B10	1.0%, TBE, 10 wells, 10 gels/box
Precast Agarose Gels	PG1-B12	1.0%, TBE, 12 wells, 10 gels/box
Precast Agarose Gels	PG1-B20	1.0%, TBE, 15 wells, 10 gels/box
Precast Agarose Gels	PG1-BE10	1.0%, TBE, EB buffer, 10 wells, 10 gels/box
Precast Agarose Gels	PG1-BE12	1.0%, TBE, EB buffer, 12 wells, 10 gels/box
Precast Agarose Gels	PG1-BE20	1.0%, TBE, EB buffer, 15 wells, 10 gels/box
Precast Agarose Gels	PG2-A10	2.0%, TAE, 10 wells, 10 gels/box
Precast Agarose Gels	PG2-A12	2.0%, TAE, 12 wells, 10 gels/box
Precast Agarose Gels	PG2-A20	2.0%, TAE, 15 wells, 10 gels/box
Precast Agarose Gels	PG2-AE10	2.0%, TAE, EB buffer, 10 wells, 10 gels/box
Precast Agarose Gels	PG2-AE12	2.0%, TAE, EB buffer, 12 wells, 10 gels/box
Precast Agarose Gels	PG2-AE20	2.0%, TAE, EB buffer, 15 wells, 10 gels/box
Precast Agarose Gels	PG2-B10	2.0%, TBE, 10 wells, 10 gels/box
Precast Agarose Gels	PG2-B12	2.0%, TBE, 12 wells, 10 gels/box
Precast Agarose Gels	PG2-B20	2.0%, TBE, 15 wells, 10 gels/box
Precast Agarose Gels	PG2-BE10	2.0%, TBE, EB buffer, 10 wells, 10 gels/box
Precast Agarose Gels	PG2-BE12	2.0%, TBE, EB buffer, 12 wells, 10 gels/box
Precast Agarose Gels	PG2-BE20	2.0%, TBE, EB buffer, 15 wells, 10 gels/box
Precast Agarose Gels	PG3-A10	3.0%, TAE, 10 wells, 10 gels/box
Precast Agarose Gels	PG3-A12	3.0%, TAE, 12 wells, 10 gels/box
Precast Agarose Gels	PG3-A20	3.0%, TAE, 15 wells, 10 gels/box
Precast Agarose Gels	PG3-AE10	3.0%, TAE, EB buffer, 10 wells, 10 gels/box
Precast Agarose Gels	PG3-AE12	3.0%, TAE, EB buffer, 12 wells, 10 gels/box
Precast Agarose Gels	PG3-AE20	3.0%, TAE, EB buffer, 15 wells, 10 gels/box
Precast Agarose Gels	PG3-B10	3.0%, TBE, 10 wells, 10 gels/box
Precast Agarose Gels	PG3-B12	3.0%, TBE, 12 wells, 10 gels/box
Precast Agarose Gels	PG3-B20	3.0%, TBE, 15 wells, 10 gels/box
Precast Agarose Gels	PG3-BE10	3.0%, TBE, EB buffer, 10 wells, 10 gels/box
Precast Agarose Gels	PG3-BE12	3.0%, TBE, EB buffer, 12 wells, 10 gels/box
Precast Agarose Gels	PG3-BE20	3.0%, TBE, EB buffer, 15 wells, 10 gels/box
Precast Agarose Gels	PG4-A10	4.0%, TAE, 10 wells, 10 gels/box
Precast Agarose Gels	PG4-A12	4.0%, TAE, 12 wells, 10 gels/box
Precast Agarose Gels	PG4-A20	4.0%, TAE, 15 wells, 10 gels/box
Precast Agarose Gels	PG4-AE10	4.0%, TAE, EB buffer, 10 wells, 10 gels/box
Precast Agarose Gels	PG4-AE12	4.0%, TAE, EB buffer, 12 wells, 10 gels/box
Precast Agarose Gels	PG4-AE20	4.0%, TAE, EB buffer, 15 wells, 10 gels/box
Precast Agarose Gels	PG4-B10	4.0%, TBE, 10 wells, 10 gels/box
Precast Agarose Gels	PG4-B12	4.0%, TBE, 12 wells, 10 gels/box
Precast Agarose Gels	PG4-B20	4.0%, TBE, 15 wells, 10 gels/box
Precast Agarose Gels	PG4-BE10	4.0%, TBE, EB buffer, 10 wells, 10 gels/box

Name	Cat #	Size
Precast Agarose Gels	PG4-BE12	4.0%, TBE, EB buffer, 12 wells, 10 gels/box
Precast Agarose Gels	PG4-BE20	4.0%, TBE, EB buffer, 15 wells, 10 gels/box

NanoPOP™ Polymers
See page 50, 51, 52.

TrenX™ PAGE Gels
See page 140, 141.

200x Redox Running Buffer Agent
See page 142.

4x Sample Buffer
See page 142.

Protein Ladder (10 – 99kDa)
See page 143.

Quik-Stain
See page 144.

SDS High Molecular Weight Running Buffer
See page 145.

SDS Low Molecular Weight Running Buffer
See page 145.

Competent E. coli

BL21 Competent E. coli

Description:
Chemically competent E. coli cells suitable for transformation and protein expression. This strain does not express the T7 RNA polymerase.

Application:
Ideal for expressing proteins in E. coli.

Recommended Storage Conditions:
This product should be stored at -80°C. Thaw on ice only before use. Do not re-freeze.

Recommended Reaction Conditions:
- Mix DNA with competent cell
- Let stand on bench for 5 minutes
- Load directly to plate

Genotype:
E. coli B F- dcm ompT hsdS(rB- mB-) gal [malB+]K-12(λS)

Reference:
Miroux B, Walker JE. J. Mol. Biol. (1996) 260, 289-298.

Competent Cell Type: Chemically Competent

Transformation Efficiency (cfu/μg): >1x10^8

Blue-White Screening: No

Strain: B

Reduces Recombination: No

Cloning Methylated DNA: No

Improves Plasmid Quality: No

Preparing Unmethylated DNA: Not Suitable

T1 Phage Resistant: No

RecA Deficient: No

Name	Cat #	Size
BL21 Competent E. coli	BL21-100	10x100μl (10 tubes)
BL21 Competent E. coli	BL21-196	96x50μl (96-well plate)

BL21(DE3) Competent E. coli

Description:
High yields, high efficiency, no heat shock necessary.

Application:
- Ideal for expressing proteins in E. coli.
- BL21(DE3) cells carry the lambda DE3 lysogen.

Recommended Torage Condition:
This product should be stored at -80°C. Thaw on ice only before use. Do not re-freeze.

Recommended Reaction Conditions:
- Mix DNA with competent cell
- Let stand on bench for 5 minutes
- Load directly to plate

Genotype:
F ompT gal dcm lon hsdSB(rB- mB-) λ(DE3 [lacI lacUV5-T7 gene 1 ind1 sam7 nin5])

Reference:
Miroux B, Walker JE. J. Mol. Biol. (1996) 260, 289-298.

Competent Cell Type: Chemically Competent

Transformation Efficiency (cfu/μg): >1x10^8

Blue-White Screening: No

Strain: B

Reduces Recombination: No

Cloning Methylated DNA: No

Improves Plasmid Quality: No

Preparing Unmethylated DNA: Not Suitable

T1 Phage Resistant: No

RecA Deficient: No

Name	Cat #	Size
BL21(DE3) Competent E. coli	BS-100	10x100μl (10 tubes)
BL21(DE3) Competent E. coli	BS-196	96x50μl (96-well plate)

BL21(DE3)pLysS Competent E. coli

Description:
High yields, high efficiency, no heat shock necessary.
BL21(DE3)pLysS cells carry the lambda DE3 lysogen. In addition, L21(DE3)pLysS cells contain the pLysS plasmid, which constitutively expresses T7 lysozyme. T7 lysozyme reduces the basal expression of target genes by inhibiting T7 RNA polymerase. This provides tight control of T7 RNA polymerase,which is necessary when the recombinant protein to be expressed is toxic.

Application:
- Ideal for expressing proteins that are toxic to E. coli.

Recommended Storage Conditions:
This product should be stored at -80°C. Thaw on ice only before use. Do not re-freeze.

Recommended Reaction Conditions:
- Mix DNA with competent cell
- Let stand on bench for 5 minutes
- Load directly to plate

Genotype:
F- ompT gal dcm lon hsdSB(rB- mB-) λ(DE3) pLysS(cmR)

Reference:
Miroux B, Walker JE. J. Mol. Biol. (1996) 260, 289-298.

Competent Cell Type: Chemically Competent

Transformation Efficiency (cfu/µg): >1x10^{8}

Blue-White Screening: No

Strain: B

Reduces Recombination: No

Cloning Methylated DNA: No

Improves Plasmid Quality: No

Preparing Unmethylated DNA: Not Suitable

T1 Phage Resistant: No

RecA Deficient: No

Name	Cat #	Size
BL21(DE3)pLysS Competent E. coli	BP-100	10x100µl (10 tubes)
BL21(DE3)pLysS Competent E. coli	BP-196	96x50µl (96-well plate)

Dh10-Beta Competent E. coli

Description:
Suitable for high efficiency transformation in a wide variety of applications.

Application:
- Highest transformation efficiency
- General cloning
- Blue-white selection
- Reduced recombination of cloned DNA (recA1)

Recommended Storage Conditions:
This product should be stored at -80°C. Thaw on ice only before use. Do not re-freeze.

Genotype:
F- mcrA Δ(mrr-hsdRMS-mcrBC) Φ80lacZΔM15 endA1 recA1 nupG rpsL ΔlacX74 araD139 Δ(ara,leu)7697 λ-

Competent Cell Type: Chemically Competent

Transformation Efficiency (cfu/µg): >3x10^{9}

Blue-White Screening: Yes

Strain: K12

Reduces Recombination: Yes

Cloning Methylated DNA: Yes

Improves Plasmid Quality: Yes

Preparing Unmethylated DNA: Not Suitable

T1 Phage Resistant: No

RecA Deficient: Yes

Name	Cat #	Size
Dh10-Beta Competent E. coli	DH10-100	10x100µl (10 tubes)
Dh10-Beta Competent E. coli	DH10-196	96x50µl (96-well plate)

Dh5-Alpha Competent E. coli

Description:
Dh5-Alpha is the most frequently used E. coli strain for routine cloning applications. In addition to supporting blue/white screening recA1 and endA1 mutations, Dh5-Alpha increases insert stability and improves the quality of plasmid DNA prepared for minipreps.

Application:
- Highest transformation efficiency
- General cloning
- Blue-white selection
- Plasmid isolation

Recommended Storage Conditions:
This product should be stored at -80°C. Thaw on ice only before use. Do not re-freeze.

Genotype:
F- 80dlacZ M15 (lacZYA-argF) U169 recA1 endA1hsdR17(rk-, mk+) phoAsupE44 -thi-1 gyrA96 relA1

Reference:
Woodcock, D.M., Crowther, D.M., Doherty, J., Jefferson,S., DeCruz, E., Noyer-Weidner, M., Smith, S.S., Michael, M.Z., and Graham, M.W., Nucl. Acids Res. (1989) 17, 3469-3478

Competent Cell Type: Chemically Competent

Transformation Efficiency (cfu/µg): >3x10^9

Blue-White Screening: Yes

Strain: K12

Reduces Recombination: Yes

Cloning Methylated DNA: No

Improves Plasmid Quality: Yes

Preparing Unmethylated DNA: Not Suitable

T1 Phage Resistant: No

RecA Deficient: Yes

Name	Cat #	Size
Dh5-Alpha Competent E. coli	DA-100	10x100µl (10 tubes)
Dh5-Alpha Competent E. coli	DA-196	96x50µl (96-well plate)
Dh5-Alpha Competent E. coli	DA-144A*	Pre-payment for one year, 15 plates of DA-196 Kit, individual shipping and handling charges will apply.

HB101 Competent E. coli

Description:
High stability, high efficiency, no heat shock necessary.
HB101 strain is a hybrid K12 x B bacterium, containing the recA13 mutation that minimizes recombination and aids in insert stability. In addition, it carries the hsdS20(rB-mB-) restriction minus genotype which prevents cleavage of cloned DNA by endogenous restriction enzymes. HB101 strain does not support Alpha-Complementation for blue/white screening. Transform efficiency is around 1.0x10^7 ~ 1.0x10^9 cfu/µg with pUC18 control DNA.

Application:
- Ideal for sub-cloning and scale-up applications

Recommended Storage Conditions:
This product should be stored at -80°C. Thaw on ice only before use. Do not re-freeze.

Recommended Reaction Conditions:
- Mix DNA with competent cell
- Let stand on bench for 5 minutes
- Load directly to plate

Genotype:
F- mcrB mrr hsdS20(rB- mB-) recA13 leuB6 ara-14 proA2 lacY1 galK2 xyl-5 mtl-1 rpsL20(SmR) glnV44 λ-

Reference:
Boyer, H. W., Roulland-Dussoix, D. J. Mol. Biol., (1969) 41: 459-472

Competent Cell Type: Chemically Competent

Transformation Efficiency (cfu/µg): >1x10^9

Blue-White Screening: No

Strain: Hybrid

Reduces Recombination: Yes

Cloning Methylated DNA: Yes

Improves Plasmid Quality: Yes

Preparing Unmethylated DNA: Yes

T1 Phage Resistant: No

RecA Deficient: Yes

Name	Cat #	Size
HB101 Competent E. coli	HB-100	10x100µl (10 tubes)
HB101 Competent E. coli	HB-196	96x50µl (96-well plate)

JM109 Competent E. coli

Description:
High stability, high efficiency, no heat shock necessary.
JM109 is a K strain bacterium that provides minimized recombination and aids in plasmid stability which results in high quality plasmid DNA preparation. The strain carries the hsdR17 genotype, which prevents cleavage of heterologous DNA by an endogenous endonuclease. JM109 strain supports Alpha-Complementation for blue/white screening for recombinant plasmids. The presence of the F' factor also allows growth of bacterio-phage M13 vectors for rescue of single-stranded DNA. Transform efficiency is around 1.0 x 10^7 ~ 1.0 x 10^8 cfu/µg with pUC18 control DNA.

Application:
- Ideal for sub-cloning, single-stranded DNA, high quality plasmid preparation, and library construction

Recommended Storage Conditions:
This product should be stored at -80°C. Thaw on ice only before use. Do not re-freeze.

Recommended Reaction Conditions:
- Mix DNA with competent cell
- Let stand on bench for 5 minutes
- Load directly to plate

Genotype:
F' (traD36, proAB+, lacIq, lacZ-M15),endA1, recA1, hsdR17, (rk-, mk+), mcrA, supE44, e-gyrA96, relA1, -(lac-proAB)

Reference:
Yanisch-Perron, C.; Vieira, J.; and Messing, J. Gene, (1985) 33, 103-119

Competent Cell Type: Chemically Competent

Transformation Efficiency (cfu/µg): >1x10^9

Blue-White Screening: Yes

Strain: K12

Reduces Recombination: Yes

Cloning Methylated DNA: No

Improves Plasmid Quality: Yes

Preparing Unmethylated DNA: Yes

T1 Phage Resistant: No

RecA Deficient: Yes

Name	Cat #	Size
JM109 Competent E. coli	JM-100	10x100µl (10 tubes)
JM109 Competent E. coli	JM-196	96x50µl (96-well plate)

Customized Competent E. coli.

You may use our customized cell service when you need to make your strain of cells competent or to increase their transformation efficiency. This service is comprehensive and customized to meet your applications.

We offer the following in this service:
- High transformation efficiencies
- Fast turnaround time
- Quality control performance testing

For more detailed information, please inquire.

Name	Cat #	Size
Customized Competent E. coli	CC-100	>10^9

Antibody-related Products

Recombinant Protein G

Description:
Recombinant Protein G is an immunoglobulin-binding protein derived from the cell wall of certain strains of β-hemolytic Streptococci. It binds with high affinity to the Fc portion of various classes and subclasses of immunoglobulins from a variety of species. The albumin and cell surface binding domains have been eliminated from Recombinant Protein G to reduce nonspecific binding and, therefore, can be used to separate IgG from crude samples. Due to its affinity for the Fc region of many mammalian immunoglobulins, protein G is a major application in purifying antibodies. Protein G is considered a universal reagent in biochemistry and immunology.

Application:
- Antibody purification
- Protein purification
- Isolates immune complexes
- Immunoprecipitation
- Immunoaffinity purification
- Western blotting

Source:
Purified from E. coli that carries the protein G gene of G Streptococci.

Purity:
>98% by SDS-PAGE and HPLC analyses. The albumin binding domain as well as cell wall and cell membrane binding domains have been removed to ensure the maximum specific IgG binding capacity. This protein contains only IgG binding domains.

Recommended Storage Conditions:
-20°C. Avoid repeated freeze-thaw cycles.

Usage:
Under optimal conditions, 1 mg protein G will bind approximately 5 mg human IgG. Optimal binding of Protein G to antibodies occurs at pH 5.0 to 6.0 and can be eluted over a pH range of 2.5 to 3.0.

Name	Cat #	Size
Protein G (Liquid form)	PPG-101	10 mg; 50 mg/ml
Protein G (Liquid form)	PPG-102	50 mg; 50 mg/ml
Protein G (Lyophilized)	PPG-201	10 mg
Protein G (Lyophilized)	PPG-202	50 mg
Protein G (Lyophilized)	PPG-203	250 mg
Protein G (N-terminal His-tag) (Liquid form)	PPG-103	10 mg; 50 mg/ml
Protein G (N-terminal His-tag) (Liquid form)	PPG-104	50 mg; 50 mg/ml
Protein G (N-terminal His-tag) (Lyophilized)	PPG-205	10 mg
Protein G (N-terminal His-tag) (Lyophilized)	PPG-206	50 mg
Protein G (N-terminal His-tag) (Lyophilized)	PPG-207	250 mg

Recombinant Protein G (FITC)

Description:
See page 176.

Application:
- Antibody purification
- Protein purification
- Isolates immune complexes
- Immunoprecipitation
- Immunoaffinity purification
- Western blotting

Source:
Purified from E. coli that carries the protein G gene of G Streptococci.

Purity:
>98% by SDS-PAGE and HPLC analyses. The albumin binding domain as well as cell wall and cell membrane binding domains have been removed to ensure the maximum specific IgG binding capacity. This protein contains only IgG binding domains.

Recommended Storage Conditions:
-20°C. Avoid repeated freeze-thaw cycles.

Usage:
Under optimal conditions, 1 mg protein G will bind approximately 5 mg human IgG. Optimal binding of Protein G to antibodies occurs at pH 5.0 to 6.0 and can be eluted over a pH range of 2.5 to 3.0.

Name	Cat #	Size
Protein G (FITC)	PPG-700	1 mg
Protein G (FITC)	PPG-701	10 mg
Protein G (FITC)	PPG-702	50 mg

Recombinant Protein G, Agarose

Description:
See page 176.

Application:
- Antibody purification
- Protein purification
- Isolates immune complexes
- Immunoprecipitation
- Immunoaffinity purification
- Western blotting

Source:
Purified from E. coli that carries the protein G gene of G Streptococci.

Purity:
>98% by SDS-PAGE and HPLC analyses. The albumin binding domain as well as cell wall and cell membrane binding domains have been removed to ensure the maximum specific IgG binding capacity. This protein contains only IgG binding domains.

Recommended Storage Conditions:
4°C.

Usage:
Under optimal conditions, 1 mg protein G will bind approximately 5 mg human IgG. Optimal binding of Protein G to antibodies occurs at pH 5.0 to 6.0 and can be eluted over a pH range of 2.5 to 3.0.

Name	Cat #	Size
Protein G Agarose	PPG-401	10 ml settled resin volume
Protein G Agarose	PPG-402	50 ml settled resin volume
Protein G Agarose	PPG-403	100 ml settled resin volume

Recombinant Protein G, Alkaline Phosphatase Conjugate

Description:
See page 176.

Application:
- Antibody purification
- Protein purification
- Isolates immune complexes
- Immunoprecipitation
- Immunoaffinity purification
- Western blotting

Source:
Purified from E. coli that carries the protein G gene of G Streptococci.

Purity:
>98% by SDS-PAGE and HPLC analyses. The albumin binding domain as well as cell wall and cell membrane binding domains have been removed to ensure the maximum specific IgG binding capacity. This protein contains only IgG binding domains.

Recommended Storage Conditions:
-20°C. Avoid repeated freeze-thaw cycles.

Usage:
Under optimal conditions, 1 mg protein G will bind approximately 5 mg human IgG. Optimal binding of Protein G to antibodies occurs at pH 5.0 to 6.0 and can be eluted over a pH range of 2.5 to 3.0.

