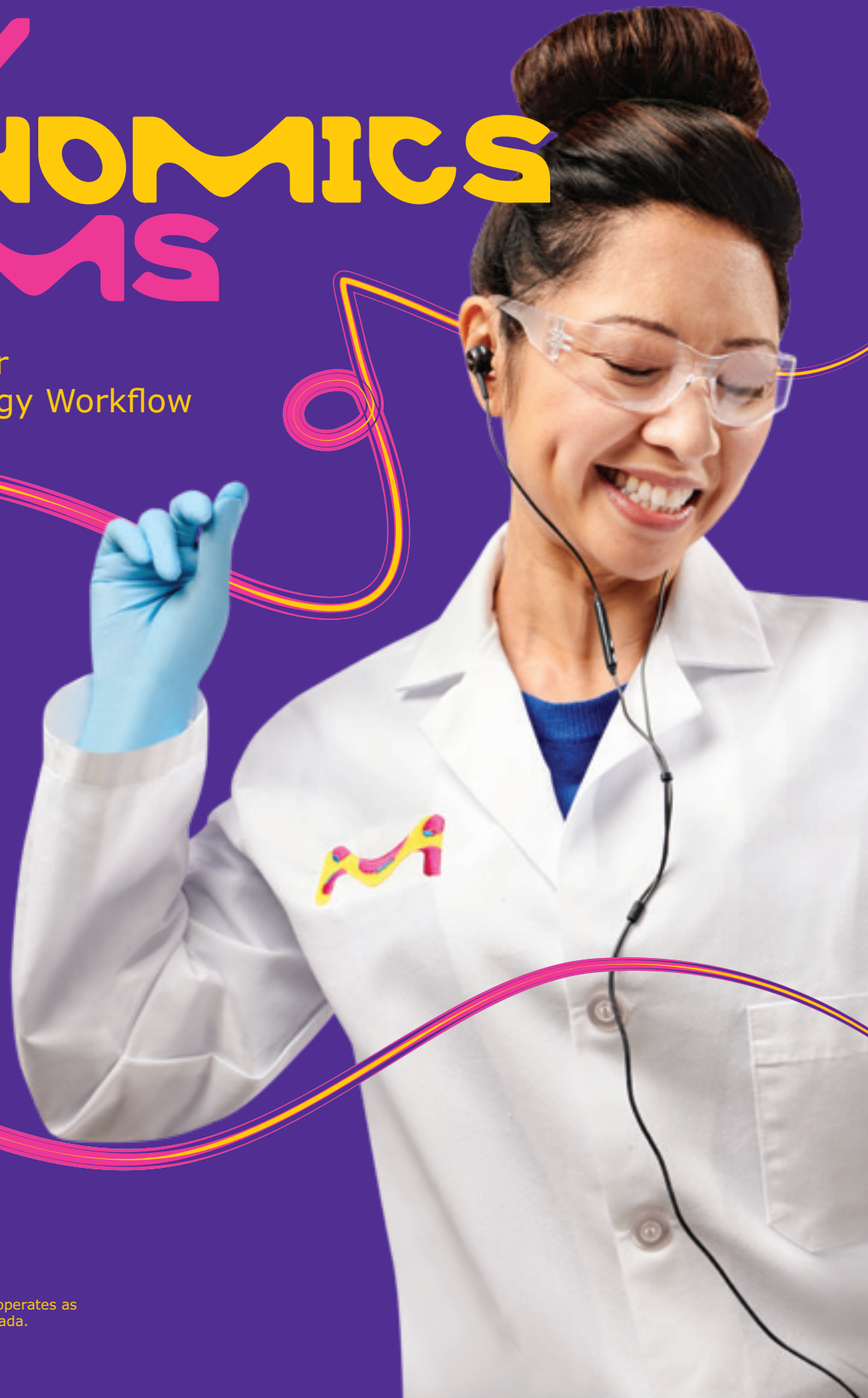
MERCK

MY GENOMICS JAMS

Streamline Your Molecular Biology Workflow

- Molecular Cloning and Expression
- DNA and RNA Sample Preparation
- Nucleic Acid Amplification



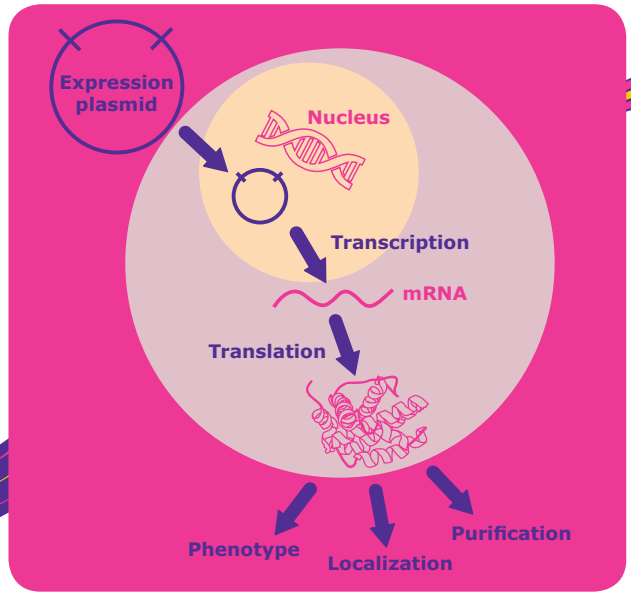
The daily grind becomes the daily jam.

Get your groove on with our comprehensive range of products to support you through every step of the genomics workflow. Whether you're performing molecular cloning and expression, isolating nucleic acids ready for amplification, or you need high-quality reagents and additives to power your research, you can dance your way through the day knowing that we're here for you.

Table of Contents

Molecular cloning and expression

Give your plasmid vectors something to sing about. Insertion of a gene-of-interest (GOI) into a plasmid vector and protein expression within a target cell are mainstays of molecular biology and allow for a wide variety of investigations into gene expression. We carry all the tools you need to employ a multitude of molecular cloning and expression applications.