Name	Cat #	Size
Protein G, Alkaline Phosphatase Conjugate	PPG-900	500 µg
Protein G, Alkaline Phosphatase Conjugate	PPG-901	5 mg
Protein G, Alkaline Phosphatase Conjugate	PPG-902	10 mg

Recombinant Protein G, Biotinylated

Description:
See page 176.

Application:
- Antibody purification
- Protein purification
- Isolates immune complexes
- Immunoprecipitation
- Immunoaffinity purification
- Western blotting

Source:
Purified from E. coli that carries the protein G gene of G Streptococci.

Purity:
>98% by SDS-PAGE and HPLC analyses. The albumin binding domain as well as cell wall and cell membrane binding domains have been removed to ensure the maximum specific IgG binding capacity. This protein contains only IgG binding domains.

Recommended Storage Conditions:
-20°C. Avoid repeated freeze-thaw cycles.

Usage:
Under optimal conditions, 1 mg protein G will bind approximately 5 mg human IgG. Optimal binding of Protein G to antibodies occurs at pH 5.0 to 6.0 and can be eluted over a pH range of 2.5 to 3.0.

Name	Cat #	Size
Recombinant Protein G, Biotinylated	PPG-500	1 mg
Recombinant Protein G, Biotinylated	PPG-501	10 mg
Recombinant Protein G, Biotinylated	PPG-502	25 mg

Recombinant Protein G, HRP Conjugated

Description:
See page 176.

Application:
- Antibody purification
- Protein purification
- Isolates immune complexes
- Immunoprecipitation
- Immunoaffinity purification
- Western blotting

Source:
Purified from E. coli that carries the protein G gene of G Streptococci.

Purity:
>98% by SDS-PAGE and HPLC analyses. The albumin binding domain as well as cell wall and cell membrane binding domains have been removed to ensure the maximum specific IgG binding capacity. This protein contains only IgG binding domains.

Recommended Storage Conditions:
-20°C. Avoid repeated freeze-thaw cycles.

Usage:
Under optimal conditions, 1 mg protein G will bind approximately 5 mg human IgG. Optimal binding of Protein G to antibodies occurs at pH 5.0 to 6.0 and can be eluted over a pH range of 2.5 to 3.0.

Name	Cat #	Size
Protein G, HRP Conjugated	PPG-801	500 µg
Protein G, HRP Conjugated	PPG-802	5 mg
Protein G, HRP Conjugated	PPG-803	10 mg

Recombinant Protein A

Description:
Recombinant Protein A is an immunoglobulin-binding protein derived from the cell wall of the bacterium Staphylococcus aureus. It is composed of five homologous Ig-binding domains that fold into a three-helix bundle. Each domain is able to bind proteins from many of mammalian species, most notably IgGs. Protein A binds with high affinity to human IgG1 and IgG2 as well as mouse IgG2a and IgG2b. Protein A binds with moderate affinity to human IgM, IgA and IgE as well as to mouse IgG3 and IgG1. It does not react with human IgG3 or IgD, nor will it react to mouse IgM, IgA or IgE. It binds the heavy chain with the Fc region of most immunoglobulins and also within the Fab region in the case of the human VH3 family. Through these interactions in serum, where IgG molecules are bound in the wrong orientation (in relation to normal antibody function), the bacteria disrupts opsonization and phagocytosis.

Application:
- Antibody purification
- Protein purification
- Isolates immune complexes

Source:
Purified from E. coli that carries the protein A gene of Staphylococcus aureus.

Purity:
>98% by SDS-PAGE and HPLC analyses.

Recommended Storage Conditions:
-20°C. Avoid repeated freeze-thaw cycles.

Name	Cat #	Size
Protein A (Liquid form)	PPA-101	10 mg; 50 mg/ml
Protein A (Liquid form)	PPA-102	500 mg; 50 mg/ml
Protein A (Lyophilized)	PPA-201	1 g
Protein A (Lyophilized)	PPA-202	10 g
Protein A (Lyophilized)	PPA-203	100 g
Protein A (Lyophilized)	PPA-204	1000 g
Protein A (N-terminal His-tag) (Liquid form)	PPA-103	10 mg; 50 mg/ml
Protein A (N-terminal His-tag) (Liquid form)	PPA-104	500 mg; 50 mg/ml
Protein A (N-terminal His-tag) (Lyophilized)	PPA-205	1 g
Protein A (N-terminal His-tag) (Lyophilized)	PPA-206	10 g
Protein A (N-terminal His-tag) (Lyophilized)	PPA-207	100 g
Protein A (N-terminal His-tag) (Lyophilized)	PPA-208	1000 g

Recombinant Protein A, Agarose

Description:
See page 182.

Application:
- Antibody purification
- Protein purification
- Isolates immune complexes

Source:
Purified from E. coli that carries the protein A gene of Staphylococcus aureus.

Purity:
>98% by SDS-PAGE and HPLC analyses.

Recommended Storage Conditions:
4°C.

Name	Cat #	Size
Protein A Agarose	PPA-501	2 ml settled resin volume
Protein A Agarose	PPA-502	5 ml settled resin volume
Protein A Agarose	PPA-503	25 ml settled resin volume
Protein A Agarose	PPA-504	75 ml settled resin volume

Nucleic Acid Purification

Nucleic Acid Purification

Puramag™ Plasmid DNA Isolation Kit

Description:
The Puramag™ Plasmid DNA Isolation Kit provides rapid isolation of high quality plasmid DNA, BACs, PACs, and cosmids after alkaline-SDS lysis of bacterial cells. The carboxyl coated magnetic beads provide efficient binding of plasmid DNA which is then easily eluted with deionized water or a low salt buffer (Tris-HCL, TE). The system is easily automatable after bacterial lysis and usually results in ~10µg yield of high quality plasmid DNA from 1ml E. coli cultures. The resulting plasmid DNA after Puramag™ Plasmid is ready for subsequent downstream molecular biology applications including digestion and fluorescent DNA sequencing.

Features:
- Quick, simple, and high-throughput (384 samples in <1 hour)
- Easily automated on most robotic platforms
- More cost-effective than column purification
- More robust yield than competitor's magnetic bead or column based plasmid isolation systems (Fig. 1)
- Results in molecular biology grade plasmid DNA ready for various downstream applications such as restriction digest (Fig 2).

Recommended Storage Conditions: 4°C.

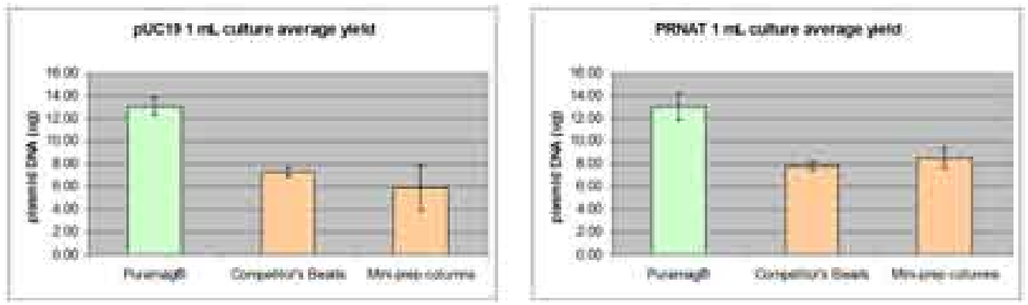


Figure 1: Comparison of Puramag™ beads, Competitor's beads, and Mini-prep columns in pUC19 and PRNAT plasmid isolation. The plasmids were isolated from pUC19 and PRNAT inoculated 1ml E. coli cultures in LB medium. The cultures were incubated overnight (17 hour) at 37°C.

Figure 2: Gel image showing pUC19 after isolation with Puramag™ beads and subsequent restriction digests. Wells 1 and 2 show supercoiled pUC19 plasmid after isolation with Puramag™ Plasmid Isolation kit. Wells 3 and 4 show pUC19 after digest with EcoRI. Wells 5 and 6 show pUC19 after EcoRI and HindIII double digest. The samples were run on a 1% agarose gel in 1X TAE buffer at 120V for 30 minutes.

Name	Cat #	Size
Puramag® Plasmid DNA Isolation Kit	PMB-100	Solution1, 2, 3, 5ml each; Puramag® Bead Solution 1ml; Elution Buffer 5ml.
Puramag® Plasmid DNA Isolation Kit	PMB-101	Solution1, 2, 3, 40ml each; Puramag® Bead Solution 8ml; Elution Buffer 40ml.
Puramag® Plasmid DNA Isolation Kit	PMB-102	Solution1, 2, 3, 500ml each; Puramag® Bead Solution 100ml; Elution Buffer 500ml.

Nucleic Acid Purification

Mini Plus Plasmid DNA Extraction System

Description:
Mini Plus Plasmid DNA extraction system presents the highest yield of plasmid DNA compared to other mini-prep systems on the market. Mini Plus Plasmid DNA extraction system also provides the best compatibility with the widest range of samples. Up to 40μg of high quality plasmid DNA is extracted with a modified alkaline lysis procedure along with simple binding and washing steps. The final product is ready-to use for many downstream molecular biology applications.

Application:
Mini Plus system provides reproducible yields of high-purity DNA suitable for use in most applications, including:
- Restriction digestion
- Transformation
- PCR
- Automated fluorescent and radioactive sequencing
- Library screening or large-scale screening

Features:
- Simple 20-30 minutes binding-washing-elution protocol
- Optional for spin or vacuum format
- No organic solvents (phenol/chloroform) extraction needed
- Reproducible yields of high-purity plasmid DNA

Recommended Storage Conditions: 4°C.

Name	Cat #	Size
Mini Plus Plasmid DNA Extraction System	PPMC-100	50 preps
Mini Plus Plasmid DNA Extraction System	PPMC-200	250 preps

Midi Plus and Maxi Plus Ultrapure Plasmid Extraction System

Description:
Ultrapure Plasmid Extraction System allows for the isolation of ultrapure plasmid DNA from a large volume of sample culture. Plasmid DNA purified from our proprietary anion-exchange resin is suitable for the use in PCR reaction, transfection, automated sequencing, and enzymatic modifications.

Application:
Plasmid or cosmid DNA purified with Ultrapure Plasmid Extraction System is ideal for the use in following applications:
- Transfection
- Transformation
- Ligation and cloning
- Manual or automated sequencing, including radioactive and fluorescent sequencing
- In vitro transcription

Features:
- Rapid and simple extraction
- Reproducible yields of ultrapure DNA
- No toxic reagent such as ethidium bromide, phenol/chloroform, CsCl involved

Midi Plus can provide more than 100μg yield of plasmid DNA from the medium scale cell culture in each preparation.
Maxi Plus can provide more than 500μg yield of plasmid DNA from the medium scale cell culture in each preparation.

Recommended Storage Conditions: 4°C.

Suitable Sample:
E. coli cell culture containing plasmid.

Advantages:
High quality Plasmid DNA is more easily extracted with a much shorter handling time.

Name	Cat #	Size
Midi Plus Ultrapure Plasmid Extraction System	PPMD-100	25 preps
Midi Plus Ultrapure Plasmid Extraction System	PPMD-200	50 preps
Maxi Plus Ultrapure Plasmid Extraction System	PPMX-100	10 preps
Maxi Plus Ultrapure Plasmid Extraction System	PPMX-200	25 preps

Nucleic Acid Purification

Endotoxin-Free Midi/Maxi Ultrapure Plasmid Extraction System

Description:
Endotoxin-Free Midi/Maxi Ultrapure Plasmid Extraction System can improve your cell transfection efficiency especially with sensitive cell lines. With our advanced technology, simply add and mix endotoxin-removal reagent (E2 Reagent) to effectively remove contamination of endotoxins such as lipopolysacchrides (LPS) from bacterial cell lysate. Using our Endotoxin-Free Ultrapure Plasmid Extraction System, the endotoxin level in your final plasmid DNA products can be less than 0.1 EU/μg plasmid DNA.

Application:
Plasmid or cosmid DNA purified with Endotoxin-Free Utrapure Plasmid Extraction System is ideal for the use in following applications:
- Transfection of sensitive cells (mammalian primary/ suspension cells)
- Gene silencing study
- Microinjection
- Other routine cloning applications

Features:
- Rapid and simple extraction
- Reproducible high yields of ultrapure DNA
- No toxic reagent such as ethidium bromide, phenol/ chloroform, CsCl involved
- Effective endotoxin removal step
- Endotoxin level can be consistently less than 0.1 EU/μg DNA in the final DNA product

Recommended Storage Conditions: 4°C.

Name	Cat #	Size
Extraction Midiprep System	EFD-100	25 preps
Extraction Maxiprep System	EFX-100	15 preps

Gel Advanced Extraction Miniprep System

Description:
Gel Advanced Gel Extraction System is designed to extract and purify DNA fragments from agarose gel. This system is based on binding up to 20μg DNA on a silica-based membrane in chemotropic salts with the recovery up to 90%. The final DNA products are free from agarose, salts and are ready-to-use for a wide range of molecular biology applications.

Application:
DNA purified with the Gel Advanced Extraction Miniprep System can be used directly in most applications, including:
- Automated fluorescent and radioactive sequencing & PCR
- Restriction digestion & modifying enzymatic reaction
- Ligation
- Labeling, & hybridization

Features:
- Efficient extraction of DNA fragments from 100-bp to 10-kb
- Recover DNA fragments from standard of low-melting point agarose gels in TAE or TBE buffer
- Elute DNA with just 15~30μl elution buffer or ddH_2O
- Recovery up to 90%
- Preparation Time: 10-15 minutes
- No sodium iodide to interfere with subsequent reactions
- No shearing of large DNA fragments

Recommended Storage Conditions: 4°C.

Suitable samples: Agarose gel slices

DNA isolation size: 100bp-10kbp

Name	Cat #	Size
Gel Advanced Extraction Miniprep System	GAE-100	50 preps
Gel Advanced Extraction Miniprep System	GAE-200	250 preps

Nucleic Acid Purification

PCR Advanced Clean Up Miniprep System

Description:
PCR Advanced Clean Up Miniprep System provides for a simple and fast method to purify DNA fragments from PCR reactions and from enzymatic reaction components such as enzymes and salts without having to work with toxic organic solvents. This system is based on binding up to 20µg of DNA on a silica-based membrane in chaotropic salts with a recovery rate of up to 95%. The easy binding and washing procedures can be finished within 10 minutes, resulting in ready-to-use DNA.

Application:
PCR Advanced Clean Up Miniprep System provides reproducible yields of high-purity DNA suitable for use in most applications, including:
- Automated fluorescent and radioactive sequencing & PCR
- Restriction digestion & modifying enzymatic reaction
- Ligation
- Labeling & Hybridization

Features:
- Clean up DNA in 5 minutes
- Up to 95% recovery of DNA fragment (100-bp to 10-kbp)
- High purity of DNA (A260 /A280 >1.9)
- > 95% primer and salts removal
- Elute DNA with just 15~30 µl Elution buffer or ddH2O

Recommended Storage Conditions: 4°C.

Suitable Samples:
- PCR products
- Enzymatic reaction

Dna Isolation Size: 100bp-10kbp

Name	Cat #	Size
PCR Advanced Clean Up Miniprep System	PAE-100	50 preps
PCR Advanced Clean Up Miniprep System	PAE-200	250 preps

Gel/PCR DNA Isolation System

Description:
Gel/PCR DNA Isolation System is developed to isolate DNA from agarose gel, PCR products, and other enzymatic reactions. With just a few easy binding and washing steps, Gel/PCR DNA Isolation System can amazingly recover ready-to-use DNA from various samples in about 10-20 minutes. With one kit, you can process up to 75% of DNA purification procedures in your lab.

Application:
Gel/PCR DNA Isolation System provides reproducible yields of high-purity DNA suitable for use in most applications, including:
- Automated fluorescent and radioactive sequencing & PCR
- Restriction digestion & modifying enzymatic reaction
- Ligation
- Labeling & Hybridization

Features:
- Efficient extraction of DNA fragments from 100-bp to 10-kbp
- High purity of DNA (A260/A280 1.8-1.9)
- >95% primer and salts removal
- Recover DNA fragments from standard of low-melting point agarose gels in TAE or TBE buffer
- Elute DNA with just 15-30µl Elution buffer or ddH_2O
- Recovery up to 90%
- Preparation Time: 10-15 minutes
- No sodium iodide to interfere with subsequent reactions
- No shearing of large DNA fragments

Recommended Storage Conditions: 4°C.

Suitable sample:
- Agarose gel
- PCR product
- Enzymatic reaction

DNA isolation size: 100bp-10kbp

Name	Cat #	Size
Gel/PCR DNA Isolation System	GPAE-100	50 preps
Gel/PCR DNA Isolation System	GPAE-200	250 preps

Nucleic Acid Purification

RNA Extraction Miniprep System

Description:
RNA Extraction Miniprep System provides a fast method to purify total RNA from various samples such as cells from culture, tissues, whole blood, plasma, serum, biological fluids containing RNA virus, etc. A simple spin-column based method can isolate large RNAs, siRNAs, microRNAs, and viral RNAs without the time-consuming procedure of phenol/chloroform extraction and ethanol precipitation.

Application:
- Northern blotting
- Ploy A+ RNA selection
- cDNA synthesis
- RT-PCR
- Transcription profiling

Features:
MicroRNA (> 15 nt) can be enriched and purified efficiently.
- Processing Time: ~ 10 minutes
- Up to 50 μg total RNA purification capacity.

Recommended Storage Conditions: 4°C.

Suitable Samples:
Provides a fast and simple method for isolation of total RNA from animal cells, biological fluids and tissues.
- Enhanced microRNAs purification
- Spin-column based
- High-quality total RNA
- Suits a wide range of samples

Name	Cat #	Size
RNA Extraction Miniprep System	REM-100	50 preps
RNA Extraction Miniprep System	REM-200	250 preps

Plant RNA Extraction Miniprep System

Description:
Plant RNA Extraction Miniprep System provides a fast method to purify total RNA from various RNA, up to 100mg of plant materials or 1 x 10^7 plant cells. A simple spin-column based method can isolate large RNAs, siRNAs, and microRNAs without the time-consuming procedure of phenol/chloroform extraction and ethanol precipitation.

Application:
- Northern blotting
- Ploy A+ RNA selection
- cDNA synthesis
- RT-PCR
- Transcription profiling

Features:
MicroRNA (> 15 nt) can be enriched and purified efficiently.
- Processing Time: ~ 15 minutes
- Up to 30 μg total RNA purification capacity.

Recommended Storage Conditions: 4°C.

Suitable sample:
Provides a fast and simple method for isolation of total RNA from plant materials and cells.
- Enhanced plant microRNAs purification
- Spin-column based
- High-quality total RNA
- Suits a wide range of plant samples

Name	Cat #	Size
Plant RNA Extraction Miniprep System	PREM-100	50 preps
Plant RNA Extraction Miniprep System	PREM-200	250 preps

Precast Agarose Gels
See Page 162, 163, 164.

RNAi, MicroRNA & Gene Regulation

One-Step™ Vector-based miRNA Target Screening Systems

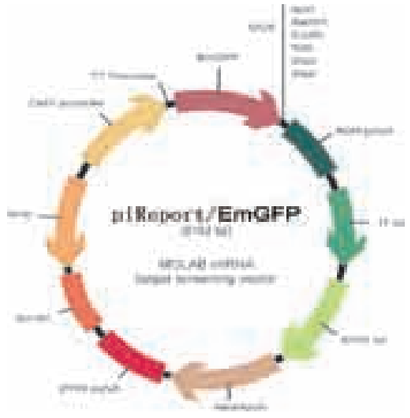
MCLAB's provides One-Step™ Vector-Based miRNA Target Screening Systems, which include 2x PCR master mix, miRNA target screening vector, and one-step cloning enzyme mix.

Description:
The piReport vector-based miRNA target screening systems are convenient systems for the cloning of a possible miRNA target (3'-UTR) for screening in mammalian cells. The piReport vector has been linearized with BamHI and NotI. This greatly improves the efficiency of recombination of a miRNA target (3'-UTR) product into the plasmid by preventing recircularization of the vector. The linearized plasmid provids a compatible overhang for recombination of miRNA (3'-UTR) products generated by any thermostable polymerases. A double digestion may be used to release the insert from the vector.
The piReport Vector-based miRNA target screening systems contain linearized miRNA target screening vector piReport/EmGFP or piReport/hluc, 2x PCR master mix for PCR amplifying miRNA targets, high efficiency (>1 x 10^9) Dh5-Alpha Competent Cells, One-Step™ cloning/recombination enzyme mix.

Features:
- The cloning systems include the PCR 2x master mix, and marker (either EmGFP or Firefly luciferase)
- Clone any miRNA target into the vector you choose
- No restriction digestion, phosphatase treatment, or ligation required
- Simple 45 minutes single-tube reaction on ice protocol
- High Efficiency with >=98% positive clones
- High throughput application

Kit contents:
Box 1: 2 x PCR master mix
Box 2: One-step cloning enzyme mix with piReport/EmGFP or piReport/hluc
Box 3: High efficiency (>1 x 10^9) Chemical Competent E. coli Dh5-Alpha cells

Recommended Storage Conditions:
Box 1: -20°C
Box 2: -20°C
Box 3: -80°C



Name	Cat #	Size
One-Step™ Vector-based miRNA Target Screening Systems	iRPT-10G	10 rxns with miRNA target screening vector piReport/EmGFP
One-Step™ Vector-based miRNA Target Screening Systems	iRPT-10L	10 rxns with miRNA target screening vector piReport/hluc
One-Step™ Vector-based miRNA Target Screening Systems	iRPT-20G	20 rxns with miRNA target screening vector piReport/EmGFP
One-Step™ Vector-based miRNA Target Screening Systems	iRPT-20L	20 rxns with miRNA target screening vector piReport/hluc
One-Step™ Vector-based miRNA Target Screening Systems	iRPT-100G	100 rxns with miRNA target screening vector piReport/EmGFP
One-Step™ Vector-based miRNA Target Screening Systems	iRPT-100L	100 rxns with miRNA target screening vector piReport/hluc

One-Step™ Vector-based pre-miRNA Cloning Systems

MCLAB provides One-Step™ Vector-based pre-miRNA Cloning Systems, which including 2x PCR master mix, pre-miRNA expression vector and one-step cloning enzyme mix.

Description:

One-Step™ Vector-based pre-miRNA Cloning Systems are convenient systems for the cloning of pre-miRNA products for expression in mammalian cells. The piEXP Vector has been linearized with NheI and BamHI, which greatly improve the efficiency of recombination of a pre-miRNA product into the plasmid by preventing recircularization of the vector and providing a compatible overhang for recombination of pre-miRNA products generated by any thermostable polymerases. A double digestion may be used to release the insert from the vector.

The piEXP Vector-based pre-miRNA System contains linearized pre-miRNA expression vector piEXP/EmGFP or piEXP/hluc, 2x PCR master mix for PCR amplifying pre-miRNA amplicon, high efficiency (>1 x 10^9) Dh5-Alpha Competent Cells, One-Step™Cloning/recombination enzyme mix.

Features:

- The cloning systems include the PCR 2x master mix, and marker (either EmGFP or Firefly luciferase)
- Clone any pre-miRNA into the vector you choose
- No restriction digestion, phosphatase treatment, or ligation required
- Simple 45 minute single-tube reaction on ice protocol
- High Efficiency with >=98% positive clones
- High throughput application

Kit contents:

Box 1: 2x PCR master mix
Box 2: One-step cloning enzyme mix with piEXP/EmGFP or piEXP/hluc
Box 3: High efficiency (>1 x 10^9) Chemical Competent E. coli DH5 alpha cells

Recommended Storage Conditions:

Box 1: -20°C
Box 2: -20°C
Box 3: -80°C

Name	Cat #	Size
One-Step™ Vector-based pre-miRNA Cloning Systems	iEXP-10G	10 rxns with pre-miRNA expression vector piEXP/ EmGFP
One-Step™ Vector-based pre-miRNA Cloning Systems	iEXP-10L	10 rxns with pre-miRNA expression vector piEXP/hluc

Name	Cat #	Size
One-Step™ Vector-based pre-miRNA Cloning Systems	iEXP-20G	20 rxns with pre-miRNA expression vector piEXP/ EmGFP
One-Step™ Vector-based pre-miRNA Cloning Systems	iEXP-20L	20 rxns with pre-miRNA expression vector piEXP/ hluc
One-Step™ Vector-based pre-miRNA Cloning Systems	iEXP-100G	100 rxns with pre-miRNA expression vector piEXP/ EmGFP
One-Step™ Vector-based pre-miRNA Cloning Systems	iEXP-100L	100 rxns with pre-miRNA expression vector piEXP/ hluc

Validated miRNA Expression Constructs

Description:
MicroRNAs (miRNAs) are naturally occurring non-coding RNAs of 21-23 nt and they have been implicated in many biological processes and disease development. miRNAs are processed in the following multiple steps:
DNA ----------> Pri-miRNA ----------> Pre-miRNA ----------> Mature miRNA
MCLAB provides clones for over-expression of miRNA of your choice. A region of ~300-500 bp encompassing each miRNA is cloned downstream of a CMV promoter. Upon transfection, the cellular machinery will process the CMV-driven expression of miRNA precursor into a mature miRNA and cellular function can then be analyzed.

Features:
- Genome-wide miRNA coverage (miRBase release 14.0) - 721 human and 579 mouse miRNAs.
- Express miRNA precursor transcripts in their native sequence context to ensure interaction with endogenous processing machinery leading to authentic mature miRNAs.
- Monitor transduced cells with co-expressed GFP fluorescent marker or firefly Photinus pyralis luciferase. Select cells stably express miRNA construct with the Neomycin selection marker.
- High quality: fully sequenced expression cassettes.
- Convenient: transfection-ready end-toxin free plasmid DNA (10µg).

Kit Contents:
10 µg of transfection-ready endotoxin-free plasmid DNA in each tube.

Recommended Storage Conditions: -20°C

Name	Cat #
Validated miRNA Expression Constructs	vmir

Validated shRNA Plasmid-based Constructs

Description:
A small hairpin RNA or short hairpin RNA (shRNA) is a sequence of RNA that makes a tight hairpin turn that can be used to silence gene expression via RNA interference. shRNA uses a vector introduced into cells and utilizes the U6 promoter to ensure that the shRNA is always expressed. This vector is usually passed on to daughter cells, allowing the gene silencing to be inherited. The shRNA hairpin structure is cleaved by the cellular machinery into siRNA, which is then bound to the RNA-induced silencing complex (RISC). This complex binds to and cleaves mRNAs that match the siRNA that is bound to it.
MCLAB's validated shRNA clone collections are mammalian expression vector-based small hairpin RNA (shRNA) clones against genome-wide target genes from human, mouse, and any other species. MCLAB provides clones for over-expression of a shRNA of your choice. A region encompassing each shRNA is cloned downstream of a U6 promoter. Upon transfection, the cellular machinery will process the expression of shRNA into mature siRNA, and cellular function can then be analyzed. A set of four expression constructs for every target gene ensures high knockdown efficiency with minimal off-target effects.

Features:
- Pre-designed shRNA with genome wide coverage (human and mouse) that delivers guaranteed successful gene knockdown (>70%).
- Expresses shRNA transcripts in their native sequence context to ensure interaction with endogenous processing machinery leading to authentic siRNAs.
- Monitors transduced cells with co-expressed GFP fluorescent marker or firefly Photinus pyralis luciferase. Selects cells stably expressing shRNA construct with puromycin selection marker.
- High quality: fully sequenced expression cassettes
- As low as $560 per kit (4 gene-specific shRNA and two negative controls).
- Convenient: transfection-ready endotoxin-free plasmid DNA (5 µg per construct).

Kit Contents:
5 µg of transfection-ready endotoxin-free plasmid DNA in each tube.

Recommended Storage Conditions: -20°C

Name	Cat #	Size
Validated shRNA Plasmid-based constructs	Vsh-G01	1 gene-specific shRNA and two negative controls (GFP)
Validated shRNA Plasmid-based constructs	Vsh-G02	2 gene-specific shRNA and two negative controls (GFP)
Validated shRNA Plasmid-based constructs	Vsh-G03	3 gene-specific shRNA and two negative controls (GFP)
Validated shRNA Plasmid-based constructs	Vsh-G04	4 gene-specific shRNA and two negative controls (GFP)
Validated shRNA Plasmid-based constructs	Vsh-L01	1 gene-specific shRNA and two negative controls (Luc)
Validated shRNA Plasmid-based constructs	Vsh-L02	2 gene-specific shRNA and two negative controls (Luc)
Validated shRNA Plasmid-based constructs	Vsh-L03	3 gene-specific shRNA and two negative controls (Luc)
Validated shRNA Plasmid-based constructs	Vsh-L04	4 gene-specific shRNA and two negative controls (Luc)

Bio Chemical Reagents

50% IGEPAL CA-630 (NP-40)

Description:
IGEPAL CA-630 is a nonionic surfactant used in the isolation of membrane complexes. This product has been reformulated to be eco-friendly. The only observable differences are that the viscosity and handling characteristics are somewhat modified. Due to its nonionic structure, this product is compatible with anionic surfactants and is stable in the presence of acids, bases, and salts. It should not be mixed with concentrated oxidizing or reducing agents since the mixture of these compounds with organic compounds could form a potentially explosive mixture. IGEPAL CA-630 is an effective emulsifier for solvents such as xylene.

Reference:
1. Neugebauer, J., Detergents: an overview. Meth. Enzymol. 182, 239-253, (1990)
2. Fricke, B., et al. Biochim. Biophys. Acta 1454, 236, (1999) Cull, M., and McHenry, C.S., Preparation of extracts from prokaryotes. Meth. Enzymol. 182, 147-153, (1990)
3. Abstract Weiss, W., et al., Application of sequential extraction procedures and glycoprotein blotting for the characterization of the 2-D polypeptide patterns of barley seed proteins. Electrophoresis 13, 770-773, (1992)
4. Ozols, J., Preparation of membrane fractions. Meth. Enzymol. 182, 225-235, (1990)
5. O'Farrell, P.H., High resolution two-dimensional electrophoresis of proteins. J. Biol. Chem. 250, 4007, (1975) Abstract
6. Zechel, K., On the resolution of polypeptides by isoelectric focusing in polyacrylamide gels in the presence of urea and nonidet-p40. Anal. Biochem. 83, 240, (1977)
7. Watts, N.R. and Singh, R.P., Peptides as standard for denaturing isoelectric focusing. Electrophoresis 16, 22-27, (1995) Hochstrasser, D.F., Methods for increasing the resolution of two-dimensional protein electrophoresis. Anal. Biochem. 173, 424, (1988) Abstract
8. Gorg, A., et al., The current state of two-dimensional electrophoresis with immobilized pH gradients. Electrophoresis 21, 1037-1053, (2000)
9. Schupbach, J., et al., A universal method for two-dimensional polyacrylamide gel electrophoresis of membrane proteins using isoelectric focusing on immobilized pH gradients in the first dimension. Anal. Biochem. 196, 337-343, (1991)
10. Gorg, A., et al., Two-dimensional polyacrylamide gel electrophoresis with immobilized pH gradients in the first dimension of barley seed proteins: discrimination of cultivars with different malting grades. Electrophoresis 13, 192-203, (1992)

Name	Cat #	Size
50% IGEPAL CA-630	50IC630-1L	50%, 1L
50% IGEPAL CA-630	50IC630-1GAL	50%, 1GAL

50% Triton x-114

Description:
Triton x-114 is used in biochemical applications to solubilize and separate proteins due to its low cloud point (23 °C). At temperatures above the cloud point, detergent solutions separate into aqueous and detergent-enriched phases. This makes Triton x-114 particularly useful in separating lipophilic proteins from hydrophilic proteins.[2,3] For example, HMG-CoA reductase was recovered quantitatively in the aqueous phase of a biphasic system formed by Triton x-114 at 30 °C.

Reference:
1. Helenius, A., and Simons, K., Biochim. Biophys. Acta, 415, 29-79 (1975).
2. Bordier, C., J. Biol. Chem., 256, 1604-1607 (1981).
3. Neugebauer, J., Meth. Enzymol, 182, 247-249 (1990).
4. Concepcion, J.L. et al., Arch. Biochem. Biophys., 352, 114-120 (1998).
5. Gu, T., and Galera-Gomez, P.A., Colloids and Surfaces A: Physicochem. Eng. Aspects, 104, 307- 312 (1995).

Name	Cat #	Size
50% Triton x-114	50TX114-1L	50%, 1L
50% Triton x-114	50TX114-1GAL	50%, 1GAL

7M Guanidine HCL Solution

Description:
7M Guanidine HCL Solution is a ready-to-use solution of guanidine hydrochloride, that can be easily diluted and pH-adjusted to any concentration below 7M. In addition to increasing solubility of hydrophobic molecules, guanidine is a general protein denaturant, unfolding proteins and altering their structure. This can cause some proteins to be irreversibly altered upon interaction with guanidine solutions and may lose their binding function. Before any significant use of guanidine, it is best to experiment with a small sample and conclude whether the denaturing effects will adversely affect the intended use of the protein.

Application:
- Solubilizing proteins from inclusion bodies
- Increasing solubility of hydrophobic peptides and proteins
- Denaturing proteins

Recommended Storage Conditions:
Store at room temperature.

Caution:
EXTREMELY CORROSIVE, HANDLE WITH CARE! Avoid ingestion and contact with skin.

Name	Cat #	Size
7M Guanidine HCL Solution	7MGHS-1L	1L
7M Guanidine HCL Solution	7MGHS-1GAL	1GAL

Acetylated Bovine Serum Albumin (BSA)

Description:
Acetylated BSA is used as a carrier protein and as an enzyme stabilizer in which the absence of contaminants such as nucleases and proteases is vital. The acetylation process inactivates any trace of active nuclease activity. While the acetylation process does change BSA's binding characteristics and makes it inhibitory in PCR reactions, it is normally added to restriction digests.

Application:
- Used as a blocking agent in northern, Southern and dot blot hybridizations
- Added to buffers for nick translation, polymerase reactions and ligations
- Common additive for PCR amplifications, footprinting and gel shift assays
- Helps stabilize some proteins during incubation
- Enhances enzyme activity in restriction digests

Concentration: 20 mg/ml

Recommended Storage Conditions:
BSA should be stored at –20°C. Do not store in a frost-free freezer.

Name	Cat #	Size
Acetylated Bovine Serum Albumin (BSA)	BSA-100	6 x 20 mg

Ammonium Sulfate

Description:
Ammonium sulfate is a widely used reagent in molecular biology and chromatography. Applications include the precipitation and fractionation of proteins,[1] crystallization of proteins[2-4] and of protein-nucleic acid complexes.[5] Ammonium sulfate is also widely used in HPLC of proteins, such as in hydrophobic interaction chromatography.[6]

Recommended Storage Conditions:
Room temperature.

Reference:
1. Englard, S., and Seifter, S., Precipitation Techniques. Methods Enzymol., 182, 285-300 (1990).
2. McPherson, A., Crystallization of macromolecules: general principles. Methods Enzymol., 114, 112-120 (1985).
3. Giegé, R., and Ducruix, A., in Crystallization of Nucleic Acids and Proteins, Ducruix, A., and Giegé, R., eds., Oxford University Press (Oxford, UK: 1999), pp. 1-16.
4. Tessier, P. M., et al., Self-interaction chromatography: a novel screening method for rational protein crystallization. Acta Crystallogr. D (Biol. Crystallogr.), 58(Pt 10 Pt 1), 1531-1535 (2002).
5. Yaremchuk, A., et al., Improved crystals of Thermus thermophilus prolyl-tRNA synthetase complexed with cognate tRNA obtained by crystallization from precipitate. Acta Crystallogr. D (Biol Crystallogr.), 56(Pt 2), 197-199 (2000).
6. Mant, C. T., and Hodges, R. S., in High- Performance Liquid Chromatography of Peptides and Proteins, Mant, C. T., and Hodges, R. S., eds., CRC Press (Boca Raton, FL: 1991), pp. 437-450.

Name	Cat #	Size
2M Ammonium Sulfate	2MAS-1L	25% Ammonium Sulfate, 1L
2M Ammonium Sulfate	2MAS-1GAL	25% Ammonium Sulfate, 1GAL
4M Ammonium Sulfate	4MAS-1L	50% Ammonium Sulfate, 1L
4M Ammonium Sulfate	4MAS-1GAL	50% Ammonium Sulfate, 1GAL

Antifoam 204

Description:
Contains 100% active components with a mixture of organic non-silicone polypropylene based polyether dispersions. May be sterilized repeatedly.

Recommended Storage Conditions:
Room temperature.

Reference:
1. Zalay, L., et al., Zentralbl. Bakteriol. [Orig], 197,118-26 (1965).
2. Zhang, S., et al., J. Biotechnol., 25, 289-306 (1992).
van der Pol, L.A., et al., Biotechnol. Prog., 9, 504-9 (1993).
Nemeth, Z., et al., J. Colloid Interface Sci., 207, 386-394 (1998).
3. Liu, H., and Wehmeyer, K.R., Chromatogr. B Biomed. Appl., 657, 206-13 (1994).

Name	Cat #	Size
Antifoam 204	ANT204-500	500ml

Brij-35 (30% Solution)

Description:
Brij-35 (30% Solution) is a nonionic polyoxyethylene surfactant that is most frequently used as a component of cell lysis buffers or as a surfactant in various HPLC applications.

Application:
- Used in various protein research and methods
- Isolates functional membrane complexes

Recommended Storage Conditions:
Room temperature.

Reference:
Yoshikawa, S. et al. (1988) Proc. Natl. Acad. Sci. USA 85,1354-8

Name	Cat #	Size
Brij-35 (30% Solution)	DB35-100	950ml

CHAPSO

Description:
CHAPSO(3-[(3-cholamidopropyl)dimethylammonio]-2-hydroxy-1-propanesulfonate) is a zwitterionic detergent used to solubilize proteins. Due to its low light absorbance in the ultraviolet region of the electromagnetic spectrum, CHAPSO is useful for researchers monitoring ongoing chemical reactions or protein-protein binding with UV/Vis spectroscopy.

Application:
- Solubilizes proteins in non-denaturing state
- Helps monitor membrane proteins due to its low background absorbance in the UV region

Recommended Storage Conditions:
Room temperature.

Synonyms:
3-[(3-Cholamidopropyl)dimethylammonio]-2-hydroxy-1-propanesulfonate.

Molecular Formula: $C_{32}H_{58}N_2O_8S$

Melting point (Mp): 184-186°C

Reference:
L.M. Hjelmeland, Proc. Natl. Acad. Sci. USA, 77, 6368 (1980)

Name	Cat #	Size
CHAPSO	DCSO100	5g
CHAPSO	DCSO101	100g

CHAPS

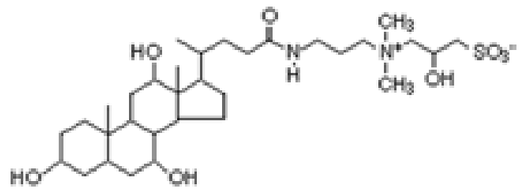
Description:
CHAPS (3-[(3-cholamidopropyl)dimethylammonio]-1-propanesulfonate) is a zwitterionic detergent used to solubilize proteins. It is used as a non-denaturing solvent in the process of protein purification and is especially useful in purifying membrane proteins, which are often sparingly soluble or insoluble in aqueous solution due to their native hydrophobicity. CHAPS can also be used in conjunction with nonionic detergents such as Triton X-100.

Application:
- Solubilizes proteins in non-denaturing state
- Helps monitor membrane proteins due to its low background absorbance in the UV region

Synonyms:
3-[(3-Chloromidopropyl)dimethylammonio]-1-propanesulfonate

Molecular Formula: $C_{32}H_{58}N_2O_7S$

Recommended Storage Conditions:
Room temperature.



Name	Cat #	Size
CHAPS	DCPS100	5g
CHAPS	DCPS101	100g

Triton x-100

Description:
Triton X-100 is a commonly used detergent in laboratories[1].

Application:
- Permeabilizes unfixed (or lightly fixed) eukaryotic cell membranes
- Solubilize membrane proteins in their native state, when used in conjunction with zwitterionic detergents such as CHAPS.
- DNA extraction as part of the lysis buffer (usually in a 5% solution in alkaline lysis buffer).
- Reduces surface tension of aqueous solutions during immunostaining (usually in concentration of 0.1-0.5% in TBS or PBS Buffer).
- Emerging use in dispersion of carbon materials for soft composite materials
- Restrict colony expansion in Aspergillus nidulans

Recommended Storage Conditions:
Room temperature.

Reference:
1. Triton X-100 Product detail page from Sigma-Aldrich
Highlights Of Prescribing Information (also known as the Package Insert, or Product Monograph), FLUARIX brand Trivalent Inactivated Influenza Vaccine (GSK, Glaxo Smith Kline) Formulation 2010/2011
2. Highlights Of Prescribing Information (also known as the Package Insert, or Product Monograph), FLUZONE brand Trivalent Inactivated Influenza Vaccine (Sanofi-Pasteur) Formulation September, 2009 "Triton X-100". exactantigen.com. Retrieved 2009-10-22.