Cloning

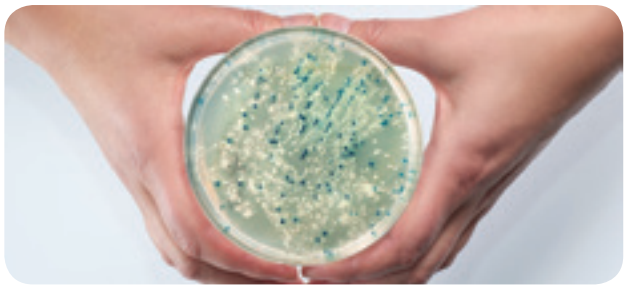
The aim of molecular cloning is often to insert the GOI into a plasmid vector. Traditional cloning by restriction enzyme digestion remains the most popular way to insert your GOI into an expression vector for expression in the target cell, whether that is an insect, mammalian, or microbial cell. Our cloning portfolio makes genetic engineering cheaper and more efficient by providing a collection of versatile cloning vectors with streamlined protocols, cloning kits, and microbial media.

Vectors

We carry a diverse line of cloning vectors that are compatible not just with restriction enzyme cloning but also other systems including Gibson Assembly®, LIC, GeneArt®, and InfusionHD.

Novagen® pET System

Driven by the powerful bacteriophage T7 promoter and translation signals, the pET System proves itself to be the gold standard for cloning and expression of recombinant proteins. Novagen's® pET System has been used to express thousands of different proteins in host cells expressing the T7 polymerase. With a variety of pET vector types, host strains, and complementing products, the pET system provides you with the flexibility to design and optimize your cloning and protein expression needs.



SnapFast™ Vectors

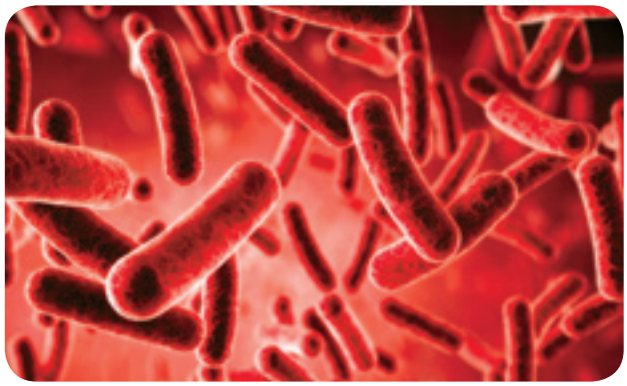
Revolving around a core DNA vector called SnapFast™, all the DNA plasmids within the SnapFast™ family share the same backbone. A quick and easy protocol allows transfer of a GOI from one vector to another using the SnapFast™ cutting sites, generating vectors which are compatible with any cloning system. With a choice of different peptide tags, reporter genes, signal peptides, promoters and selection markers, SnapFast™ vectors standardize cloning and increase the efficiency and cost-effectiveness of genetic engineering.

Description	Cat. No.
Novagen pET-28a(+) DNA vector	**69864**
pETDuet™-1 DNA - Novagen	**71146**
pET-22b(+) DNA - Novagen	**69744**
pACYCDuet™-1 DNA - Novagen	**71147**
pRSFDuet™-1 DNA - Novagen	**71341**

For a complete list of our SnapFast™ vectors, visit
SigmaAldrich.com/snapfast

Transformation

Bacterial transformation is the process of inserting foreign DNA into bacteria using methods such as heat shock and electroporation. Our NovaBlue competent cells, optimized for transfection efficiency and plasmid preservation, support superior library preparations and plasmid stability. Additionally, the Novagen competent cells are designed to facilitate proper protein folding, increased solubility or expression of cytotoxic proteins. Our portfolio of competent cells are engineered for optimal protein expression of even the most challenging recombinant proteins.



NovaBlue Competent Cells for Cloning

Designed for routine molecular cloning applications, blue/white screening and plasmid preparation, NovaBlue competent cells are a K-12 strain derivative offering many benefits.

Available in a variety of formats, thoroughly optimized to support different transformation requirements, the use of NovaBlue competent cells results in high yields of stable, excellent-quality plasmid DNA.

- Multiple formats for ultimate convenience and reliability in plasmid transformation
- Stabilize target plasmid
- Ideal as an initial cloning host due to its high transformation efficiency, blue/white screening capability (with appropriate plasmids) and recA endA mutations

Description	Cat. No.
Novagen NovaBlue(DE3) Competent Cells	**69284**
Novagen NovaBlue Singles™ Competent Cells	**70181**
Novagen HT96™ NovaBlue Competent Cells	**71011**
Novagen NovaBlue GigaSingles™ Competent Cells	**71227**

Novagen Competent Cells for Protein Expression

Designed for high efficiency and tailored to alleviate common protein expression challenges such as protein truncation, insoluble protein/no activity, protein misfolding, and toxic proteins.

Novagen competent cells come in a variety of strains for chemical transformation.

Optimized for high transformation efficiency, the incorporation of Novagen competent cells into transformation protocols ensures superior yields of stable and high-quality plasmid DNA.

- BL21(DE3) strains are most commonly used strain and gold standard for protein expression from target genes cloned in pET vectors by induction with IPTG.
- Origami 2 and Origami B strains facilitate proper disulfide bond formation and increasing yields of folded, soluble protein.
- pLysS strains express T7 lysozyme, which further suppresses basal expression of T7 RNA polymerase prior to induction, thus stabilizing pET recombinants encoding target proteins that affect cell growth and viability.

Description	Cat. No.
Novagen HMS174(DE3) Competent Cells	**69453**
Novagen BL21(DE3) Singles™ Competent Cells	**70235**
Novagen BL21(DE3)pLysS Singles™ Competent Cells	**70236**
Novagen Rosetta™ 2(DE3) Singles™ Competent Cells	**71400**
Novagen Rosetta™ 2(DE3)pLysS Singles™ Competent Cells	**71401**
Novagen Origami™ 2(DE3) Singles™ Competent Cells	**71408**

Transfection

Transfection, the introduction of DNA or RNA into eukaryotic cells, is a key tool to study and modulate gene expression. Our transfection reagents have low cytotoxicity, high efficiency, and are suitable for transfection of a broad range of cells.