Name	Cat #	Size
Triton x-100	TX100-500	500 ml
50% Triton x-100	50TX100-1L	50%, 1L
50% Triton x-100	50TX100-1GAL	50%, 1GAL

TWEEN 20

Description:
TWEEN 20 helps to prevent non-specific antibody binding in enzyme immunoassay as a washing agent (e.g. western blots and ELISAs). In this major application, it is dissolved in Tris-Buffered Saline or Phosphate buffered saline at dilutions of 0.05% to 0.5% v/v. These buffers are used for washes between each immunoreactions, to remove unbound immunologicals, and eventually for incubation solutions of immunoreagents (labeled antibodies) to reduce unspecific background.

Application:
- To saturate binding sites on surfaces (i.e. to coat polystyrene microplates, generally combined to proteins such as BSA)
- To stabilize proteins purified in protein derivative (PPD) solution used in skin testing for tuberculosis exposure
- As a solubilizing agent of membrane proteins
- For lysing mammalian cells, at a concentration of 0.05% to 0.5% v/v, generally combined to other detergents, salts and additives

Recommended Storage Conditions:
Room Temperature

Reference:
1. Ayorinde FO, Gelain SV, Johnson JH Jr, Wan LW. (2000). "Analysis of some commercial polysorbate formulations using matrix-assisted laser desorption/ionization time-of-flight mass spectrometry". Rapid Communications in Mass Spectrometry 14 (22): 21162124. doi:10.1002/1097-0231(20001130)14:22<2116::AID-RCM142>3.0.CO;2-1. PMID 11114018.
2. Joint FAO/WHO Expert Committee on Food Additives (1974). "Toxicological evaluation of some food additives including anticaking agents, antimicrobials, antioxidants, emulsifiers and thickening agents". WHO Food Additives Series No. 5. World Health Organization.
3. Chunhee Kim, You-Lo Hsieh (2001). "Wetting and absorbency of nonionic surfactant solutions on cotton fabrics". Colloids and Surfaces A 187: 385397. doi:10.1016/S0927-7757(01)00653-7.

Name	Cat #	Size
50% TWEEN 20	50T020-1L	50%, 1L
50% TWEEN 20	50T020-1GAL	50%, 1GAL

TWEEN 40

Description:
Tween-40 are a class of emulsifiers used in some pharmaceuticals and food preparation. They are often used in cosmetics to solubilize essential oils into water-based products. Polysorbates are oily liquids derived from PEG-ylated sorbitan (a derivative of sorbitol) esterified with fatty acids.

Application:
-Non-ionic detergent used for cell lysis, nuclei isolation and cell fractionation.

Recommended Storage Conditions:
Room temperature.

Name	Cat #	Size
TWEEN 40	TW40-1L	50%, 1L
TWEEN 40	TW40-1GAL	50%, 1GAL

RNA Stabilizing Solution

Description:
In order to isolate high quality RNA for important downstream applications, RNA Stabilizing Solution prevents RNA degradation during fresh tissue sample collection and homogenization. It preserves RNA integrity in harvested samples and facilitates parallel processing of multiple samples later on.
Besides stabilizing RNA, RNA Stabilizing Solution also enables preserving the integrity of DNA and denatured protein in corresponding samples.

Protocol:
Simply add 10x volume of RNA Stabilizing Solution into the tube containing the freshly collected sample (e.g. 1 ml RNA Stabilizing Solution to 100 mg tissue). The mixed sample can be stored up to one week at room temperature, four weeks at 4°C, or remove all solution and transfer the tube to –20°C for longer storage until RNA purification. When processing, thaw and homogenize sample in RNA Stabilizing Solution.

Recommended Storage Conditions:
Room temperature.

Name	Cat #	Size
RNA Stabilizing Solution	RSS-100	100 ml
RNA Stabilizing Solution	RSS-200	500 ml

Ultrapure Bovine Serum Albumin (BSA)

Description:
MCLAB's Ultrapure BSA is a "non-acetylated" BSA, pure enough to use when DNA or RNA integrity is essential. It has been tested for DNase, RNase, endonuclease, protease, peroxidase, and alkaline phosphatase activity, and assayed for fluorescence background.

Application:
- Used as a blocking agent in northern, Southern and dot blot hybridizations
- Added to buffers for nick translation, polymerase reactions and ligations
- Common additive for PCR amplifications, footprinting and gel shift assays
- Enhances enzyme activity in restriction digests

Concentration: 20 mg/ml

Recommended Storage Conditions:
BSA should be stored at –20°C. Do not store in a frost-free freezer.

Name	Cat #	Size
Ultrapure Bovine Serum Albumin (BSA)	UBSA-100	2x25 mg, 20mg/ml
Ultrapure Bovine Serum Albumin (BSA)	UBSA-500	10 x 25 mg, 20mg/ml

Services

Standard DNA Sequencing Services

Features:

- Technology: We have proprietary DNA sequencing technologies and consumables to solve hairpin problems and sequence the most difficult templates, including multiple RNAi loops and uneven base distributions.
- Convenience: We can sequence directly from bacterial colonies or cultures (including 2xYT), phage supernatant, or yeast cells.
- Large capacity: We can process 10,000+ reactions in 24 hours.
- Low price: As low as $3.50/reaction (please inquire for details).
- High quality: Up to 1000 base sequence results using ABI 3730xl sequencers.
- Fast turnaround time: We can deliver sequencing results within 8 to 24 hours.
- User friendly: Free repeat, free 100+ universal primers, free pickup (for San Francisco Bay Area), free 96-well alignment tool.
- Integrated services:We also provide low cost relevant DNA analysis services including DNA fragment analysis, genotyping and the genome sequencing using ABI's SOLiD™ (coming soon).

How to Use MCLAB DNA Sequencing Services?

For first time orders	1. Email MCLAB to request a quote.
	2. For each order, an order form is required to provide necessary information including template/ primer name, billing information, online account (email address) to receive sequencing data, etc. Please download MCLAB's standard DNA sequencing order form, complete it and send it to MCLAB. You can send it through either email attachment (when placing orders by email) or online upload (when placing orders online).
For repeated orders	3. Send your samples to MCLAB (free pick up is provided to San Francisco Bay Area customers), follow Sample Submission Requirements as shown below. If a primer is within our 100+ free universal primers, there is no need to submit it.
	4. Go to the Download Sequences page at MCLAB's secure website after you have received email notification from MCLAB, about the availability of your sequencing results. All of your data files will be listed on that page. For each of them, you can simply click a link to align up to 96 sequences using MCLAB's free tool. On the same page, you can also download a free software called FinchTV to view the chromatogram result files.

Sample Submission Requirements

1. For 96 or more reactions, 96-well PCR plates are required. Otherwise, 8-strip PCR tubes are recommended. For your convenience, MCLAB now provides 96-well PCR plate with 8-strip Caps (Cat# 96P8C-010).
2. For separated DNA templates and primers, detailed requirements are shown below:

Template Type	Template Concentration	Template Volume	Primer Concentration	Primer Volume
Plasmid	50 ~ 100 ng/µl	10 µl	5 µM	10 µl
PCR	>30 ng/µl	10 µl	5 µM	10 µl
Cosmid, BAC	1000 ng/µl	10 µl	5 µM	10 µl
Genomic DNA	>10,000 ng/µl	10 µl	5 µM	10 µl

3. For mixed DNA templates and primers, detailed requirements are shown below:

Template Type	Total Amount of Template	Total Amount of Primer	Total Volumn (Template+Primer)
Plasmid	500 ng	9 pmol	15 µl
PCR (100-500 bp)	10 ng	9 pmol	15 µl
PCR (500-1000 bp)	20 ng	9 pmol	15 µl
PCR (>1000 bp)	50 ng	9 pmol	15 µl

DNA Fragment Analysis Services

Description:
MCLAB's DNA fragment analysis services help customers to determine the size and the amount of the fluorescent labeled DNA fragments in samples. The labeled DNA fragments are separated on ABI's Genetic Analyzers (3730xl).

Services Included:
- Microsatellite assay development, including amplicon selection and primer design
- STR analysis
- Genotyping
- AFLP (amplified fragment length polymorphism)
- PCR amplification of genomic DNA using validated conditions
- Analysis of fragment size and allele calling
- Electrophoresis of PCR amplicons using ABI's 3730xl

Supported Dye Sets:

Dye	Color
FAM	Blue
VIC/HEX/JOE	Green
NED/TAMARA	Yellow
PET	RED
ROX	RED
LIZ	Orange

Sample Requirements:
Samples should arrive either as dry, precipitated DNA products or as a 10µl volume of your reactions.
Send samples in 1.5mL microfuge tubes or plates.

Name	Cat #
DNA Fragment Analysis Services	DNAFRG-100

DNA Mutagenesis Services

Description:
MCLAB offers a variety of mutagenesis services, allowing any type of mutations to be generated. Our services include design, synthesis, purification of oligonucleotide primers, PCR amplification, transformation, plasmid isolation, and sequence verification.

- PCR method is used to introduce insertion, deletion or point mutations into specific DNA sequences.
- Modify the end of a DNA fragment into any defined way.
- Linker-scanning mutagenesis used to introduce clusters of point mutations.
- Fast turn-around time, one week for 10 mutations per fragment.
- 100% guaranteed by DNA sequencing.
- PCR based point mutations can be as low as $250 per mutation.
- The introduction of a large number of mutations in a single DNA is more efficiently performed by gene synthesis.

Name	Cat #
DNA Mutagenesis Services	DNAMUT-100

Monoclonal Antibody Sequencing Services

Description:
MCLAB offers a fast and professional sequencing service for your valuable monoclonal antibodies. We can sequence from any antibody producing cell line with a service that can be tailored to your requirements for Quality Control, Patent Applications, Full Traceability and Drug Development.
MCLAB has extensive experience in antibody V-region determination from cDNA sequencing. Sequences are compiled and aligned based on bi-directional sequencing of multiple independent clones. We offer a rapid yet high quality and cost effective service.

MCLAB Offers:
- Personalized Ph.D. level project support for your inquiries: virtually no project limitations in terms of size and complexity
- The lowest price and the fastest monoclonal sequencing service on the market: as a global market leader in DNA sequencing services and consumables
- Reliability and productivity based on technological experience

Starting Materials:
- A pellet of snap frozen cells ($1x10^7$ cells) expressing your antibody
- An EBV transformed B-cell line

Technical Summary:
Stage 1: Total RNA extraction from the hybridoma cell pellet
Total RNA will be extracted and purified from the hybridoma cell pellet. The quality of the total RNA will be assayed on the Agilent Bioanalyzer 2100.

Stage 2 : Reverse transcription
Total RNA will be transcribed into cDNA using either an Oligo(dT) or a gene-specific anti-sense primer. Specific murine and human constant domain primers can be used to determine the isotype of the antibody.

Stage 3 : PCR or 5 RACE amplification of heavy and light chains
Degenerate VH and VL primers are used to amplify the variable domains from the cDNA.
For 5RACE, our proprietary adaptor is added to the 3' end of the cDNA. The heavy and light chains can now be amplified with our proprietary adaptor (sense primer) and a gene specific (CH/CL, reverse primer). PCR products will include the sequence of the signal peptide, variable domains and constant domains up to the reverse primer.

Stage 4 : Cloning into a standard sequencing vector
The PCR products will be gel purified to clone into a sequencing vector for sequencing.

Stage 5 : Sequencing analysis
As a standard, we will sequence a minimum of 12 independent clones for each chain.

Stage 6 : Final Report
A detailed report is produced on the work performed which includes the sequence alignments of the heavy and light chains and is e-mailed to the client.

Cat #	Description
VDA-100	Variable Domains Sequencing Service -Total RNA extraction from the hybridoma cell pellet -Reverse transcription -PCR using degenerate primers for variable domains -Cloning of the variable heavy chain sequence -Cloning of the variable light chain sequence

Cat #	Description
VDB-100	Variable Domains & Leader Sequence Sequencing Service -Total RNA extraction from the hybridoma cell pellet -Reverse transcription -5RACE amplification of the heavy and light chain from antibody constant domains CH1 and CL -Cloning of the variable heavy chain sequence -Cloning of the variable light chain sequence
VDC-100	Variable & Constant Domains, and Leader Sequence Sequencing Service -Total RNA extraction from the hybridoma cell pellet -Reverse transcription -5RACE amplification of the heavy and light chain from antibody constant domains CH1 and CL -Cloning of the variable heavy chain sequence -Cloning of the variable light chain sequence

Name	Cat #	Turn auound time
Variable Domains Sequencing Service	VDA-100	1-2 weeks turnaround time
Variable Domains & Leader Sequence Sequencing Service	VDB-100	2-3 weeks turnaround time
Variable & Constant Domains, and Leader Sequence Sequencing Service	VDC-100	3-4 weeks turnaround time

454™ DNA Sequencing

Description:
Based on 454™ sequencing-by-synthesis technology, the Genome Sequencer 454™ FLX Instrument features long reads (average 400-450 bp for the Titanium chemistry), exceptional accuracy and high throughput. This platform accommodates a wide variety of applications including de novo sequencing, resequencing of whole genomes and target DNA regions, metagenomics and RNA analysis.

Workflow:
To reach "One fragment = One bead = One read" goal, the complete sequencing workflow of the Genome Sequencer 454™ FLX System is comprised of four main steps:

1. Generation of a template DNA library:
Large samples such as genomic DNA, BACs and cDNA libraries (larger than ~1.5kb) are nebulized into fragments 300 to 800 basepairs in length. Using a series of protocols, short adaptors (A and B) - specific for both the 3' and 5' ends - are ligated to the fragmented DNA. The adaptors enable subsequent amplification, purification, and sequencing steps. After general library preparation, single-stranded fragments with A and B adaptors comprise the sample library.
Double-stranded libraries prepared with the rapid library technique undergo a denaturing step before the fragments can be captured.
Short PCR products amplified using Roche/454™ fusion primers do not need to undergo the library preparation process and can be used directly for immobilization onto DNA capture beads.

2. Emulsion-based clonal amplification of the library:
The single-stranded DNA library is immobilized onto specifically designed DNA Capture Beads. An experimentally-determined volume of library through titration test is added to the capture beads, ideally so that each bead carries a unique single-stranded DNA library fragment. The bead-bound library is emulsified in a water-in-oil mixture with amplification enzymes and primers, resulting in microreactors surrounding only one bead with one unique sample-library fragment. Each unique sample library fragment is amplified within its own microreactor in parallel, excluding competing or contaminating sequences. For each fragment, this results in a copy number of several million per bead. Following amplification, the emulsion is broken and excess enzymes/oil/primer are washed away while the amplified fragments remain bound to their specific beads.

3. Data generation via sequencing-by-synthesis:
The clonally amplified fragments are enriched and loaded onto a PicoTiterPlate™ device for sequencing (approximately 1 million beads are deposited onto one region of a 2-region plate). The diameter of the wells on a PicoTiterPlate™ allow only one DNA-containing bead to be deposited per well, surrounded by much smaller beads with attached sulphurylase and luciferase. The fluidics subsystem of the Genome Sequencer FLX™ Instrument flows individual nucleotides in a fixed order across the entire plate. Addition of a nucleotide complementary to the template strand results in a release of one pyrophosphate unit, converting to ATP and producing light from the oxidation of luciferin to oxyluciferin. This release of light is recorded by an extremely sensitive CCD camera, and for homopolymer repeats (multiple incorporations of the same nucleotide) up to six nucleotides, the number of bases added is directly proportional to the light signal detected.

4. Data analysis:
According to individual application, sequencing data are analyzed using different bioinformatics tools, such as the GS de Novo Assembler and Reference Mapper.

Sample Preparation:
- Genomic DNA: 454™ Rapid Library protocols from genomic DNA are optimized for a total of 10µg of DNA per sample in a maximum volume of 100µl TE buffer (10 mM Tris pH 7-8 + ~0.2 mM EDTA pH 8). However, 15µg is needed for preparation of a paired-end library. Double stranded DNA should not be degraded, i.e. starting DNA material should be in pieces >1.5kb and should be pure and without particulate matter.
- PCR products: Short PCR products amplified using Roche/454™ fusion primers do not need to undergo the library preparation process. Amplicons without 454™ adapters are generally treated as genomic DNA, except that no shearing is necessary. Usually need 700ng-1µg PCR product total per sample.
- cDNAs/RNA: The Roche has protocol for cDNA library preparation. If only RNA is available (transcriptomes, viral RNA, etc.), a cDNA synthesis must be performed prior to library preparation. MCLAB recommend use RNase free water for your RNA sample final elution. Please contact us before you submit your RNA sample.
Every sample received for sequencing will go through a set of quality control checks before it can be processed. Customers will be asked for more sample if their sample fails either of check points.

Options for Multiple Samples:
To reduce costs and facilitate simultaneous sequencing of multiple samples on the same sequencing run, it is possible to divide a Titanium sequencing plate (also called PicoTiter Plate) into several regions, or identify individual samples with multiplex identifier (MID) tags (i.e., DNA barcodes) and to pool multiple samples into one plate/large region.
Physically dividing a plate: A PicoTiter Plate can be divided in 2, 4, 8, and 16 regions. Splitting the plate reduce the total sequencing output per plate as some wells being unusable by gasket covering.
MID-tags: Roche has released 12 MID-tagged linkers for use with their Rapid Library kits. As many as 12 DNA samples can be bar-coded and pooled together on one large region. Using pooled MID-tagged libraries often also results in a slight decrease in overall numbers of reads obtained from a run.
Within a pooled set of MID-tagged libraries, it is expected to see a ±2X coverage differences among the libraries. To reduce costs through pooling of libraries prior to emPCR, variance in the number of reads will be increased. If equal coverage among libraries is needed upon project requirement, MCLAB recommends carrying each sample through emPCR including an individual titration for each sample.

Specifications of GS FLX system with Titanium XlR70 reagents

Specifications	GS FLX Titanium XlR70
Read lengths	Average 400 to 450 nt
Throughput profile	85% of the reads >300 nt
Typical throughput	450Mb
Shotgun reads per full run	~1,000,000
Applications	Genomic DNA sequencing
	cDNA/transcriptome sequencing
	Amplicons sequencing
	Paired-end sequencing

Name	Cat #
454™ DNA Sequencing	NG454-100

GAIIx™ Sequencing

Description:
GAIIx™ sequencers powerfully combine the flexibility of single reads, short- and long-insert paired-end reads, enabling the broadest range of genomic applications.

Workflow:
Steps to obtain sequences on Illumina platforms are as follow:
1. Prepare library by placing Illumina platform specific adapters on the templates, such as DNA, RNA or small RNA. Indexing (barcoding or tagging) is possible by using Illumina indexing adapters as well as custom adapters.
2. Seed the DNA library onto a glass slide for cluster generation. Adapters ligated DNA libraries are amplified by bridge PCR reaction.
3. Sequencing and base calling: Massively parallel sequencing using reversible terminator-based method that enables detection of single bases as they are incorporated into growing DNA strands. A fluorescently-labeled terminator is imaged as each dNTP is added and then cleaved to allow incorporation of the next base. The end result is base-by-base sequencing.
4. Image data are converted to sequences on the analysis server, and data are delivered for further analysis.

Sample Preparation:
MCLAB currently is mainly preparing libraries with the following sample preparation kits for Genome Analyzer™ II.
- TruSeq™ RNA sample preparation: The TruSeq™ RNA sample preparation kit, which employs poly(A) selection from mRNA enrichment, is used to prepare double-stranded cDNA libraries starting from total RNA. Up to 24 samples can be multiplexed with different indices. Please provide a minimum of 1 to 10µg of total RNA per sample with high quality at a concentration of at least 20 ng/µl in high pure water or TE buffer. RNA samples must be accompanied by an Agilent 2100 bioanalyzer profile to determine integrity of the sample. It is prefer to have an RIN (RNA integrity number) of 8 or higher. Samples with lower RIN numbers could potentially generate sequences with 3' bias. Besides TruSeq™ protocol, MCLAB provides services for rRNA removal with additional cost.
- TruSeq™ Small RNA sample preparation: The TruSeq™ Small RNA sample preparation kit primarily target microRNAs and other small RNAs, that have a 5'-phosphate and a 3'-hydroxyl group, to generate cDNA from total RNA or purified small RNA. Up to 48 samples can be multiplexed in total. Please provide 1 to 10µg of high-quality total RNA at a concentration of at least 20 ng/µl in high quality water or TE. Alternatively, submit the entire fraction of small RNA purified from 1-10µg of total RNA in molecular grade water of 10 mM Tris buffer. RNA samples must be accompanied by an Agilent 2100 bioanalyzer profile to determine integrity of the sample.
- TruSeq™ DNA sample preparation: The TruSeq™ sample preparation kit is used to prepare DNA libraries with inserts from 200-500 bp for single, paired-end, and multiplexed sequencing. Please submit a minimum of 1 to 5µg of DNA per sample at a concentration of at least 50 ng/µl in TE for library construction. It is recommended to use fluorometric based methods for quantification (Qubit® or PicoGreen®) to obtain accurate DNA measurement. DNA samples must be accompanied by gel image to determine quality of the sample.
- Nextera™ DNA sample preparation: The Nextera™ DNA sample preparation kit is used to prepare DNA libraries by using transposons to fragment the DNA and add adapters (tagmentation) for single read or paired end sequencing. This protocol is recommended for large/complex genomes (human, plants, invertebrates, and non-human mammalian genomes). Up to 96 samples can be multiplexed with different indices. Only 50ng of starting DNA material is needed. It is recommended to use fluorometric based methods for quantification (Qubit® or PicoGreen®) to obtain accurate DNA measurement.
- Nextera™ XT DNA sample preparation: This protocol is recommended for small genomes (microbes: prokaryotes, archae, viruses), PCR amplicons of >300 bp, plasmids, double-stranded cDNA, and concatenated amplicons. Only 1 ng of starting DNA material is needed.
- ChIP-Seq DNA sample preparation: Using an antibody and unique oligonucleotide adapters added to small stretches of DNA bound to the protein of interest, chromatin immunoprecipitation (ChIP) supports virtually unconstrained selection of any ChIP-able protein and/or modification to be studied. These include transcription factors, polymerases and transcriptional machinery, structural proteins, protein modifications, and DNA modifications. This protocol is used to build DNA libraries for single-read sequencing. Please submit 100-500ng ChIP enriched DNA in 30µl ultra pure water. Sample must be accompanied by qPCR verification.

Platform Specification:
Sequencing on an Illumina sequencer can be done by generating data from one end (single-end reads=SE, 1x) of the library fragments or from both ends (paired-end reads=PE, 2x). Turnaround time varies and mainly depends on the library preparation protocol, running time and sequencer availability (i.e. longer reads need significantly more time through GAIIx™).

Approximate Run Duration and Output

Read Length	Single Flow Cell Run Time	Output*	Reads Passing Filter	Percent of Bases Higher than Q30*
1 x 35 bp	~ 2 days	10–12 Gb	Up to 320 million	
2 × 50 bp	~ 5 days	25–30 Gb		> 85%
2 × 75 bp	~ 7 days	37.5–45 Gb		
2 × 100 bp	~ 9.5 days	54–60 Gb	Up to 640 million	> 80%

*Sequencing output generated using TruSeq™ SBS V5 kit with PhiX library and cluster densities between 508–630 K/mm2 that pass filtering on a GAIIx™.

Name	Cat #
GAIIx™ Sequencing	NGGA-100

Transgene Intergration Site(s) Identification

Description:
Production of genetically engineered animals has been a successful strategy for generating animal models to better understand the functionality of genes. The site of integration of the transgene within the genome is either a specific or a random event. The integration site will be same or different in each founder animal. Dependents on the delivery system, for some transgene animals, there are typically one insertion site, although multiple transgene copies are often found in a tandem array at that integration site; for other transgene animals, there are often multiple integration events with random transgene insertions on several chromosomes. Determining transgene integration sites is challenging. MCLAB has been developed a proprietary system to isolate DNA fragments adjacent to known sequences. MCLAB can determine the precise integration sites, the adjacent sequence (left and right arms) of the transgenic animals from mouse, rat, dog, fish , fruit fly and other animal models.

Features:
- A unique way of allowing the capture of DNA fragments containing the chromosomal region flanking the transgene.
- A quick and precise determination of either single or multiple independent transgene integration sites in founder animals and their offspring.

Name	Cat #	Size
Transgene Intergration Site(s) Identification	TGS-100	Single intergration site per sample
Transgene Intergration Site(s) Identification	TGS-200	Multiple intergration site per sample

Custom ORF Cloning Services

MCLAB has about 1,500,000 open reading frames (ORFs) information and/or clones from 92 species. With our advanced ligase independent cloning (LIC) technology and advanced gene synthesis technology, we can put your ORFs into expression-ready vectors for three different expression systems - bacteria, insect cells (such as Sf9), and mammalian cells.

Name	Cat #
Custom ORF Cloning Services	ORF-100

Custom Vector-Base siRNA Construction

MCLAB makes custom vector-based siRNA constructs. Customers can provide target genes and MCLAB will design 3-5 siRNA targets. Customers can also provide specific siRNA target sequences. Results of the final vector-base siRNA construct will be sent back within 7 business days. The siRNA insert will be confirmed by sequencing.

Name	Cat #
Custom Vector-Base siRNA Construction	siRNA-100

RACE Cloning

Description:
Most attempts to identify and isolate a novel cDNA result in the acquisition of clones that represent only a part of the mRNAs complete sequence. The missing sequence (cDNA ends) can be cloned by PCR using a technique called Rapid Amplification of cDNA Ends (RACE). MCLAB has developed significant improvements on the classic and basic approach on RACE Cloning and has a more powerful new RACE protocol.

Why Choose MCLAB's RACE cloning service instead of screening cDNA libraries?
1. Saves time: It takes weeks to screen cDNA libraries, obtain individual cDNA clones, and analyze the clones to determine whether the missing sequence is present. Using MCLAB's RACE cloning service, such information can be generated within a few days.
2. Convenience: Unlimited numbers of independent clones can be generated using MCLAB's RACE cloning service; unlike library screens, in which generally a single to a few cDNA clones are recovered. The availability of large numbers of clones provide confirmation of nucleotide sequence and allows the isolation of unusual transcripts that are alternately spliced or that begin at infrequently used promoters.
3. Technology: We have proprietary reverse transcriptional, PCR and DNA sequencing technologies to solve the most difficult and rare genes.

Name	Cat #
RACE Cloning	RACE-100

Regular Subcloning Services

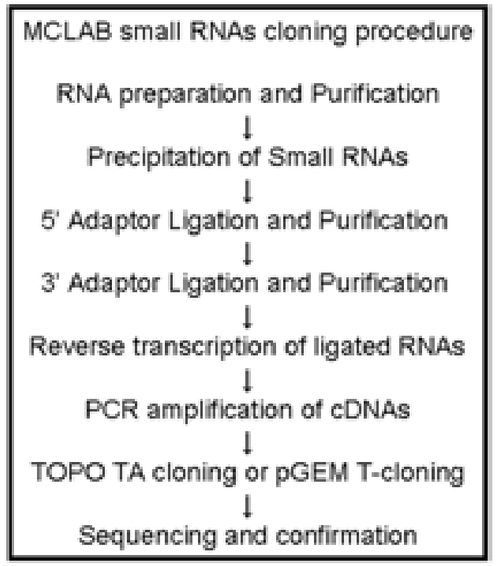
Description:
We offer service for cloning of known and unknown genes and/or fragments from plasmid, cosmid, genomic DNAs, total RNAs or poly(A) mRNAs and cDNA libraries, synthetic DNA into any vector, including large double gene vectors.

Features:
- Reliable verification of clones by sequencing.
- Confidentiality: No data or material provided to third parties, and all rights are transferred to the customer.
- High throughput and multiple fragment cloning compatible using our proprietary revolution Choo-Choo Cloning™ system.
- Seamless: No extra amino acid at the junction between the insert and the vector.
- Extendable: Subsequent in-house production of any amout of plasmid DNA possible.
- Template DNA or RNA, or their description.
- Sequence and description of the DNA to be cloned.
- Vector or description of the vector for the DNA to be cloned into.
- Primer design for PCR or RT-PCR.
- Cloning into the vector of your choice.
- Sequencing of target DNA in both directions.
- Plasmid purification.
- 5-10 business days for known genes.
- 1 month for unknown gene or if the template is not available in collections.
- Detailed report on the experiments and data obtained.
- At least 2.0μg of the vector containing cloned DNA with glycerol stock.

Name	Cat #
Regular Sub-Cloning Services	RCLN-100

Small RNAs Cloning

Description:
Small RNAs, which include microRNAs (miRNAs) and short interfering RNA (SiRNA), play a variety of roles in biology. miRNAs are very important molecules that regulate protein translation. SiRNA is involved in the RNA interference (RNAi) pathway to interfere with the expression of a specific gene. SiRNA also act in RNAi-related pathways. We provides small RNAs cloning and sequencing services to be used for characterizing known and unknown miRNAs.



Name	Cat #
Small RNAs Cloning	SRNA-100

Copy Number Variation Assay

Description:
For fast, specific, reproducible, accurate target quantitation of copy number variation.

Name	Cat #
Copy Number Variation Assay	CNVA-100

PCR Array Service

Description:
PCR Arrays are the most reliable and sensitive tools for analyzing the expression of a focused panel of genes, particularly if you are more familiar with real-time PCR-based techniques than microarray-based methods.
Pathway-Focused design is used for a thoroughly researched panel of relevant, pathway- or disease-focused genes.

Reliable and Sensitive:
Real-time PCR method provides greater sensitivity and a wider linear dynamic range.
Compatibility with most common machines

Ease-of-Use:
Simply mix your template with the appropriate ready-to-use PCR master mix. Then, aliquot equal volumes to each well of the same plate.

Name	Cat #
PCR Array Service	PCRA-100

Regenerate ~ Sell ~ Trade Capillary Arrays

Description:

- Bring in your old and used capillary array and we will restore it back to its original condition with a guarantee* that it will be as good as new. Each array can be regenerated multiple times, allowing you to save up to thousands of dollars while being eco-friendly.
- Once it hits its maximum amount of runs, the faster it gets off the sequencer to us, the faster we can get it back to you. We accept wet or dry arrays. With a 2-3 day turnaround time, ship your array overnight to us, and receive it back in a few days.

*Note: Capillaries that have been irreversibly blocked (i.e. breaks or clogs) will not be able to be restored by regeneration procedures.

Name	Cat #	Size
Capillary Arrays	CAR-16	16
Capillary Arrays	CAR-48	48
Capillary Arrays	CAR-96	96

Large Scale Plasmid Purification Service

Description:

MCLAB's endotoxin free plasmid DNA maxi prep service provides high quantities of transfection grade plasmid DNA from bacterial cultures. Using our proprietary technology, we can provide ultra fast processing with a turn around time of 1-2 days upon sample receipt. Our service results in robust yield of high quality plasmid DNA typically yielding >1mg of high copy number plasmids. We can prep the DNA from cultures that you have already grown or we can grow the cultures and prep DNA from your plasmid DNA, colonies on LB plates, or starter cultures.

Features:

- Cost effective.
- Much quicker than competitors' services.

1 day sample turn around time if grown cultures are provided (at least 200ml)

2 day sample turn around time if cultures have to be grown by us

- Results in high quality endotoxin free plasmid DNA ready for transfection.
- RNA and genomic DNA free.
- Flexible Scale: 1mg to 100,000mg.
- Highest Yield: >200-1000 mg/L.

Application:

- Restriction analysis
- Labeling
- Ligation
- Cloning
- Probe construction
- Hybridization
- PCR

Name	Cat #	Size
Large scale plasmid production	PLASM-100	1 mg
Large scale plasmid production	PLASM-200	10 mg
Large scale plasmid production	PLASM-300	100 mg
Xlarge scale plasmid production	PLASM-400	500 mg
Xlarge scale plasmid production	PLASM-500	1,000 mg
Xlarge scale plasmid production	PLASM-600	10,000 mg
Fermentation cell pste or plasmid isolation	PLASM-CP	200 g

Plasmid Sequence Verification

Description:

We can verify either the insert sequence or the whole sequence of your plasmid.

Name	Cat #	Desciption
Plasmid Sequence Verification	CONFIR-100	Insert Only Plasmid Sequence Confirmation
Plasmid Sequence Verification	CONFIR-200	Whole Plasmid Plasmid Sequence Confirmation

Monoclonal Antibody Generation Services

Description:

These are monospecific antibodies derived from one cell line. They have monovalent affinity towards the same epitope and are generally produced by fusing myeloma cells with the spleen cells from a mouse that has been immunized with the desired antigen.

New Mouse Monoclonal: Balb/c Mice

Necessary Purity of ntigen	*Required Quantity of Antigen	Products	Time
>80%	1.5 mg	Hydridoma cell lines and medium	4-6 months

Monoclonal With Hybridoma Cells

Methods	Products	Antibody Concentration	Time
Integra CL350 bioreactor	36 ml hybridoma medium	~1mg/ml	9 weeks
Integra CL100	90 ml hybridoma medium	~1mg/ml	9 weeks
Conventional flask culture	Hybridoma medium	0.02-0.1 mg/ml	7-20 days
Mouse ascites	Crude ascites fluid	20 ml	
1-6 mg/ml	9 weeks		

Name	Cat #	Description
Monoclonal Antibody	AMAN-100	Balb/c Mice Hydridoma cell lines and medium
Hybridoma medium	AMAM-100	Integra CL350 bioreactor, Antibody Concentration ~1mg/ml
Hybridoma medium	AMAM-200	Integra CL100, Antibody Concentration ~1mg/ml
Hybridoma medium	AMAM-300	Conventional flask culture, Antibody Concentration 0.02-0.1 mg/ml
Crude ascites fluid	AMAM-400	Mouse ascites, Antibody Concentration 1-6 mg/ml

Polyclonal Antibody Generation Services

Description:
Polyclonal antibodies are obtained from different B cell resources. They consist of a combination of immunoglobulin molecules secreted against a specific antigen in which each identifies a different epitope. Production of polyclonal antibodies involves the inoculation of an antigen into a suitable animal, such as mouse, rabbit or goat. Currently we offer polyclonal antibody production from rabbit and chicken.

Rabbit:

Necessary Purity of Antigen	*Required Quantity of Antigen	Testing Sample	Final Product	Time
>90%	1.5 mg for one animal	2 x 10 ml serum from each animal	70 ml serum from each animal	2-5 months

*Purity of Antigen less than 90% is acceptable under certain conditions.

Chicken:

Necessary Purity of Antigen	*Required Quantity of Antigen	Testing Sample	Final Product	Time
>90%	1.5 mg for one animal	500 ul serum from each animal	10 eggs	3-4 months

Name	Cat #	Size
Polyclonal Antibody (Rabbit)	APAR-100	70 ml serum from each animal
Polyclonal Antibody (Chicken)	APAC-100	100 eggs

Antigen Affinity Purification

Description:
Antigen of interest can be coupled to a solid support in order to specifically purify only antibodies that have affinity towards the antigen.

Name	Cat #	Description
Antigen Affinity Purification	AAAP-100	Starting Material Serum/ascites, 1-3 weeks turn around time.

IgG Purification Using Protein A

Description:
Recombinant Protein A is an immunoglobulin-binding protein derived from the cell wall of the bacterium Staphylococcus aureus. It is composed of five homologous Ig-binding domains that fold into a three-helix bundle. Each domain is able to bind immunoglobulin proteins from many of mammalian species, most notably IgGs. Protein A binds with high affinity to human IgG1 and IgG2 as well as mouse IgG2a and IgG2b. Protein A binds with moderate affinity to human IgM, IgA and IgE as well as to mouse IgG3 and IgG1. It does not react with human IgG3 or IgD, and mouse IgM, IgA or IgE.
This service is to help our customers to purify the IgG using protein A from a variety of sources, including hybridoma medium, frozen cells, mouse ascites, etc.

Name	Cat #	Description
IgG Purification using Protein A	AIPA-100	Rabbit serum, 20 mg purified antibody, 1-3 weeks turn around time

IgG Purification Using Protein G

Description:
Due to its affinity for the Fc region of many mammalian immunoglobulins, protein G plays a major role in purifying antibodies. Protein G is considered a universal reagent in biochemistry and immunology. Recombinant Protein G is an immunoglobulin-binding protein derived from the cell wall of certain strains of b-hemolytic Streptococci. It binds with high affinity to the Fc portion of various classes and subclasses of immunoglobulins from a variety of species. The albumin and cell surface binding domains of our protein G have been eliminated to reduce nonspecific binding and, therefore, can be used to separate IgG from crude samples.
This service is to help our customers to purify the IgG using protein G from a variety of sources, including hybridoma medium, frozen cells, mouse ascites, etc.

Starting Material	Time	Products
Hybridoma medium	1-3 weeks	100 ml hybridoma medium (2 – 5 mg)
Frozen cells	1-3 weeks	5 mg purified antibody
Mouse ascites	1-3 weeks	20 ml ascites

Name	Cat #	Description
IgG Purification Using Protein G	AIPG-100	Starting Material Hybridoma medium, 100 ml hybridoma medium (2 – 5 mg)
IgG Purification Using Protein G	AIPG-200	Starting Material Frozen cells, 5 mg purified antibody
IgG Purification Using Protein G	AIPG-300	Starting Material Mouse ascites, 20 ml ascites

Antibody Biotinylation

Description:
Antibody biotinylation allows the user to detect protein of interest. This can be useful in localization, western blots, ELISPOT, ELISA and other immunoanalytical methods.

Name	Cat #	Description
Antibody Biotinylation	MAAB-100	1-10 mg antibody
Antibody Biotinylation	MAAB-200	less than 0.5 mg antibody

Antibody Isotyping

Description:
Antibodies come in different varieties are known as isotypes or classes. Each one differs in their biological properties, functional locations and ability to deal with different antigens. Knowing the specific isotype of the antibody of interest is crucial for downstream experiments.

Name	Cat #	Size
Antibody Isotyping	MAAI-100	One cell line ($13.50 for Additional Cell line)

ELISA

Description:
ELISA (enzyme-linked immunosorbent assay) is a common biochemistry assay used to detect a substance in a liquid or wet sample. It is a fast and reliable method to evaluate the presence and concentration of an antigen or antibody in a sample.

Name	Cat #	Size
ELISA	MAEL-100	One 96-well plate

Peptide Conjugation to KLH

Description:
Most peptides of interest are not adequately large enough to be immunogenic. Conjugation to a carrier protein is usually necessary. KLH (Keyhole Limpet Hemacyanin), is used for conjugation to the peptide of interest because species cross-reactivity is very minimal.

Name	Cat #	Description
Peptide Conjugation to KLH	MAPK-100	One peptide to one carrier protein (KLH, BSA or OVA)

Antibody Complementarity Determining Regions (CDRs)

Description:
Immunoglobulins are composed of polymorphic heavy and light chains. The idiotypic variability is related to the diversity of the antigen binding site and in particular to the hyper variable domains called complementarity-detering regions (CDRs). There are 6 CDRs in both variable regions of light (VL) and heavy chains (VH) with background variability on each side of the CDRs. Antibodies of different specificities can assembled identical VL domains with different VH domains. The framework sequences between CDRs can be similar or identical.
MCLAB offers a fast and professional service to determine your valuable antibody CDRs via cDNA cloning and sequencing. We can determine any antibody producing cell line tailored to your requirements.
MCLAB has extensive experience in antibody CDR determination from cDNA. Sequences are compiled and aligned based on bi-directional sequencing of multiple independent clones, then determine the CDRs by our proprietary bioinformatics tools.

Features:
- Relability and productivity based on technological experience.

Starting Materials:
A pellet of snap frozen cells ($1x10^5$ ~ $1x10^7$cells) or B-cell line expressing your antibody.

Technical Summary:
Stage 1: Total RNA extraction from the cell pellet
Stage 2: Reverse transcription
Stage 3: PCR or 5' RACE amplification of heavy and light chains
Stage 4: Cloning into a standard sequencing vector and sequencing
Stage 5: Determination of the peptides corresponding to the CDRs
Stage 6: Final Report, including sequence alignments of the heavy and light chains and the peptide sequences corresponding to the CDRs, to the client.

Name	Cat #
Antibody Complementarity Determining Regions	AntiCDR-100

Antibody Generation Services

Description:
We make antibodies directly from the gene. Routinely, we construct the interested gene under the control of a CMV promoter. The final structure is then injected into a rabbit or chicken to make an antibody. This technique has the capability to produce antibodies against structurally complex protein with high success rates.