X-tremeGENE™ Transfection Reagents

A non-liposomal polymer reagent, X-tremeGENE™ has been thoroughly optimized to save time and eliminate multiple handling steps. Available in two different formats, including high performance X-tremeGENE™ HP for use with hard-to-transfect cell lines such as primary cells and tumor cell lines. The X-tremeGENE™ reagents benefit from extremely low cytotoxicity for the generation of physiologically relevant data.

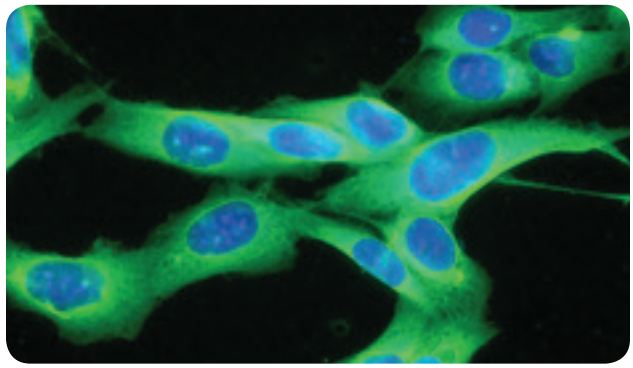
- Quick and easy transfection protocol
- Non-liposomal reagent free of animal-derived components
- Highly validated in a variety of cell lines
- Large publication database

Novagen® GeneJuice® Transfection Reagents

Affording high-efficiency transfection for a wide variety of mammalian cells, Novagen® GeneJuice® transfection reagent is a superior alternative to techniques such as a lipofection and electroporation. Suitable for both stable and transient transfections, Novagen® GeneJuice® demonstrates minimal cytotoxicity for successful gene expression and is available for transfection of a wide variety of cell types.

- Simplified protocol for a wide variety of cell types and applications
- Active in serum-containing and serum-free media
- Minimal cellular toxicity
- Cost-effective

Description	Cat. No.
Roche X-tremeGENE™ 9 DNA Transfection Reagent	**XTG9-RO**
Roche X-tremeGENE™ HP DNA Transfection Reagent	**XTGHP-RO**
Novagen GeneJuice® Transfection Reagent	**70967**
Novagen 293-Free™ Transfection Reagent	**72181**



Cloning Kits

Phage display is a technique that employs bacteriophages, viruses that infect bacteria, to couple genotype and phenotype. Our novel and easy-to-use T7Select® Phage Display System can display peptides of varying sizes to suit a wide variety of applications.

T7Select® Phage Display System

Taking full advantage of the properties of bacteriophage T7, this novel phage display system has the capacity to display small peptides in high copy number, and also larger peptides or proteins in low-to- mid-copy number range. In contrast to filamentous phage assembly, peptides or proteins displayed on the surface of T7 do not need to be capable of secretion through the cell membrane. Instead, phage assembly takes place in the *E. coli* cytoplasm and mature phage are released by cell lysis.

- Novel system exploiting bacteriophage T7
- Easy to use
- Fully optimized packaging extracts for maximum packaging efficiencies of T7Select® vectors ligated with insert
- Affords non-recombinant cloning background of <0.1%

Description	Cat. No.
Novagen T7Select®10-3 Cloning Kit	**70550**
Novagen T7Select® Packaging Kit	**70014**
Novagen T7Select® 415-1 Cloning Kit	**70015**

Microbial Media

From freshly-thawed competent cells to transformed clones, producing plasmid DNA or protein, we have the microbial medium you need to achieve optimized cellular growth and reproducible results. No matter what you're growing, we have a medium that you can depend on.

Sigma LB Broth

We offer a range of microbial media for culture of bacteria, yeast and bacteriophages, the most popular of which is LB. LB broth (Lysogeny broth, Luria broth, Lennox broth, LB Agar or Luria-Bertani medium) is the most widely used nutritionally rich medium, for the culture and growth of bacteria. There are several different formulations of LB broth, but the composition is generally the same comprising of peptides and casein peptones, trace elements, minerals and vitamins. Agar is a complex gelatinous carbohydrate, and is added to the LB broth, in order to form gel for bacteria to grow on. We carry a variety of formats of LB including: powder, tablets and EZMix™.

Novagen Overnight Express™ Autoinduction System

Simplify bacterial protein expression and increase soluble protein yields using the The Overnight Express™ Autoinduction System. No longer will you have to monitor cultures for optimal induction windows or adding IPTG inducer during cell growth. With easy to use protocols, the Overnight Express™ Autoinduction System allows effortless protein expression in *E. coli* so that you can drive you research forward.

- No need to monitor cell growth or add IPTG
- High cell densities
- Autoinduction of protein expression
- Induction of numerous expression clones simultaneously
- Usable with any conventional glucose-free bacterial growth medium

Description	Cat. No.
Sigma LB Broth (Lennox)	**L3022**
Sigma LB Broth (Miller)	**L3522**
Sigma LB Broth EZMix™ Powder	**L7658**
Novagen Overnight Express™ Instant TB Medium	**71491**
Novagen Overnight Express™ Autoinduction System 1	**71300**

Reagents

You can count on us for all of the reagents you need to complete your experiment. From setup to clean up, and every step in between, we've got you covered.

Description	Cat. No.
Sigma RNase A	**R6513**
Sigma PMA	**P1585**
Sigma Dimethyl sulfoxide (DMSO)	**D8418**
Sigma Isopropanol	**I9516**
Sigma Molecular Biology Grade Water	**W4502**
Sigma Betaine solution	**B0300**
Sigma RNaseZAP™	**R2020**
Sigma DAPI	**D9542**
Sigma Forskolin	**F3917**
Sigma Ficoll(R) 400	**F2637**
Roche PCR grade water	**PCRH20-RO**
Novagen ColiRollers™ Plating Beads	**71013**
Pellet Paint®	**69049**

For more information on our molecular cloning and expression portfolio, visit **SigmaAldrich.com/cloning**

something to SING about

DNA & RNA sample preparation

Our products for DNA and RNA sample preparation really top the charts. Every successful genomics experiment depends on high quality sample preparation. Our diverse portfolio of products is guaranteed to get your DNA or RNA isolated, purified, and ready for amplification. With a wide range of kits for plasmid DNA, genomic DNA, and RNA, you can count on us no matter how much source material you have.

Sigma GenElute™ Plasmid Kits

Rapidly recover high-quality plasmid DNA while easily removing any remaining contaminants. The Sigma GenElute™ Plasmid Kits allows for reliable isolation of predominantly supercoiled DNA that is ready to use in a variety of downstream cloning and sequencing-related applications.

- Designed with advanced silica bind and elute technology
- Endotoxin-free maxi preps in 30 minutes
- Compatible with both vacuum or spin format
- Formulated without phenol/chloroform

Roche Genopure Plasmid Kits

Using a modified lysis buffer, the Roche Genopure Plasmid Kits facilitate the rapid capture of transfection-grade DNA plasmids that are suitable for numerous molecular biology applications.

- Save time with ready-to-use reagents
- Purify all sizes and types of plasmid
- Process multiple samples in parallel
- Eliminate the use of hazardous organic compounds
- Obtain higher purity plasmid DNA

top the charts

Complete Stabilization

Ensure maximum quality while preventing degradation of your cellular lysates in one convenient lysate mixture. Our Stabilyser™ reagent is optimized for extraction of functionally intact DNA, RNA, and proteins from tissue samples.

- Maintain functionally active protein and nucleic acids from the same tissue samples
- Long-term storage and protection from freeze/thaw cycles
- Archive tissue samples if future analyte needs change
- Compatible with nucleic acid applications like qPCR

To request a sample, visit
SigmaAldrich.com/stabilyser

Description	Cat. No.
Plasmid DNA	
Sigma GenElute™ Plasmid Miniprep Kit	**PLN70**
Sigma GenElute™ HP Plasmid Midiprep Kit	**NA0200S**
Sigma GenElute™ HP Plasmid Maxiprep Kit	**NA0300S**
Sigma GenElute™ HP Endotoxin-Free Plasmid Maxiprep Kit	**NA0400S**
Sigma GenElute™ HP Endotoxin-Free Plasmid Gigaprep Kit	**NA0800**
Roche Genopure Plasmid Midi Kit	**03143414001**
Roche Genopure Plasmid Maxi Kit	**03143422001**
Genomic DNA	
Sigma GenElute™ Blood Genomic DNA Kit	**NA2010**
Sigma GenElute™ Mammalian Genomic DNA Miniprep Kit	**G1N70**
Sigma GenElute™ Plant Genomic DNA Miniprep Kit	**G2N70**
Sigma GenElute™ Bacterial Genomic DNA Kit	**NA2100**
EMD Millipore GenElute™ UltraMag Cell-Free DNA Kit	**CFMAG**

Description	Cat. No.
RNA	
Sigma RNA*later*®	**R0901**
Sigma GenElute™ Mammalian Total RNA Miniprep Kit	**RTN70**
Sigma GenElute™ mRNA Miniprep Kit MRN10	**MRN10**
Sigma GenElute™ Direct mRNA Miniprep Kit	**DMN10**
Sigma GenElute™ FFPE RNA Purification Kit	**RNB400**
Sigma GenElute™ Plasma/Serum RNA Purification Mini Kit	**RNB500**
Roche High Pure miRNA Isolation Kit	**05080576001**
Reaction Clean-Up	
Sigma GenElute™ PCR Clean-up Kit	**NA1020**
Sigma GenElute™ Gel Extraction Kit	**NA1111**
EMD Millipore MultiScreen-PCR96 Filter Plate	**MSNU03010**
EMD Millipore MultiScreen PCRμ96 Filter Plate	**LSKMPCR10**

For more information on our nucleic acid purification kits and reagents, visit
SigmaAldrich.com/nap

Amplification

Let us help you turn up the volume of your DNA and RNA. Amplification is used to generate multiple copies of a target DNA or RNA sequence, often present at very low abundance, producing a quantity that is suitable for study. It is applicable to a multitude of sample types and can be achieved through a variety of techniques.

PCR

A mainstay of virtually every molecular biology lab, polymerase chain reaction (PCR) is an easy and affordable method for amplifying specific fragments of DNA by several orders of magnitude. We have specialized kits for a variety of PCR applications, including:

- Hot Start
- High-Fidelity
- Long and Accurate
- Genotyping

Hot Start PCR

During Hot Start PCR, DNA polymerases remain inactive during the reaction set up, allowing for room temperature reaction set up, higher yield and improved specificity. Hot Start PCR is preferred for applications like genotyping and clinical applications that require specific detection.

Roche FastStart Taq DNA Polymerase

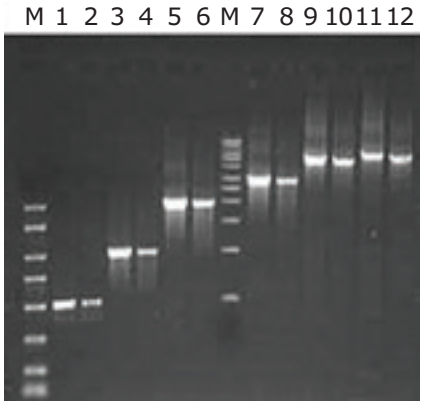
This modified thermostable recombinant Taq DNA Polymerase is inactive below 75°C, preventing elongation of non-specific primer-template hybrids which may form at those temperatures. Easily activated by a simple 95°C heat step, the high stability of the resulting enzyme mix makes Roche FastStart Taq DNA Polymerase ideally suited to automated assay setups. Supplied with an optimized PCR buffer system and GC-RICH solution, the enzyme can handle a wide range of templates.