Name	Cat #
Antibody Generation Services	ANTIBD-100

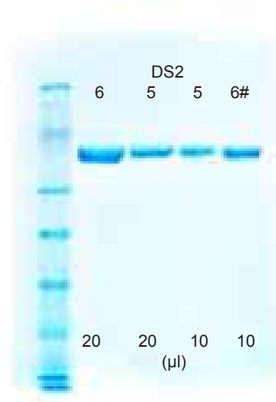
Protein Expression and Purification

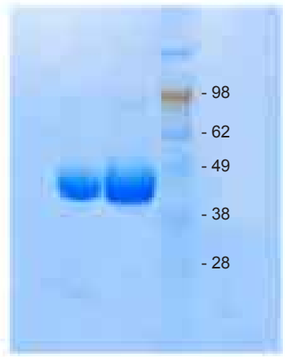
Description:
MCLAB provides a full scope of protein process services, including gene construction, codon optimization, pilot fermentation, and up to gram level scale up purification of recombinant protein .
MCLAB is equipped with up to 250L fermenters, cell lysis devices, centrifuges, ultra-filtration, FPLC, and HPLC. Our scientists have years of experiences in the lab as well as with industrial process development.

We can help you select expression system and strains, develop standard protocols, and scale up processes.
We can also help you solve the challenging problems in the areas of protein solubility, expression levels, refolding, biological activity maintenance, endotoxin level reduction, crystallization, etc.

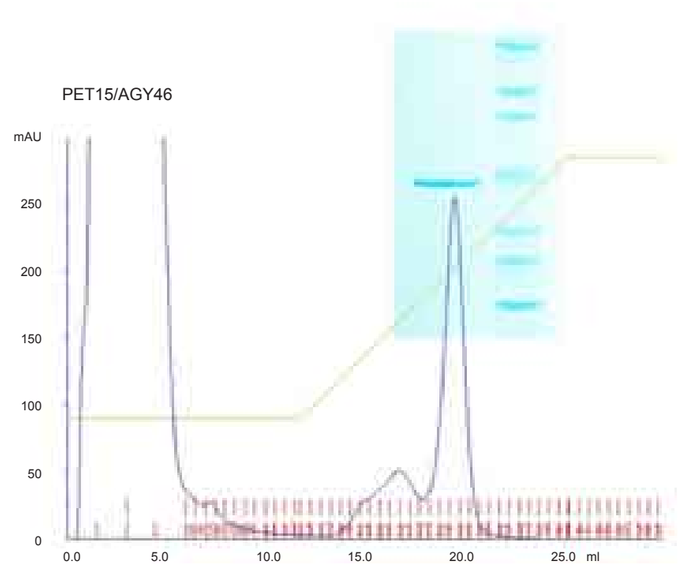
Service Details:
1. Protein Expression in E. coli
- Single batch and feed batch, high cell density fermentation
- Inclusion body isolation and protein refolding.
- Soluble protein purification in high yield.
2. Expression in Yeast
- Expression strain construction, positive clone selection.
- Development of procedures and processes for protein in secretion or non secretion.
- Expression strain optimization and scale up production.
3. Purification of tagged Proteins
- One step purification with affinity resins protein with tags: His6, Flag, Fc, GST, maltose, chitin, or glucoprotein.
- Remove tag with special enzymes: Thrombin, EK, TEV, Precision, or Capase3.
4. Further purification of protein
- Chromatography: Ion exchange, size exclusion, hydrophobic interaction.
- Affinity: Heparin-sepharose, hypetate, Ciba blue-agarose, red-agarose, benzimidine-agarose, camoduline-agarose resins.
- Refolding protein.
- Concentration.
- Endotoxin removal.
5. Expression/Mammalian cell system
Stable cell line production, optimization of stable cell line production, isolation of conditioned media production, isolation of cell pellet, transient transfection production, conditioned media production, Cell Pellet production, and high level of protein production by using transient transfection up to a level of 40 mg/L
6. Expression/Baculovirus system
Recombinant virus generation, viral plaque assays, titer determination or viral purification, high titer stock production, and optimization of baculovirus expression.
Purification protein from inset cell.

Some Processed Results:





GST removed AHCY



Name	Cat #
Protein Expression and Purification	PROTEP-100

Cell Line Identification Testing Service

Description:
Short tandem repeat (STR or microsatellite markers) profiling prevents misidentification and allows for the authentication of cell lines. MCLAB provides quick and accurate STR cell line authentication as a tool to help confirm the legitimacy of research for publication or grant agencies. We will isolate and amplify your DNA with Promega PowerPlex® 16 HS system or Identifier© to analyze the results using Genemapper® ID software from Applied Biosystems™.
MCLAB can generate date directly from the cell pellet.

Cell Authentication Service Report includes:
- STR Allele Report
- Electropherogram
- Comprehensive explanation of results

Name	Cat #	Description
Cell Line Identification Testing Service	CLID-01	One Cell Line
Cell Line Identification Testing Service	CLID-10	Ten Cell Lines

Appendix

Cat #	Prodcut	Description	Page
2MAS-1GAL	2M Ammonium Sulfate	25% Ammonium Sulfate, 1GAL	211
2MAS-1L	2M Ammonium Sulfate	25% Ammonium Sulfate, 1L	211
2TY-ACa501	2YT Agar Carbenicillin-50	Plate size, 150 x 15 mm, 10/PK, 50ug/ml carbenicillin	10
2TY-ACa502	2YT Agar Carbenicillin-50	Plate size, 100 x 15 mm, 20/PK, 50ug/ml carbenicillin	10
2YP-Amp101	2YT Agar Amp-100	Plate size, 150 x 15 mm, 10/PK, 100ug/ml ampicillin	10
2YP-Amp102	2YT Agar Amp-100	Plate size, 100 x 15 mm, 20/PK, 100ug/ml ampicillin	10
2YTA-100	2YT Agar Plates	Plate size, 150 x 15 mm, 10/PK	10
2YTA-200	2YT Agar Plates	Plate size, 100 x 15 mm, 20/PK	10
2YT-Ach341	2YT Agar Chloramphenicol-34	Plate size, 150 x 15 mm, 10/PK, 34ug/ml chloramphenicol	10
2YT-Ach342	2YT Agar Chloramphenicol-34	Plate size, 100 x 15 mm, 20/PK, 34ug/ml chloramphenicol	10
2YT-AK301	2YR Agar Kanamycin-30	Plate size, 150 x 15 mm, 10/PK, 30ug/ml kanamycin	10
2YT-AK302	2YR Agar Kanamycin-30	Plate size, 100 x 15 mm, 20/PK, 30ug/ml kanamycin	10
4MAS-1GAL	4M Ammonium Sulfate	50% Ammonium Sulfate, 1GAL	211
4MAS-1L	4M Ammonium Sulfate	50% Ammonium Sulfate, 1L	211
50IC630-1GAL	50% IGEPAL CA-630	50%, 1GAL	208
50IC630-1L	50% IGEPAL CA-630	50%, 1L	208
50T020-1GAL	50% TWEEN 20	50%, 1GAL	215
50T020-1L	50% TWEEN 20	50%, 1L	215
50TX100-1GAL	50% Triton x-100	50%, 1GAL	214
50TX100-1L	50% Triton x-100	50%, 1L	214
50TX114-1GAL	50% Triton x-114	50%, 1GAL	209
50TX114-1L	50% Triton x-114	50%, 1L	209
7MGHS-1GAL	7M Guanidine HCL Solution	1GAL	210
7MGHS-1L	7M Guanidine HCL Solution	1L	210
96P8C-010	96-well PCR plate with 8-strip Caps	10 Sets, each has 10 96-well plates (96 x 0.2ml) and 120 8-cap strips for closure of the plates.	55
AAAP-100	Antigen Affinity Purification	Starting Material Serum/ascites, 1-3 weeks turn around time.	241
AD-200	Pfu DNA Polymerase	500 units, 2.5 U/ul	74
AD-205	Pfu DNA Polymerase	1,000 units, 2.5 U/ul	74
AD-210	Pfu DNA Polymerase	2,500 units, 2.5 U/ul	74
AFU-100	FEN1 (AFU)	100µg, 0.5 mg/ml	113
AFU-200	FEN1 (AFU)	500µg, 0.5 mg/ml	113
AIPA-100	IgG Purification using Protein A	Rabbit serum, 20 mg purified antibody, 1-3 weeks turn around time	241
AIPG-100	IgG Purification Using Protein G	Starting Material Hybridoma medium, 100 ml hybridoma medium (2 – 5 mg)	242
AIPG-200	IgG Purification Using Protein G	Starting Material Frozen cells, 5 mg purified antibody	242
AIPG-300	IgG Purification Using Protein G	Starting Material Mouse ascites, 20 ml ascites	242
AMAM-100	Hybridoma medium	Integra CL350 bioreactor, Antibody Concentration ~1mg/ml	239
AMAM-200	Hybridoma medium	Integra CL100, Antibody Concentration ~1mg/ml	239
AMAM-300	Hybridoma medium	Conventional flask culture, Antibody Concentration 0.02-0.1 mg/ml	239
AMAM-400	Crude ascites fluid	Mouse ascites, Antibody Concentration 1-6 mg/ml	239
AMAN-100	Monoclonal Antibody	Balb/c Mice Hydridoma cell lines and medium	239
ANT204-500	Antifoam 204	500ml	211
ANTIBD-100	Antibody Generation Services		245
AntiCDR-100	Antibody Complementarity Determining Regions		245
APAC-100	Polyclonal Antibody (Chicken)	100 eggs	240
APAR-100	Polyclonal Antibody (Rabbit)	70 ml serum from each animal	240
APE-100	APE 1	5,000 units,10,000 U/ml	106
APE-105	APE 1	10,000 units, 10,000 U/ml	106
APE-110	APE 1	25,000 units, 10,000 U/ml	106
ATPSY0010	ATP sulfurylase Yeast	50 units, 300 U/ml	121
ATPSY0050	ATP sulfurylase Yeast	100 units, 300 U/ml	121
ATPSY0150	ATP sulfurylase Yeast	500 units, 300 U/ml	121
BCB-100	BigDye® Cleaning Beads	5 ml	42
BCB-200	BigDye® Cleaning Beads	50 ml	42
BCB-300	BigDye® Cleaning Beads	500 ml	42
BDP-100	Hairpin Premix	1ml, 4µl/rnx	49
BDX-100	BDX64 Buffer	2 x1.25 ml	41
BGL-100	Bgl II	2,000 units (8-12 units/µl)	132
BGL-200	Bgl II	6,000 units (8-12 units/µl)	132
BGL-300	Bgl II	2,000 units (50 units/µl)	132
BL21-100	BL21 Competent E. coli	10x100µl (10 tubes)	168
BL21-196	BL21 Competent E. coli	96x50µl (96-well plate)	168
BP-100	BL21(DE3)pLysS Competent E. coli	10x100µl (10 tubes)	170
BP-196	BL21(DE3)pLysS Competent E. coli	96x50µl (96-well plate)	170
bpDNA-050	100 bp DNA Ladder	50 µg, 100 lanes	12
bpDNA-250	100 bp DNA Ladder	250 µg, 500 lanes	12
BPL-100	Bst DNA Polymerase (large fragment)	8,000 units, 8 U/µl	70
BPL-200	Bst DNA Polymerase (large fragment)	10,000 units, 100 U/µl	70
BPL-300	Bst DNA Polymerase (large fragment)	50,000 units, 100 U/µl	70
BPL-400	Bst DNA Polymerase (large fragment)	100,000 units, 100 U/µl	70
BPL-500	Bst DNA Polymerase (large fragment)	1,000,000 units, 100 U/µl	70
BPR-200	Bst DNA Polymerase (regular)	8,000 units, 8 U/µl	71
BPR-205	Bst DNA Polymerase (regular)	20,000 units, 8 U/µl	71
BPR-210	Bst DNA Polymerase (regular)	50,000 units, 8 U/µl	71
BS-100	BL21(DE3) Competent E. coli	10x100µl (10 tubes)	169
BS-196	BL21(DE3) Competent E. coli	96x50µl (96-well plate)	169
BSA-100	Acetylated Bovine Serum Albumin (BSA)	6 x 20 mg	210
CAP-47	310 Genetic Analysis Capillary, 47 cm	5	54
CAP-61	310 Genetic Analysis Capillary, 61 cm	2	54
CAR-16	Capillary Arrays	16	236
CAR-48	Capillary Arrays	48	236
CAR-96	Capillary Arrays	96	236
CC-100	Customized Competent E. coli	>109	175
CCK-096	Choo-Choo Cloning™ Kits	96 rxns with Choo-Choo Cloning™ Blue Chemical CompetentE. coli Cells (50 µl x 96 wells)	5
CCK-10	Choo-Choo Cloning™ Kits	10 rxns with Choo-Choo Cloning™ Blue Chemical CompetentE. coli Cells (50 µl x 10 tubes)	5
CCK-100	Choo-Choo Cloning™ Kits	100 rxns with Choo-Choo Cloning™ Blue Chemical CompetentE. coli Cells (50 µl x 100 tubes)	5
CCK-20	Choo-Choo Cloning™ Kits	20 rxns with Choo-Choo Cloning™ Blue Chemical CompetentE. coli Cells (50 µl x 20 tubes)	5
CLID-01	Cell Line Identification Testing Service	One Cell Line	248
CLID-10	Cell Line Identification Testing Service	Ten Cell Lines	248
CNVA-100	Copy Number Variation Assay		235
CONFIR-100	Plasmid Sequence Verification	Insert Only Plasmid Sequence Confirmation	238
CONFIR-200	Plasmid Sequence Verification	Whole Plasmid Plasmid Sequence Confirmation	238
CR-100	CARE Solution	28 ml	44
CR-500	CARE Solution	5 x 28 ml	44
CSP-100	Csp68KVI	1,000 units (10,000 units/ml)	132
CSP-200	Csp68KVI	5,000 units (10,000 units/ml)	132
DA-100	Dh5-Alpha Competent E. coli	20x50µl (20 tubes)	172
DA-144A*	Dh5-Alpha Competent E. coli	Pre-payment for one year, 144x10x100µl or 15 plates of DA-196 Kit, individual shipping and handling charges will apply.	172

Cat #	Prodcut	Description	Page
DA-196	Dh5-Alpha Competent E. coli	96x50µl (96-well plate)	172
DB35-100	Brij-35 (30% Solution)	950ml	212
DCPS100	CHAPS	5g	213
DCPS101	CHAPS	100g	213
DCSO100	CHAPSO	5g	212
DCSO101	CHAPSO	100g	212
DH10-100	Dh10-Beta Competent E. coli	10x100µl (10 tubes)	171
DH10-196	Dh10-Beta Competent E. coli	96x50µl (96-well plate)	171
DNAFRG-100	DNA Fragment Analysis Services		222
DNAK-100	DnaK (HSP70) E. coli Recombinant	1mg, 1mg/ml	151
DNAK-200	DnaK (HSP70) E. coli Recombinant	50mg, 1mg/ml	151
DNAMUT-100	DNA Mutagenesis Services		223
dNTP-10M	Mix of 4 dNTPs	10mM each dNTP, 1ml	20
dNTP-25M	Mix of 4 dNTPs	25mM each dNTP, 1ml	20
dNTP-2DN	Set of 4 nucleotides	100mM each, 4 x 200µl	20
dNTP-5DA	dATP nucleotides	100mM, 500µl	20
dNTP-5DC	dCTP nucleotides	100mM, 500µl	20
dNTP-5DG	dGTP nucleotides	100mM, 500µl	20
dNTP-5DN	Set of 4 nucleotides	100mM each, 4 x 500µl	20
dNTP-5DT	dTTP nucleotides	100mM, 500µl	20
DPI-100	DNA Polymerase I	5,000 units, 10,000 U/ml	81
DPI-200	DNA Polymerase I	10,000 units, 10,000 U/ml	81
DPI-300	DNA Polymerase I	50,000 units, 10,000 U/ml	81
DPTN-100	DNA Polymerase, Thermotoga Neapolitana	2,000 units, 5 U/µl	72
DPTN-200	DNA Polymerase, Thermotoga Neapolitana	4,000 units, 5 U/µl	72
DPTN-300	DNA Polymerase, Thermotoga Neapolitana	10,000 units, 5 U/µl	72
DSB-100	DNA Storage Buffer	50ml	65
DSB-200	DNA Storage Buffer	100ml	65
DSMD-100	Double Peak DNA Size Standard	800 analyses (400ul)	47
DSMD-101	Double Peak DNA Size Standard	800 analyses (8 x 1.5ml, premixed in Super-DI™)	47
DSMO-100	Orange DNA Size Standard	800 analyses (400ul)	47
DSMO-101	Orange DNA Size Standard	800 analyses (8 x 1.5ml, premixed in Super-DI™)	47
DSMR-100	Red DNA Size Standard	800 analyses (400ul)	47
DSMR-101	Red DNA Size Standard	800 analyses (8 x 1.5ml, premixed in Super-DI™)	47
ECCL-100	E. coli (DH5a) Cell Lysate	1 Kit (10 tubes)	159
ECOR-100	EcoR I	10,000 units (20 units/µl)	133
ECOR-200	EcoR I	60,000 units (20 units/µl)	133
ECOR-300	EcoR I	10,000 units (200 units/µl)	133
ECOR-400	EcoR I	60,000 units (200 units/µl)	133
EDLA-100	E. coli DNA ligase	2,500 units, 10,000 U/ml	86
EDLA-200	E. coli DNA ligase	5,000 units, 10,000 U/ml	86
EDLA-300	E. coli DNA ligase	10,000 units, 10,000 U/ml	86
EFD-100	Extraction Midiprep System	25 preps	192
EFX-100	Extraction Maxiprep System	15 preps	192
EIII-100	Exonuclease III, E. coli	50,000 units, 100,000 U/ml	112
EIII-200	Exonuclease III, E. coli	100,000 units, 100,000 U/ml	112
EIII-300	Exonuclease III, E. coli	250,000 units, 100,000 U/ml	112
EIV-100	Endonuclease IV, E. coli	250 units, 2 U/µl	107
EIV-200	Endonuclease IV, E. coli	1,250 units, 2 U/µl	107
ERRP-100	Exo-Resistant Random Primer	100µl, 100 reactions, 500 µM (1.1 µg/µl)	56
ERRP-110	Exo-Resistant Random Primer	1,000µl , 1,000 reactions, 500 µM (1.1 µg/µl)	56
ERRP-120	Exo-Resistant Random Primer	10,000µl, 10,000 reactions, 500 µM (1.1 µg/µl)	56
ESSB-100	E. coli SSB	1.0 mg, 5.0 mg/ml	94
ESSB-200	E. coli SSB	2.0 mg, 5.0 mg/ml	94
ESSB-300	E. coli SSB	5.0 mg, 5.0 mg/ml	94
ETSSB-100	Extreme Thermostable SSB	50ug, 500 ug/ml	95
ETSSB-200	Extreme Thermostable SSB	100ug, 500 ug/ml	95
ETSSB-300	Extreme Thermostable SSB	500ug, 500 ug/ml	95
EZTP-100	EZ-TOPO PCR Cloning Kits	EZ-TOPO vector 20 reactions, Salt Solution 50µl, Sterile Water 1ml	6
EZTP-200	EZ-TOPO PCR Cloning Kits	EZ-TOPO vector 100 reactions, Salt Solution 300µl, Sterile Water 1ml	6
FL0001	Firefly luciferase	1mg	125
FL00010	Firefly luciferase	10x1mg	125
FL0002	Firefly luciferase	2x1mg	125
GAB-100	Glutathione Agarose Beads	10 ml	147
GAB-200	Glutathione Agarose Beads	25 ml	147
GAB-300	Glutathione Agarose Beads	100 ml	147
GAE-100	Gel Advanced Extraction Miniprep System	50 preps	193
GAE-200	Gel Advanced Extraction Miniprep System	250 preps	193
GEL-100	GroEL	1 mg	152
GEL-200	GroEL	25 mg	152
GES-100	GroES	1 mg	153
GES-200	GroES	25 mg	153
GPAE-100	Gel/PCR DNA Isolation System	50 preps	195
GPAE-200	Gel/PCR DNA Isolation System	250 preps	195
H53-102	Human p53 Signaling PCR Array	96-well plate containing 88 pathway regulated genes plus 5 endogenous control genes, one non-transcribed genomic DNA contamination control, one reverse transcription control and one positive PCR control (2 plates)	30
H53-102S	Human p53 Signaling PCR Array	H53-102 with 2.5 ml SYBR Green master Mix	30
H53-104	Human p53 Signaling PCR Array	96-well plate containing 88 pathway regulated genes plus 5 endogenous control genes, one non-transcribed genomic DNA contamination control, one reverse transcription control and one positive PCR control (4 plates)	30
H53-104S	Human p53 Signaling PCR Array	H53-104 with 5.0 ml SYBR Green master Mix	30
hap-102	Human Apoptosis PCR Array	96-well plate containing 88 pathway regulated genes plus 5 endogenous control genes, one non-transcribed genomic DNA contamination control, one reverse transcription control and one positive PCR control (2 plates)	28
hap-102S	Human Apoptosis PCR Array	hap-102 with 2.5 ml SYBR Green master mix	28
hap-104	Human Apoptosis PCR Array	96-well plate containing 88 pathway regulated genes plus 5 endogenous control genes, one non-transcribed genomic DNA contamination control, one reverse transcription control and one positive PCR control (4 plates)	28
hap-104S	Human Apoptosis PCR Array	hap-104 with 5.0 ml SYBR Green master mix	28
HB-100	HB101 Competent E. coli	10x100µl (10 tubes)	173
HB-196	HB101 Competent E. coli	96x50µl (96-well plate)	173
HBB-100	Heparin Agarose Beads	10 ml	146
HBB-200	Heparin Agarose Beads	25 ml	146
HBB-300	Heparin Agarose Beads	100 ml	146
hCC-102	Human Cell Cycle PCR Array	96-well plate containing 88 pathway regulated genes plus 5 endogenous control genes, one non-transcribed genomic DNA contamination control, one reverse transcription control and one positive PCR control (2 plates)	29
hCC-102S	Human Cell Cycle PCR Array	hCC-102 with 2.5 ml SYBR Green master mix	29
hCC-104	Human Cell Cycle PCR Array	96-well plate containing 88 pathway regulated genes plus 5 endogenous control genes, one non-transcribed genomic DNA contamination control, one reverse transcription control and one positive PCR control (4 plates)	29
hCC-104S	Human Cell Cycle PCR Array	hCC-104 with 5.0 ml SYBR Green master mix	29
HGD-9947A-100	9947A Female Genomic DNA	250ng, 10ng/ul	48
HGD-9948-100	9948 Male Genomic DNA	250ng, 10ng/ul	48
HGD-K562-100	K562 53 years old female Genomic DNA	250ng, 10ng/ul	48