- High specificity, sensitivity, and yield
- Stable enzyme mix (24 hours at 15 - 25°C) for compatibility with automated setups
- dUTP-containing mix with uracil-DNA glycosylase to eliminate contaminating DNA carried over from previous PCR reactions

Sigma JumpStart™ Taq ReadyMix™

Unlike hot start methods which rely on chemical inactivation, Sigma JumpStart™ Taq polymerase does not require a pre-incubation step prior to cycling because polymerase activity is fully restored during the first denaturation cycle of the PCR reaction. Designed to minimize non-specific amplification while increasing target yield, JumpStart™ Taq DNA Polymerases provide superior amplification regardless of template concentration.

- High specificity, sensitivity, and yield
- Minimal setup time
- Convenient ReadyMix™ format requires only the addition of primers, template, and water



JumpStart REDTaq ReadyMix Hot Start PCR in the convenience of a ReadyMix.

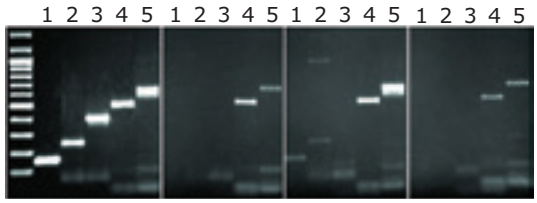
200 ng Lambda phage DNA was amplified with Sigma's JumpStart REDTaq ReadyMix (odd numbered lanes) and Competitor I's Direct Load ReadyMix (even numbered lanes). Taq was activated per the supplier's recommendations.

KAPA2G Fast HotStart ReadyMix

Containing an engineered DNA polymerase specifically developed for fast PCR, KAPA2G Fast HotStart ReadyMix™ reduces cycling times by up to 75% and affords broad coverage of both AT- and GC-rich targets. With extension times as low as 1 second per kilobase and meeting strict requirements with respect to DNA contamination levels, increased yields are produced at exceptionally high speed.

- Excellent specificity, sensitivity, and yield at high speed
- Reduces total reaction time by up to 70%
- Efficient primer annealing across a wide range of primer lengths, GC contents, and melting temperatures

High Speed and Performance



Amplification of 5 human gene fragments using KAPA2G Fast HotStart or competitor hot-start Taq formulations.

Reactions (25 µL) contained 5 ng human genomic DNA and 0.5 units (KAPA2G Fast HotStart and Competitor I) or 0.625 units (Competitor A and Q) enzyme. For amplicons with a GC content >65% (lanes 2 and 3), 7.5% DMSO was included in reactions. A 3-step cycling profile (35 cycles) with 15 sec denaturation (95 °C) and 15 sec annealing (60 °C) per cycles was used for all enzymes. The extension (72 °C) was 1 sec/cycle for KAPA2G Fast HotStart and 60 sec/cycle for competitor enzymes. The total reaction time for each enzyme is indicated.

Description	Cat. No.
Roche FastStart™ Taq DNA Polymerase, 5 U/µl	**FTAQ-RO**
Sigma JumpStart™ Taq ReadyMix™	**P2893**
KAPA2G Fast HotStart ReadyMix	**2GFHSRMDKB**

turn up the VOLUME

High Fidelity PCR

When you need accurate introduction of target DNA, choose High Fidelity PCR. The inclusion of a proofreading enzyme with 3′→5′ exonuclease activity is ideal for cloning or sequencing applications.

Roche Expand™ High Fidelity PCR System

Composed of an enzyme mix containing a thermostable Taq DNA polymerase and a thermostable DNA polymerase with proofreading activity, Roche Expand™ High Fidelity PCR System is optimized for PCR of DNA fragments up to 5kb. Affording a four-fold increase in fidelity compared to the use of Taq DNA polymerase alone, the combined activities of the two enzymes provide improved performance and results.

- Combination of two enzymes produces increased DNA synthesis fidelity
- Requires only small quantities of template DNA
- Formulated as a 2x concentrate for maximum convenience

EMD Millipore KOD Hot Start DNA Polymerase

Employing a recombinant Thermococcus kodakaraensis KOD1 DNA polymerase expressed in *E. coli* and two monoclonal antibodies to inhibit DNA polymerase and 3′→5′ exonuclease activities at ambient temperatures, EMD Millipore KOD Hot Start DNA Polymerase affords high fidelity, fast extension speed and high specificity.

- Highest accuracy, yield, and processivity of commercially available proofreading DNA polymerases
- Amplification of genomic DNA templates up to 21 kb including GC-rich genes
- Eliminates mis-priming and primer-dimer formation
- Convenient room-temperature setup compatible with automation

Description	Cat. No.
Roche Expand™ High Fidelity PCR System	**EHIFI-RO**
EMD Millipore KOD Hot Start DNA Polymerase	**71086**

Long and Accurate PCR

Many applications such as cloning and sequencing require both longer amplifications and higher fidelity than standard Taq DNA polymerase can provide. In Long and Accurate PCR, special blends of proofreading (3′→5′ exonuclease) and non-proofreading polymerases are used to synthesize long fragments by preventing reaction arrest.

Roche Expand™ Long Template PCR System

Comprising a thermostable Taq DNA polymerase and a thermostable DNA polymerase with proofreading activity, the Roche Expand™ Long Template PCR System has been optimized for the amplification of genomic DNA templates which range from 5 - 20kb in length. Ideal for applications such as genome mapping and sequencing, contig construction, and rapid identification and cloning of complete genes from genomic DNA, this powerful polymerase mixture results in exceptional yields.

- Accurate amplification of long target sequences up to 20kb
- Three-fold higher fidelity compared to Taq DNA polymerase
- High yields of quality product

Description	Cat. No.
Roche Expand™ Long Template PCR System	**ELONG-RO**

Genotyping

Genotyping is the process of determining an organism's genetic makeup. Our products can extract and amplify genomic DNA from a wide variety of source materials:

- mouse tails and other animal tissues
- buccal swabs
- saliva
- hair shafts

Sigma REDExtract-N-Amp™ Tissue PCR Kit

Designed for rapid genomic DNA isolation, the Sigma REDExtract-N-Amp™ Tissue PCR Kit provides single-step extraction of genomic DNA for PCR from a wide variety of cells and tissues in just 15 minutes. Benefiting from a novel extraction method which eliminates the need for long enzymatic digestions or homogenization, the kit also includes a specially formulated hot start PCR reaction mix for amplification directly from the extract and the addition of an inert tracking dye for convenient gel loading.

- Rapid extraction of genomic DNA from cells and tissues
- No need for enzymatic digestions or homogenization
- Includes PCR ReadyMix™ for amplification directly from extract
- Extract stable at 4°C for at least 6 months

KAPA HotStart Mouse Genotyping Kit

Designed for the extraction of PCR-ready DNA from mouse tail, ear, or toe tissue in just 15 minutes, the KAPA HotStart Mouse Genotyping Kit contains sufficient template for multiple assays and is easily scaled to handle samples in a 96-well format. The combination of KAPA Express Extract, a novel thermostable protease and buffer system, with KAPA2G Fast Genotyping Mix allows extraction and amplification to be performed in as little as 1 hour, as compared to ≥1 day with conventional protocols.

- Extract PCR-ready DNA from mouse tail, ear, or toe tissue in 15 minutes
- Minimal handling, reducing the risk of sample loss or contamination
- Easy scalability to a 96-well format
- Fast and reliable amplification across a wide range of amplicon lengths and GC contents

Description	Cat. No.
Sigma REDExtract-N-Amp™ Tissue PCR Kit	**XNAT**
KAPA HotStart Mouse Genotyping Kit	**HSMGTKB**

high FIDELITY

qPCR

Unlike traditional PCR where amplification results come only at the end of the reaction, real-time PCR, also known as quantitative or qPCR, determines the actual amount of PCR product present at a given cycle on an ongoing basis. By using a fluorescent reporter in the PCR reaction, this process allows for measurement of DNA generation during the qPCR assay. We offer both SYBR Green-based kits as well as probe-based ones.

SYBR Green

Choose one of our SYBR Green qPCR mixes when you need to monitor the amplification of any double-stranded DNA sequence. Probes aren't required, which reduces assay setup and running costs. Also, multiple dyes can bind to a single amplified molecule, increasing sensitivity for detecting amplification products.

Roche FastStart Universal SYBR Green Master (Rox)

The novel reference dye used within Roche FastStart Universal SYBR Green Master (Rox) binds specifically to dsDNA during each phase of DNA synthesis, allowing the amplicon to be detected by its fluorescence. Utilizing FastStart Taq DNA Polymerase, a modified enzyme which is inactive at room temperature and relies on a hot start protocol to improve the specificity, sensitivity, and yield of PCR, this 2x concentrated master mix is suitable for running quantitative, real-time DNA detection assays in the SYBR Green I detection format.

- Amplify and detect a broad range of DNA or cDNA targets, up to 500bp in length
- Compatible for use on all real-time PCR instruments requiring normalization with ROX
- Suitable for real-time DNA detection assays including qPCR and two-step RT-qPCR
- dUTP-containing mix with uracil-DNA glycosylase to eliminate contaminating DNA carried over from previous PCR reactions

KAPA SYBR® FAST

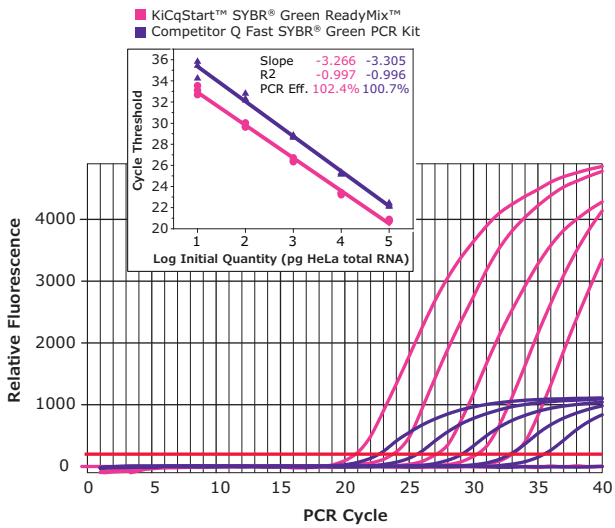
Containing the first DNA polymerase engineered via directed evolution to be more tolerant of SYBR Green I dye inhibition, the Roche KAPA SYBR® FAST qPCR kits facilitate the completion of real-time PCR runs in just 40 minutes. High reaction efficiency across a wide range of GC contents and amplicon lengths allows more accurate quantitation of changes in gene expression.

- Complete real-time PCR runs in just 40 minutes
- High reaction efficiency of 95 – 105% improves accuracy and reproducibility
- Detect low copy and difficult targets consistently
- Maintain high performance when switching from standard to fast protocols

Sigma KiCqStart® SYBR® Green qPCR ReadyMix™ with ROX™, for ABI instruments

Specifically designed with a hot-start mechanism for maximal efficiency, KiCqStart® provides increased specificity, sensitivity, and optimized for both conventional and fast qPCR. Just supply the primers and template while the KiCqStart® SYBR® Green qPCR ReadyMix™ with ROX™ contains all necessary components needed for real-time qPCR.

- Stringent hot-start mechanism for enhanced specificity
- Suitable for conventional or fast qPCR
- Formatted with varying concentrations of ROX as recommended by cycler manufacturers
- Complemented by our range of KiCqStart® primers and primer gene arrays



Target gene was amplified from log-fold dilutions of total HeLa cell cDNA (100 ng to 10 pg) using KiCqStart® SYBR® Green qPCR ReadyMix™ or Competitor Q according to each manufacturer's protocol. Plots represent averages of quadruplicate reactions.