Cat #	Prodcut	Description	Page
hHKG-100	Human and Mouse Housekeeping Gene Primer Sets	2 human genes, h18S rRNA and hActß, 100rxns	27
hHKG-110	Human and Mouse Housekeeping Gene Primer Sets	2 high expression level hACtß, hGapdh; 2 medium expression level genes, hHprt1, hTfrc; 2 low expression level genes, hGusb, hUbc; 100rxns	27
hHKG-120	Human and Mouse Housekeeping Gene Primer Sets	All 12 human housing keeping genes at different expression levels, 100rxns	27
HIND-100	Hind III	10,000 units (20 units/µl)	134
HIND-200	Hind III	60,000 units (20 units/µl)	134
HIND-300	Hind III	10,000 units (200 units/µl)	134
HIND-400	Hind III	60,000 units (200 units/µl)	134
HMM-100	2x HotStart PCR Master Mix	100 Reactions, 10µl/Reaction	17
HMM-300	2x HotStart PCR Master Mix	500 Reactions, 10µl/Reaction	17
HPYA-100	HpyA V	100 units (2,000 units/ml)	135
HPYA-200	HpyA V	500 units (2,000 units/ml)	135
HSM400	2x HotSybr Real-time PCR Kit	Regular level of ROX, for Real-time PCR Machines ABI 7000, 7300, 7700, 7900, 200 rnx, 4x1.25ml	24
HSM400LR	2x HotSybr Real-time PCR Kit	Low level of ROX, for Real-time PCR Machines ABI 7500, Stratagene Mx 3000P, Mx 3005P, 200 rnx, 4x1.25ml	24
HSM400RF	2x HotSybr Real-time PCR Kit	ROX Free, for Real-time PCR Machines BioRad iCycler MiniOpticon, Opticon 2, Chromo4, iQ5; Roche LightCycler 480; MJ Research DNA Engine Opticon 2, Chromo4; Corbett Roto-gene 3000, 6000, 200 rnx, 4x1.25ml	24
hstem-102	Human Stem Cell Gene Biomarkers PCR Array	96-well plate containing 88 pathway regulated genes plus 8 endogenous control genes (2 plates)	32
hstem-102S	Human Stem Cell Gene Biomarkers PCR Array	hstem-102 with 2.5 ml SYBR Green master mix	32
hstem-104	Human Stem Cell Gene Biomarkers PCR Array	96-well plate containing 88 pathway regulated genes plus 8 endogenous control genes (4 plates)	32
hstem-104S	Human Stem Cell Gene Biomarkers PCR Array	hstem-104 with 5.0 ml SYBR Green master mix	32
HT-200	HoTaq DNA Polymerase (hot start)	500 units, 5 U/µl	73
HT-205	HoTaq DNA Polymerase (hot start)	2,500 units, 5 U/µl	73
HT-210	HoTaq DNA Polymerase (hot start)	5,000 units, 5 U/µl	73
hTGFb-102	Human TGF Beta Signaling PCR Array	96-well plate containing 92 pathway regulated genes plus 4 endogenous control genes (2 plates)	34
hTGFb-102S	Human TGF Beta Signaling PCR Array	hTGFb-102 with 2.5 ml SYBR Green master mix	34
hTGFb-104	Human TGF Beta Signaling PCR Array	96-well plate containing 92 pathway regulated genes plus 4 endogenous control genes (4 plates)	34
hTGFb-104S	Human TGF Beta Signaling PCR Array	hTGFb-104 with 5.0 ml SYBR Green master mix	34
HTP-1000	2x HiFi HTP PCR Master Mix	1000 Reactions, 10µl/Reaction	16
HTP-500	2x HiFi HTP PCR Master Mix	500 Reactions, 10µl/Reaction	16
HTP-200	2x HiFi HTP PCR Master Mix	200 Reactions, 10µl/Reaction	16
HTP400	2x HoTaq Real-time PCR Kit	Regular level of ROX, for Real-time PCR Machines ABI 7000, 7300, 7700, 7900, 200 rnx, 4x1.25ml	23
HTP400LR	2x HoTaq Real-time PCR Kit	Low level of ROX, for Real-time PCR Machines ABI 7500, Mx 3000P, Mx 3005P, 200 rnx, 4x1.25ml	23
HTP400RF	2x HoTaq Real-time PCR Kit	ROX Free, for Real-time PCR Machines BioRad iCycler MiniOpticon, Opticon 2, Chromo4, iQ5; Roche LightCycler 480; MJ Research DNA Engine Opticon 2, Chromo4; Corbett Roto-gene 3000, 6000, 200 rnx, 4x1.25ml	23
HTP405	2x HoTaq Real-time PCR Kit	Regular level of ROX, for Real-time PCR Machines ABI 7000, 7300, 7700, 7900, 200 rnx, 5 ml	23
HTRH-100	Thermostable RNase H	500 units, 5 U/µl	120
HTRH-200	Thermostable RNase H	1,000 units, 5 U/µl	120
HTRH-300	Thermostable RNase H	5,000 units, 5 U/µl	120
HTRT400	HoTaq One-step Real-time RT-PCR Kit	Regular level of ROX, for Real-time PCR Machines ABI 7000, 7300, 7700, 7900, 200 rxns, 4x1.25ml	25
HTRT400LR	HoTaq One-step Real-time RT-PCR Kit	Low level of ROX, for Real-time PCR Machines ABI 7500, Mx 3000P, Mx 3005P, 200 rxns, 4x1.25ml	25
HTRT400RF	HoTaq One-step Real-time RT-PCR Kit	ROX Free, for Real-time PCR Machines BioRad iCycler MiniOpticon, Opticon 2, Chromo4, iQ5; Roche LightCycler 480; MJ Research DNA Engine Opticon 2, Chromo4; Corbett Roto-gene 3000, 6000, 200 rxns, 4x1.25ml	25

Cat #	Prodcut	Description	Page
iEXP-100G	One-Step™ Vector-based pre-miRNA Cloning Systems	100 rxns with pre-miRNA expression vector piEXP/ EmGFP	203
iEXP-100L	One-Step™ Vector-based pre-miRNA Cloning Systems	100 rxns with pre-miRNA expression vector piEXP/ hluc	203
iEXP-10G	One-Step™ Vector-based pre-miRNA Cloning Systems	10 rxns with pre-miRNA expression vector piEXP/ EmGFP	202
iEXP-10L	One-Step™ Vector-based pre-miRNA Cloning Systems	10 rxns with pre-miRNA expression vector piEXP/h luc	202
iEXP-20G	One-Step™ Vector-based pre-miRNA Cloning Systems	20 rxns with pre-miRNA expression vector piEXP/ EmGFP	203
iEXP-20L	One-Step™ Vector-based pre-miRNA Cloning Systems	20 rxns with pre-miRNA expression vector piEXP/ hluc	203
IPE-100	Inorganic Pyrophosphatase, E. coli	0.25 mg, 1 mg/ml	122
IPE-200	Inorganic Pyrophosphatase, E. coli	0.5 mg, 1 mg/ml	122
IPE-300	Inorganic Pyrophosphatase, E. coli	1 mg, 1mg/ml	122
iRPT-100G	One-Step™ Vector-based miRNA Target Screening Systems	100 rxns with miRNA target screening vector piReport/EmGFP	201
iRPT-100L	One-Step™ Vector-based miRNA Target Screening Systems	100 rxns with miRNA target screening vector piReport/hluc	201
iRPT-10G	One-Step™ Vector-based miRNA Target Screening Systems	10 rxns with miRNA target screening vector piReport/EmGFP	200
iRPT-10L	One-Step™ Vector-based miRNA Target Screening Systems	10 rxns with miRNA target screening vector piReport/hluc	201
iRPT-20G	One-Step™ Vector-based miRNA Target Screening Systems	20 rxns with miRNA target screening vector piReport/EmGFP	201
iRPT-20L	One-Step™ Vector-based miRNA Target Screening Systems	20 rxns with miRNA target screening vector piReport/hluc	201
JM-100	JM109 Competent E. coli	10x100µl (10 tubes)	174
JM-196	JM109 Competent E. coli	96x50µl (96-well plate)	174
kDNA-050	1 Kb DNA Ladder	50 µg, 100 lanes	11
kDNA-250	1 Kb DNA Ladder	250 µg, 500 lanes	11
KPIM-100	Klenow Fragment (3′–5′ exo–)	10,000 units, 50,000 U/ml	82
KPIM-200	Klenow Fragment (3′–5′ exo–)	20,000 units, 50,000 U/ml	82
KPIM-300	Klenow Fragment (3′–5′ exo–)	50,000 units, 50,000 U/ml	82
LBA-100	LB Agar	0.1% Trypton, 0.5% yeast extract, 1.0% NaCl, 1.5% agar; Plate Size, 150 x 15 mm; 10/pk	7
LBA-200	LB Agar	0.1% Trypton, 0.5% yeast extract, 1.0% NaCl, 1.5% agar; Plate Size, 100 x 15 mm; 20/pk	7
LB-Amp101	LB Agar Amp-100	100ug/ml; Plate size, 150 x 15 mm; 10/pk	7
LB-Amp102	LB Agar Amp-100	100ug/ml; Plate size, 100 x 15 mm; 20/pk	7
LB-Amp501	LB Agar Amp-50	50ug/ml ampicillin; Plate size, 150 x 15 mm; 10/pk	7
LB-Amp502	LB Agar Amp-50	50ug/ml ampicillin; Plate size, 100 x 15 mm; 20/pk	7
LB-AmpG501	LB Agar Amp-50, 1% Glucose	50ug/ml ampicillin, 1% glucose; Plate size, 150 x 15 mm; 10/pk	7
LB-AmpG502	LB Agar Amp-50, 1% Glucose	50ug/ml ampicillin, 1% glucose; Plate size, 100 x 15 mm; 20/pk	7
LB-AmpX101	LB Agar Amp-100, X-gal	100ug/ml ampicillin, 60ug/ml X-gal; Plate size, 150 x 15 mm; 10/pk	7
LB-AmpX102	LB Agar Amp-100, X-gal	100ug/ml ampicillin, 60ug/ml X-gal; Plate size, 100 x 15 mm; 20/pk	7
LB-AmpX501	LB Agar Amp-50, X-gal	50ug/ml ampicillin, 60ug/ml X-gal; Plate size, 150 x 15 mm; 10/pk	7
LB-AmpX502	LB Agar Amp-50, X-gal	50ug/ml ampicillin, 60ug/ml X-gal; Plate size, 100 x 15 mm; 20/pk	7
LBAX-100	LB Agar with X-gal	60ug/ml X-gal; Plate size, 150 x 15 mm; 10/pk	8
LBAX-200	LB Agar with X-gal	60ug/ml X-gal; Plate size, 100 x 15 mm; 20/pk	8
LB-Car101	LB Agar Carbenicillin-100	100ug/ml carbenicillin; Plate size, 150 x 15 mm; 10/pk	7
LB-Car102	LB Agar Carbenicillin-100	100ug/ml carbenicillin; Plate size, 100 x 15 mm; 20/pk	7
LB-Car501	LB Agar Carbenicillin-50	50ug/ml carbenicillin; Plate size, 150 x 15 mm; 10/pk	7
LB-Car502	LB Agar Carbenicillin-50	50ug/ml carbenicillin; Plate size, 100 x 15 mm; 20/pk	7
LB-CarX101	LB Agar Carbenicillin-100, X-gal	100ug/ml carbenicillin, 60ug/ml X-gal; Plate size, 150 x 15 mm; 10/pk	7
LB-CarX102	LB Agar Carbenicillin-100, X-gal	100ug/ml carbenicillin, 60ug/ml X-gal; Plate size, 100 x 15 mm; 20/pk	7

Cat #	Prodcut	Description	Page
PG3-A10	Precast Agarose Gels	3.0%, TAE, 10 wells, 10 gels/box	163
PG3-A12	Precast Agarose Gels	3.0%, TAE, 12 wells, 10 gels/box	163
PG3-A20	Precast Agarose Gels	3.0%, TAE, 15 wells, 10 gels/box	163
PG3-AE10	Precast Agarose Gels	3.0%, TAE, EB buffer, 10 wells, 10 gels/box	163
PG3-AE12	Precast Agarose Gels	3.0%, TAE, EB buffer, 12 wells, 10 gels/box	163
PG3-AE20	Precast Agarose Gels	3.0%, TAE, EB buffer, 15 wells, 10 gels/box	163
PG3-B10	Precast Agarose Gels	3.0%, TBE, 10 wells, 10 gels/box	163
PG3-B12	Precast Agarose Gels	3.0%, TBE, 12 wells, 10 gels/box	163
PG3-B20	Precast Agarose Gels	3.0%, TBE, 15 wells, 10 gels/box	163
PG3-BE10	Precast Agarose Gels	3.0%, TBE, EB buffer, 10 wells, 10 gels/box	163
PG3-BE12	Precast Agarose Gels	3.0%, TBE, EB buffer, 12 wells, 10 gels/box	163
PG3-BE20	Precast Agarose Gels	3.0%, TBE, EB buffer, 15 wells, 10 gels/box	163
PG4-A10	Precast Agarose Gels	4.0%, TAE, 10 wells, 10 gels/box	163
PG4-A12	Precast Agarose Gels	4.0%, TAE, 12 wells, 10 gels/box	163
PG4-A20	Precast Agarose Gels	4.0%, TAE, 15 wells, 10 gels/box	163
PG4-AE10	Precast Agarose Gels	4.0%, TAE, EB buffer, 10 wells, 10 gels/box	163
PG4-AE12	Precast Agarose Gels	4.0%, TAE, EB buffer, 12 wells, 10 gels/box	163
PG4-AE20	Precast Agarose Gels	4.0%, TAE, EB buffer, 15 wells, 10 gels/box	163
PG4-B10	Precast Agarose Gels	4.0%, TBE, 10 wells, 10 gels/box	163
PG4-B12	Precast Agarose Gels	4.0%, TBE, 12 wells, 10 gels/box	163
PG4-B20	Precast Agarose Gels	4.0%, TBE, 15 wells, 10 gels/box	163
PG4-BE10	Precast Agarose Gels	4.0%, TBE, EB buffer, 10 wells, 10 gels/box	163
PG4-BE12	Precast Agarose Gels	4.0%, TBE, EB buffer, 12 wells, 10 gels/box	164
PG4-BE20	Precast Agarose Gels	4.0%, TBE, EB buffer, 15 wells, 10 gels/box	164
PI-100	Inorganic Pyrophosphatase, yeast	10 units, 100 U/ml	123
PI-200	Inorganic Pyrophosphatase, yeast	50 units, 100 U/ml	123
PI-300	Inorganic Pyrophosphatase, yeast	100 units, 100 U/ml	123
PKI-100	Pyruvate Kinase I (pykF)	10 ug	104
PKI-200	Pyruvate Kinase I (pykF)	50 ug	104
PLASM-100	Large scale plasmid production	1 mg	237
PLASM-200	Large scale plasmid production	10 mg	237
PLASM-300	Large scale plasmid production	100 mg	237
PLASM-400	Xlarge scale plasmid production	500 mg	237
PLASM-500	Xlarge scale plasmid production	1,000 mg	237
PLASM-600	Xlarge scale plasmid production	10,000 mg	237
PLASM-CP	Fermentation cell pste or plasmid isolation	200 g	237
PMB-100	Puramag® Plasmid DNA Isolation Kit	Solution1, 2, 3, 5ml each; Puramag® Bead Solution 1ml; Elution Buffer 5ml.	189
PMB-101	Puramag® Plasmid DNA Isolation Kit	Solution1, 2, 3, 40ml each; Puramag® Bead Solution 8ml; Elution Buffer 40ml.	189
PMB-102	Puramag® Plasmid DNA Isolation Kit	Solution1, 2, 3, 500ml each; Puramag® Bead Solution 100ml; Elution Buffer 500ml.	189
PP-100	Phi29 DNA Polymerase	2,000 units, 10,000 U/ml	83
PP-200	Phi29 DNA Polymerase	5,000 units, 10,000 U/ml	83
PP-300	Phi29 DNA Polymerase	10,000 units, 10,000 U/ml	83
PP-400	Phi29 DNA Polymerase	25,000 units, 10,000 U/ml	83
PPA-101	Protein A (Liquid form)	10 mg; 50 mg/ml	184
PPA-102	Protein A (Liquid form)	500 mg; 50 mg/ml	184
PPA-103	Protein A (N-terminal His-tag) (Liquid form)	10 mg; 50 mg/ml	184
PPA-104	Protein A (N-terminal His-tag) (Liquid form)	500 mg; 50 mg/ml	184
PPA-201	Protein A (Lyophilized)	1 g	184
PPA-202	Protein A (Lyophilized)	10 g	184
PPA-203	Protein A (Lyophilized)	100 g	184
PPA-204	Protein A (Lyophilized)	1000 g	184
PPA-205	Protein A (N-terminal His-tag) (Lyophilized)	1 g	184
PPA-206	Protein A (N-terminal His-tag) (Lyophilized)	10 g	184
PPA-207	Protein A (N-terminal His-tag) (Lyophilized)	100 g	184
PPA-208	Protein A (N-terminal His-tag) (Lyophilized)	1000 g	184
PPA-501	Protein A Agarose	2 ml settled resin volume	185
PPA-502	Protein A Agarose	5 ml settled resin volume	185
PPA-503	Protein A Agarose	25 ml settled resin volume	185
PPA-504	Protein A Agarose	75 ml settled resin volume	185
PPG-101	Protein G (Liquid form)	10 mg; 50 mg/ml	178
PPG-102	Protein G (Liquid form)	50 mg; 50 mg/ml	178
PPG-103	Protein G (N-terminal His-tag) (Liquid form)	10 mg; 50 mg/ml	178
PPG-104	Protein G (N-terminal His-tag) (Liquid form)	50 mg; 50 mg/ml	178
PPG-201	Protein G (Lyophilized)	10 mg	178
PPG-202	Protein G (Lyophilized)	50 mg	178
PPG-203	Protein G (Lyophilized)	250 mg	178
PPG-205	Protein G (N-terminal His-tag) (Lyophilized)	10 mg	178
PPG-206	Protein G (N-terminal His-tag) (Lyophilized)	50 mg	178
PPG-207	Protein G (N-terminal His-tag) (Lyophilized)	250 mg	178
PPG-401	Protein G Agarose	10 ml settled resin volume	180
PPG-402	Protein G Agarose	50 ml settled resin volume	180
PPG-403	Protein G Agarose	100 ml settled resin volume	180
PPG-500	Recombinant Protein G, Biotinylated	1 mg	182
PPG-501	Recombinant Protein G, Biotinylated	10 mg	182
PPG-502	Recombinant Protein G, Biotinylated	25 mg	182
PPG-700	Protein G (FITC)	1 mg	179
PPG-701	Protein G (FITC)	10 mg	179
PPG-702	Protein G (FITC)	50 mg	179
PPG-801	Protein G, HRP Conjugated	500 µg	183
PPG-802	Protein G, HRP Conjugated	5 mg	183
PPG-803	Protein G, HRP Conjugated	10 mg	183
PPG-900	Protein G, Alkaline Phosphatase Conjugate	500 µg	181
PPG-901	Protein G, Alkaline Phosphatase Conjugate	5 mg	181
PPG-902	Protein G, Alkaline Phosphatase Conjugate	10 mg	181
PPMC-100	Mini Plus Plasmid DNA Extraction System	50 Preps	190
PPMC-200	Mini Plus Plasmid DNA Extraction System	250 presp	190
PPMD-100	Midi Plus Ultrapure Plasmid Extraction System	25 preps	191
PPMD-200	Midi Plus Ultrapure Plasmid Extraction System	50 preps	191
PPMX-100	Maxi Plus Ultrapure Plasmid Extraction System	10 preps	191
PPMX-200	Maxi Plus Ultrapure Plasmid Extraction System	25 preps	191
PREM-100	Plant RNA Extraction Miniprep System	50 preps	197
PREM-200	Plant RNA Extraction Miniprep System	250 preps	197
PROTEP-100	Protein Expression and Purification		247
PST-100	Pst I	10,000 units (20 units/µl)	137
PST-200	Pst I	60,000 units (20 units/µl)	137
PST-300	Pst I	10,000 units (200 units/µl)	137
PST-400	Pst I	60,000 units (200 units/µl)	137
qHPR-001	Real-time PCR Primer Sets	1 set	37
qHPR-010	Real-time PCR Primer Sets	10 sets	37
qHPR-100	Real-time PCR Primer Sets	100 sets	37
qHRcDNA-100	Human qPCR Reference cDNA	100rxns, 200ul	31
qHRcDNA-50	Human qPCR Reference cDNA	50rxns, 100ul	31