Description	Cat. No.
Roche FastStart Universal SYBR Green Master (Rox)	**FSUSGMMRO**
KAPA SYBR® FAST Universal	**SFUKB**
Sigma KiCqStart® SYBR® Green qPCR ReadyMix™ with ROX™, for ABI instruments	**KCQS02**
Sigma KiCqStart® SYBR® Green qPCR ReadyMix™, Low ROX™, for ABI and Stratagene instruments	**KCQS01**
Sigma LuminoCt® SYBR® Green qPCR ReadyMix™	**L6544**

Probe-Based

Probe-based qPCR allows for specific hybridization. The targeted nature of probe-based qPCR leads to low background (nonspecific fluorescence), and eliminates the presence of false positives. By labeling probes with different, distinguishable reporter dyes, probe-based qPCR also allows for amplification of two distinct sequences in one reaction tube.

Roche FastStart Universal Probe Master (Rox)

A universal ready-to-use hot start reaction mix for qPCR and two-step RT-qPCR, the Roche FastStart Universal Probe Master (Rox) can be used on all real-time PCR systems requiring normalization with ROX. Facilitating the production of lower cycle threshold (Ct) values and benefitting from high room-temperature stability, this product is ideal for use with robotic pipetting stations.

- Compatible with any probe-based assay
- Amplify and detect a broad range of DNA or cDNA targets
- Suitable for use with robotic pipetting stations
- dUTP-containing mix with uracil-DNA glycosylase to eliminate contaminating DNA carried over from previous PCR reactions

KAPA PROBE FORCE qPCR Master Mix Universal

Allowing amplification directly from crude samples which include cells, mouse tails, FFPE and soil, KAPA PROBE FORCE qPCR Master Mix Universal streamlines sample-to-Cq workflows to <1 hour. Use of a DNA polymerase enzyme which maintains high reaction efficiency in the presence of PCR inhibitors enhances levels of sensitivity even in inhibited samples such as blood and plant.

- Direct qPCR from crude samples such as blood, tissue, and plant extracts
- Highly inhibitor resistant qPCR master mix that removes the need for DNA purification
- Streamlines sample-to-Cq workflows to <1 hour
- Multiplex crude samples efficiently

Roche EagleTaq Universal Master Mix (ROX)

Suitable for all real-time PCR instruments on which a ROX reference dye is needed for quantitative analysis, Roche EagleTaq Universal Master Mix (ROX) is provided as a 2× concentrated, ready-to-use hot start master mix for qPCR and qRT-PCR. This highly robust product minimizes PCR protocol optimization.

- Hot start properties for reaction setup at ambient temperature
- dUTP-containing mix with uracil-DNA glycosylase to eliminate contaminating DNA carried over from previous PCR reactions
- Minimizes protocol optimization

Sigma JumpStart™ Taq ReadyMix™ for Quantitative PCR

Ideal for high-throughput applications, Sigma JumpStart™ Taq ReadyMix™ for Quantitative PCR is formulated without a detection chemistry, making it suitable for use with a variety of formats including dual-labeled probes, molecular beacons or double stranded binding dyes such as SYBR Green I. Using JumpStart™ Taq DNA Polymerase to prevent non-specific amplification and increase target yield, the ReadyMix™ simply requires the addition of a fluorescent detection chemistry, primers, and template.

- Formulated without a detection chemistry
- Ideal for high throughput qPCR
- Includes a reference dye for data normalization

Description	Cat. No.
Roche FastStart Universal Probe Master (Rox)	**FSUPMMRO**
KAPA PROBE FORCE qPCR Master Mix Universal	**PFORCEKB**
Roche EagleTaq Universal Master Mix (ROX)	**EAGLETMMRO**
Sigma JumpStart™ Taq ReadyMix™ for Quantitative PCR	**D7440**
Sigma LuminoCt® qPCR ReadyMix™	**L6669**

RT-PCR/RT-qPCR

DNA isn't always center stage. When you need to amplify mRNA, turn to reverse transcription PCR (RT-PCR). In this technique, reverse transcription is used to create cDNA from an mRNA template. Standard PCR using the cDNA as template completes the reaction resulting in dsDNA of the target sequence for study. Our diverse portfolio includes both one-step and two-step reaction options.

One-Step

One-step assays combine reverse transcription and PCR in a single tube and buffer, using a reverse transcriptase along with a DNA polymerase. One-step RT-qPCR only utilizes sequence-specific primers.

Roche Transcriptor One-Step RT-PCR Kit

Featuring an innovative reaction buffer, the Roche Transcriptor One-Step RT-PCR Kit combines sensitive, high-yield reverse transcription with the improved performance of a hot start system for high-fidelity, high-yield amplification. Designed for rapid, specific end-point RT-PCR analysis of RNA, including total RNA, mRNA, in vitro-transcribed RNA or viral RNA using gene-specific primers, the kit can be used to generate transcripts up to 6.5 kb in length.

- High specificity, sensitivity, and fidelity
- Convenient one-step format minimizes hands-on steps
- Compatible with a variety of templates including GC-rich RNA

Roche Titan One Tube RT-PCR System

Using Reverse Transcriptase AMV for first strand cDNA synthesis and the Expand High Fidelity enzyme blend for amplification of cDNA by PCR, the Roche Titan One Tube RT-PCR System affords high fidelity PCR through its proofreading capability. Significantly faster than conventional two-step RT-PCR, the combination of enzymes delivers increased sensitivity and represents a convenient one-tube reaction system for quantifying gene expression levels.