Cat #	Prodcut	Description	Page
Qsep-100	Q Sepharose High Performance	75ml	149
Qsep-200	Q Sepharose High Performance	5L	149
Qsep-300	Q Sepharose High Performance	10L	149
RACE-100	RACE Cloning		232
RBUF-100	CE 10X Running Buffer (with EDTA)	100 ml	45
RBUF-500	CE 10X Running Buffer (with EDTA)	500 ml	45
RCLN-100	Regular Sub-Cloning Services		233
REM-100	RNA Extraction Miniprep System	50 preps	196
REM-200	RNA Extraction Miniprep System	250 preps	196
RN3E-100	Rnase III, E. coli	50 units, 1 U/µl	118
RN3E-200	Rnase III, E. coli	100 units, 1 U/µl	118
RN3E-300	Rnase III, E. coli	500 units, 1 U/µl	118
RNFD-100	RNase-Free DNase I	5,000 units, 2,000 U/ml	119
RNFD-200	RNase-Free DNase I	10,000 units,2,000 U/ml	119
RNFD-300	RNase-Free DNase I	50,000 units, 2,000 U/ml	119
RNHE-100	RNase H, E. coli	5000 units, 5,000 U/ml	116
RNHE-200	RNase H, E. coli	10,000 units, 5,000 U/ml	116
RNHE-300	RNase H, E. coli	25,000 units, 5,000 U/ml	116
RNIE-100	RNase I, E. coli	25,000 units, 50,000 U/ml	117
RNIE-200	RNase I, E. coli	50,000 units, 50,000 U/ml	117
RNIE-300	RNase I, E. coli	250,000 units, 50,000 U/ml	117
RNIN-100	RNAse Inhibitor	20,000 units, 40,000 U/ml	126
RNIN-200	RNAse Inhibitor	40,000 units, 40,000 U/ml	126
RNIN-300	RNAse Inhibitor	250,000 units, 40,000 U/ml	126
RP-100	T7 RNA Polymerase	50,000 units, 50,000 U/ml	103
RP-200	T7 RNA Polymerase	100,000 units, 50,000 U/ml	103
RP-300	T7 RNA Polymerase	500,000 units, 50,000 U/ml	103
RP-400	T7 RNA Polymerase	1,000,000 units, 50,000 U/ml	103
RPEC-100	RecA Protein, E. coli	1,000 µg, 1 mg/ml	96
RPEC-200	RecA Protein, E. coli	3.0 mg, 1 mg/ml	96
RPEC-300	RecA Protein, E. coli	10 mg, 1 mg/ml	96
RPTT-100	RecA protein, Tth	1 mg, 1mg/ml	97
RPTT-200	RecA protein, Tth	2 mg, 1mg/ml	97
RPTT-300	RecA protein, Tth	10 mg, 1mg/ml	97
RSS-100	RNA Stabilizing Solution	100 ml	216
RSS-200	RNA Stabilizing Solution	500 ml	216
SBA-100	Super Broth Agar Plates	plate size, 150 x 15 mm, 10/PK	9
SBA-200	Super Broth Agar Plates	plate size, 100 x 15 mm, 20/PK	9
SBUF-100	BigDye® Terminator 5X Sequencing Buffer	1 ml	43
SBUF-110	BigDye® Terminator 5X Sequencing Buffer	28 ml	43
SBUF-120	BigDye® Terminator 5X Sequencing Buffer	233 ml	43
SDI-100	Super-DI™ Formamide	25 ml	53
siRNA-100	Custom Vector-Base siRNA Construction		231
SP-100	Sumo Protease	5,000 U, 50 U/µl, 100µl	155
SP-200	Sumo Protease	10,000 U, 50 U/µl, 200µl	155
SP-300	Sumo Protease	50,000 U, 50 U/µl, 1 ml	155
SPS-100	SP Sepharose Big Beads	1L	150
SRNA-100	Small RNAs Cloning		234
SSII-100	Universal Reverse Transcriptase	5,000U	99
SSII-200	Universal Reverse Transcriptase	10,000U	99
SSII-300	Universal Reverse Transcriptase	50,000U	99

Cat #	Prodcut	Description	Page
SSIII-100	Thermostable Reverse Transcriptase	5,000U	100
SSIII-200	Thermostable Reverse Transcriptase	10,000U	100
SSIII-300	Thermostable Reverse Transcriptase	50,000U	100
T3DL-100	T3 DNA Ligase	900,000 units, 3,000,000 U/ml	87
T3DL-200	T3 DNA Ligase	2,000,000 units, 3,000,000 U/ml	87
T3DL-300	T3 DNA Ligase	10,000,000 units, 3,000,000 U/ml	87
T4DH-100	T4 DNA helicase	10ug, 0.5 mg/ml	127
T4DH-200	T4 DNA helicase	25ug, 0.5 mg/ml	127
T4DP-100	T4 DNA Polymerase	3,000 units, 3,000 U/ml	84
T4DP-200	T4 DNA Polymerase	6,000 units, 3,000 U/ml	84
T4DP-300	T4 DNA Polymerase	12,000 units, 3,000 U/ml	84
T4EV-100	T4 Endonuclease V	10,000 units, 10,000 U/ml	108
T4EV-200	T4 Endonuclease V	20,000 units, 10,000 U/ml	108
T4EV-300	T4 Endonuclease V	50,000 units, 10,000 U/ml	108
T4LY-100	T4 Lysozyme	1 mg, 1mg/ml	128
T4LY-200	T4 Lysozyme	5 mg, 1mg/ml	128
T4LY-300	T4 Lysozyme	15 mg, 1mg/ml	128
T4PK-100	T4 Polynucleotide Kinase	10,000 units, 10,000 U/ml	105
T4PK-200	T4 Polynucleotide Kinase	20,000 units, 10,000 U/ml	105
T4PK-300	T4 Polynucleotide Kinase	100,000 units, 10,000 U/ml	105
T4RL1-100	T4 RNA Ligase 1 (ssRNA Ligase)	10,000 units, 20,000 U/ml	89
T4RL1-200	T4 RNA Ligase 1 (ssRNA Ligase)	20,000 units, 20,000 U/ml	89
T4RL1-300	T4 RNA Ligase 1 (ssRNA Ligase)	50,000 units, 20,000 U/ml	89
T4RL2-100	T4 RNA Ligase 2 (dsRNA Ligase)	500 units, 10,000 U/ml	90
T4RL2-200	T4 RNA Ligase 2 (dsRNA Ligase)	1,000 units, 10,000 U/ml	90
T4RL2-300	T4 RNA Ligase 2 (dsRNA Ligase)	4,000 units, 10,000 U/ml	90
T4RL2T-100	T4 RNA Ligase 2(truncated)	100,000 U, 200 U/ul	91
T4RL2T-200	T4 RNA Ligase 2(truncated)	200,000 U, 200 U/ul	91
T4RL2T-300	T4 RNA Ligase 2(truncated)	1,000 KU, 200 U/ul	91
T7DL-100	T7 DNA Ligase	900,000 units, 3,000,000 U/ml	92
T7DL-200	T7 DNA Ligase	1,800,000 units, 3,000,000 U/ml	92
T7DL-300	T7 DNA Ligase	9,000,000 units, 3,000,000 U/ml	92
T7DP-100	T7 DNA Polymerase	5000 units, 10,000 U/ml	85
T7DP-200	T7 DNA Polymerase	10,000 units, 10,000 U/ml	85
T7DP-300	T7 DNA Polymerase	25,000 units, 10,000 U/ml	85
T7G6E-100	T7 Exonuclease	5,000 units, 10,000 U/ml	115
T7G6E-200	T7 Exonuclease	20,000 units, 10,000 U/ml	115
T7G6E-300	T7 Exonuclease	100,000 units, 10,000 U/ml	115
TBAC-101	Terrific Broth Agar Carbenicillin-100	plate size 150 x 15 mm, 10/PK	9
TBAC-102	Terrific Broth Agar Carbenicillin-100	plate size 100 x 15 mm, 20/PK	9
TBAP-100	Terrific Broth Agar Plates	plate size, 150 x 15 mm, 10/PK	9
TBAP-200	Terrific Broth Agar Plates	plate size, 100 x 15 mm, 20/PK	9
TDL-100	Taq DNA Ligase	20,000 units, 40,000 U/ml	93
TDL-200	Taq DNA Ligase	40,000 units, 40,000 U/ml	93
TDL-300	Taq DNA Ligase	250,000 units, 40,000 U/ml	93
TE-100	Taq DNA Polymerase (exo+ and polymerase-)	2,000 units, 5,000 U/ml	77
TE-200	Taq DNA Polymerase (exo+ and polymerase-)	4,000 units, 5,000 U/ml	77
TE-300	Taq DNA Polymerase (exo+ and polymerase-)	10,000 units, 5,000 U/ml	77
TEP-100	TEV Protease	1mg, 1mg/ml	156
TEP-200	TEV Protease	10mg, 1mg/ml	156
TEP-300	TEV Protease	25mg, 1mg/ml	156

Cat #	Prodcut	Description	Page
TF-100	Taq DNA Polymerase (full length exo-)	2,000 units, 5,000 U/ml	78
TF-200	Taq DNA Polymerase (full length exo-)	4,000 units, 5,000 U/ml	78
TF-300	Taq DNA Polymerase (full length exo-)	10,000 units, 5,000 U/ml	78
TGS-100	Transgene Intergration Site(s) Identification	Single intergration site per sample	230
TGS-200	Transgene Intergration Site(s) Identification	Multiple intergration site per sample	230
TI-100	Inorganic Pyrophosphatase,Thermostable	250 units, 2,000 U/ml	124
TI-200	Inorganic Pyrophosphatase,Thermostable	1,250 units, 2,000 U/ml	124
TI-300	Inorganic Pyrophosphatase,Thermostable	5,000 units, 2,000 U/ml	124
TK-100	Taq DNA Polymerase (Klenow Fragment)	2,000 units, 5,000 U/ml	79
TK-200	Taq DNA Polymerase (Klenow Fragment)	4,000 units, 5,000 U/ml	79
TK-300	Taq DNA Polymerase (Klenow Fragment)	10,000 units, 5,000 U/ml	79
TL-100	T4 DNA Ligase	20,000 units, 400 cohesive end units/µl	88
TL-200	T4 DNA Ligase	20,000 units, 2,000 cohesive end units/µl	88
TL-300	T4 DNA Ligase	100,000 units, 400 cohesive end units/µl	88
TL-400	T4 DNA Ligase	100,000 units, 2,000 cohesive end units/µl	88
TP-200	Topoisomerase I (Vaccinia)	1,000 Units, 10 U/uL	110
TP-205	Topoisomerase I (Vaccinia)	2,000 Units, 10 U/uL	110
TP-210	Topoisomerase I (Vaccinia)	5,000 Units, 10 U/uL	110
TPA-15	200x Redox Running Buffer Agent	30ml	142
TPG10-20	TrenX™ PAGE Gels	15- 160kDa (High molecular weight running buffer) or 3.5- 160kDa (Low molecular weight running buffer), 10% Acrylamide, 15 wells, 20ul per well, 10/pk	140
TPG10-30	TrenX™ PAGE Gels	15- 160kDa (High molecular weight running buffer) or 3.5- 160kDa (Low molecular weight running buffer), 10% Acrylamide, 12 wells, 30ul per well, 10/pk	140
TPG10-40	TrenX™ PAGE Gels	15- 160kDa (High molecular weight running buffer) or 3.5- 160kDa (Low molecular weight running buffer), 10% Acrylamide, 10 wells, 40ul per well, 10/pk	140
TPG12-20	TrenX™ PAGE Gels	3.5- 40kDa (Low molecular weighr running buffer) or 10- 80kDa (High molecular weight running buffer), 12% Acrylamide, 15 wells, 20ul per well, 10/pk	140
TPG12-30	TrenX™ PAGE Gels	3.5- 40kDa (Low molecular weight running buffer) or 10- 80kDa (High molecular weight running buffer), 12% Acrylamide, 12 wells, 30ul per well, 10/pk	140
TPG12-40	TrenX™ PAGE Gels	3.5- 40kDa (Low molecular weight running buffer) or 10- 80kDa (High molecular weight running buffer), 12% Acrylamide, 10 wells, 40ul per well, 10/pk	140
TPG412-20	TrenX™ PAGE Gels	15-260kDa (High molecular weight running buffer) or 3.5- 160kDa (Low molecular weight running buffer), 4-12% Acrylamide, 15 wells, 20ul per well, 10/pk	140
TPG412-30	TrenX™ PAGE Gels	15-260kDa (High molecular weight running buffer) or 3.5- 160kDa (Low molecular weight running buffer), 4-12% Acrylamide, 12 wells, 30ul per well, 10/pk	140
TPG412-40	TrenX™ PAGE Gels	15-260kDa (High molecular weight running buffer) or 3.5- 160kDa (Low molecular weight running buffer), 4-12% Acrylamide, 10 wells, 40ul per well, 10/pk	140
TPG8-20	TrenX™ PAGE Gels	30-180kDa (High molecular weight running buffer) or 3.5- 160kDa (Low molecular weight running buffer), 8% Acrylamide, 15 wells, 20ul per well, 10/pk	141
TPG8-30	TrenX™ PAGE Gels	30-180kDa (High molecular running buffer) or 3.5- 160kDa (Low molecular weight running buffer), 8% Acrylamide, 12 wells, 30ul per well, 10/pk	141
TPG8-40	TrenX™ PAGE Gels	30-180kDa (High molecular weight running buffer) or 3.5- 160kDa (Low molecular weight running buffer), 8% Acrylamide, 10 wells, 40ul per well, 10/pk	141
TPL-250	Protein Ladder	250 ul	143
TPL-500	Protein Ladder	500 ul	143
TPQ-1L	Quik-Stain	1 L	144
TPQ-3L	Quik-Stain	3.5 L	144
TPR-H1	High Molecular Weight Running Buffer	500 ml	145
TPR-H2	High Molecular Weight Running Buffer	1 L	145
TPR-H3	High Molecular Weight Running Buffer	5 L	145
TPR-L1	Low Molecular Weight Running Buffer	500 ml	145
TPR-L2	Low Molecular Weight Running Buffer	1 L	145
TPR-L3	Low Molecular Weight Running Buffer	5 L	145
TPS-10	4x Sample Buffer	10 ml	142
TPS-250	4x Sample Buffer	250 ml	142

Cat #	Prodcut	Description	Page
TR-200	Taq DNA Polymerase (regular)	2,000 units, 5,000 U/ml	76
TR-205	Taq DNA Polymerase (regular)	4,000 units, 5,000 U/ml	76
TR-210	Taq DNA Polymerase (regular)	10,000 units, 5,000 U/ml	76
TS-100	T4 Endonuclease VII	50 ku, 500 U/µl	109
TS-200	T4 Endonuclease VII	100 ku, 500 U/µl	109
TS-300	T4 Endonuclease VII	500 ku, 500 U/µl	109
TT-100	Taq DNA Polymerase (truncated and exo-)	2,000 units, 5,000 U/ml	80
TT-200	Taq DNA Polymerase (truncated and exo-)	4,000 units, 5,000 U/ml	80
TT-300	Taq DNA Polymerase (truncated and exo-)	10,000 units, 5,000 U/ml	80
TTP-100	TurboTEV Protease	1mg, 2mg/ml	157
TTP-200	TurboTEV Protease	10mg, 2mg/ml	157
TTP-300	TurboTEV Protease	25mg, 2mg/ml	157
TW40-1GAL	TWEEN 40	50%, 1GAL	216
TW40-1L	TWEEN 40	50%, 1L	216
TX100-500	Triton x-100	500 ml	214
UBSA-100	Ultrapure BSA	2x25 mg, 20mg/ml	217
UBSA-500	Ultrapure BSA	10 x 25 mg, 20mg/ml	217
UTM-100	2x Universal Taq Master Mix	100 reactions	19
UTM-300	2x Universal Taq Master Mix	300 reactions	19
UTM-500	2x Universal Taq Master Mix	500 reactions	19
VDA-100	Variable Domains Sequencing Service	1-2 weeks turnaround time	225
VDB-100	Variable Domains & Leader Sequence Sequencing Service	2-3 weeks turnaround time	225
VDC-100	Variable & Constant Domains, and Leader Sequence Sequencing Service	3-4 weeks turnaround time	225
vmir	Validated miRNA Expression Constructs		204
Vsh-G01	Validated shRNA Plasmid-based constructs	1 gene-specific shRNA and two negative controls (GFP)	205
Vsh-G02	Validated shRNA Plasmid-based constructs	2 gene-specific shRNA and two negative controls (GFP)	205
Vsh-G03	Validated shRNA Plasmid-based constructs	3 gene-specific shRNA and two negative controls (GFP)	205
Vsh-G04	Validated shRNA Plasmid-based constructs	4 gene-specific shRNA and two negative controls (GFP)	205
Vsh-L01	Validated shRNA Plasmid-based constructs	1 gene-specific shRNA and two negative controls (Luc)	205
Vsh-L02	Validated shRNA Plasmid-based constructs	2 gene-specific shRNA and two negative controls (Luc)	205
Vsh-L03	Validated shRNA Plasmid-based constructs	3 gene-specific shRNA and two negative controls (Luc)	205
Vsh-L04	Validated shRNA Plasmid-based constructs	4 gene-specific shRNA and two negative controls (Luc)	205
YT-AC501	YT Agar Carbenicillin-50	Plate size, 150 x 15 mm, 10/PK, 50ug/ml carbenicillin	10
YT-AC502	YT Agar Carbenicillin-50	Plate size, 100 x 15 mm, 20/PK, 50ug/ml carbenicillin	10
YTAP-100	YT Agar Plates	Plate size, 150 x 15 mm, 10/PK	10
YTAP-200	YT Agar Plates	Plate size, 100 x 15 mm, 20/PK	10

Numerical

A

B

C

D

E

F

G

H

I

J

K

L

M

N

O

P

Q

R

S

T

U

V

X

Y

Trademarks

Orders
Telephone: 1-888-MCLAB-88
or 1-650-872-0245
Fax: 1-650-872-0253
Email: order@mclab.com
Online: www.mclab.com

Technical Assistance
Telephone: 1-888-MCLAB-88
or 1-650-872-0245
Email: labsupport@mclab.com

Internet
www.mclab.com

USA
384 Oyster Point Blvd, Suite 15
South San Francisco, CA
USA

China
克劳宁（北京）生物科技有限公司
北京市海淀区中关村西区天创科技大厦407A
邮编：100080
China
Telephone: 0086-10-62698317
Fax: 0086-10-62698352
Email: mclab@mclab.com.cn
Online: www.mclab.com.cn