- High specificity and sensitivity
- Three-fold higher fidelity compared to Taq DNA polymerase
- Can be used to amplify a specific message or the entire population of transcripts

Description	Cat. No.
Roche Transcriptor One-Step RT-PCR Kit	**TOSRTRO**
Roche Titan One Tube RT-PCR System	**11855476001**

center STAGE

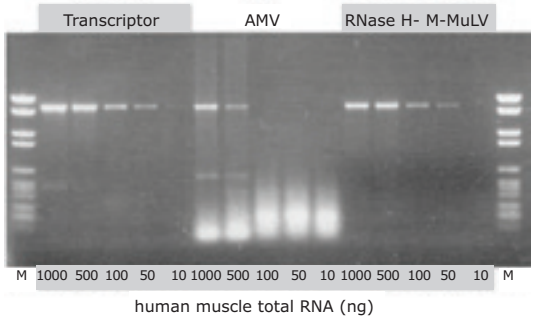
Two-Step

In two-step assays, the reverse transcription and PCR steps are performed in separate tubes, with different optimized buffers, reaction conditions, and priming strategies.

Roche Transcriptor Reverse Transcriptase

Intended for the transcription of RNA from a variety of sources using conventional thermal cyclers and real-time PCR instruments, Roche Transcriptor Reverse Transcriptase is effective at elevated temperatures, thereby overcoming RNA secondary structure and facilitating optimal reaction conditions. Providing the ability to obtain full-length transcripts up to 14 kb, this product allows the generation of cDNA libraries with large inserts.

- Compatible with conventional thermal cyclers and real-time PCR instruments
- Obtain full-length transcripts up to 14 kb
- Suitable for reverse transcription of difficult templates
- Incorporate Cy3-, Cy5-, DIG-, biotin-, or aminoallyl-labeled nucleotides during cDNA synthesis



Produce full-length transcripts up to 14 kb for sensitive, high-yielding RT-PCR with Roche Transcriptor Reverse Transcriptase.

Roche Reverse Transcriptase AMV

A gene product of the RNA genome of avian myeloblastosis virus, Reverse Transcriptase AMV can be employed for synthesis of first strand cDNA for use in subsequent amplification reactions and dideoxy DNA sequencing, as well as for RNA sequencing, 3′ end labeling of DNA fragments, and for the generation of ss probes for genomic footprints.

- Mature enzyme consists of an RNA-directed DNA polymerase, a DNA-dependent DNA polymerase, an RNase H and an unwinding activity
- Suitable for multiple applications
- Requires a primer and Mg2+ or Mn2+ for activity

Sigma M-MLV Reverse Transcriptase

Moloney Murine Leukemia Virus (M-MLV) reverse transcriptase is a DNA polymerase that uses single-stranded RNA, DNA, or an RNA-DNA hybrid (using a primer) to synthesize a complementary DNA strand. Purified from *E. coli*, the thermostable Sigma M-MLV Reverse Transcriptase enzyme is active at 37°C and can be used to generate first strand cDNA of up to 7 kb in length.

- Active at 37°C
- Can use ss RNA, DNA, or an RNA-DNA hybrid
- Ideal for the preparation of cDNA libraries or for first strand cDNA synthesis for use in RT-PCR reactions

Description	Cat. No.
Roche Transcriptor Reverse Transcriptase	**TRANSRTRO**
Roche Reverse Transcriptase AMV	**10109118001**
Sigma M-MLV Reverse Transcriptase	**M1302**
Roche Transcriptor Universal cDNA Master Mix	**05893151001**
Roche First Strand cDNA Synthesis Kit for RT-PCR (AMV)	**11483188001**

For more information on our complete portfolio of PCR reagents, visit **SigmaAldrich.com/pcr**

Custom Primers and Probes

We can fine-tune your PCR reaction. Our ability to guarantee quality and performance is directly related to our comprehensive understanding of various synthesis chemistries and manufacturing platforms, our investment in analytical systems, and our experience in methods development. We offer a variety of tools to help you create the custom primers and probes you need to achieve the best results.

Custom DNA & RNA Oligos

- DNA Oligos in Tubes & Plates
- Long Oligos (121-180 bases)
- iScale Oligos™ (milligram quantity)
- Next-Gen Sequencing Oligos
- RNA Oligos
- Oligos for Commercial Use (OEM)

Custom qPCR Probes

- Dual-Labeled Probes
- Molecular Beacons
- LightCycler® Probes
- Scorpions® Probes

Predesigned Primers & Probe Assays

- KiCqStart® SYBR® Green Primers
- KiCqStart® SYBR® Green Primers Gene Arrays
- KiCqStart® Probe Assays

For more information on our custom primers and probes, visit
SigmaAldrich.com/oligos

fine-tune
your reaction

Reagents and Additives

PCR isn't just about top-notch primers and polymerases. It requires reagents and additives of the highest quality as well. We offer a number of products that will send your PCR experiment straight to the top of the charts:

- ThermaGenix additives to maximize PCR performance
- dNTPs
- Water
- Betaine

ThermaGenix Reagents

Representing a range of easy-to-use PCR additives, the ThermaGenix reagents have been carefully optimized to minimize the risks of mis-priming at different steps and temperatures during amplification. While ThermaStop™ acts before and after amplification, ThermaGo™ is active during the denaturation, annealing and extension steps of PCR. ThermaStop™-RT improves the sensitivity, specificity and yield of RT-PCR by interacting with the reverse transcriptase to reduce priming errors.

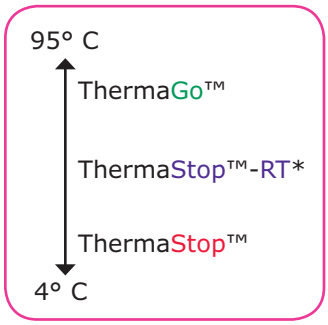


Figure 1. PCR additives used at different temperatures

* ThermaStop™-RT should not be used in combination with ThermaStop™ or ThermaGo™

ThermaStop™

- Enables master mix long-term storage
- Significantly reduces primer-dimer formation
- Facilitates PCR multiplexing
- Increases reaction sensitivity and specificity
- Eliminates undesired products after cooling

ThermaGo™

- Reduces signal scatter
- Increases detection of low-copy number targets
- Improves endpoint genotyping

ThermaStop™-RT

- Improves detection sensitivity and increases specific cDNA yield
- Enhances accuracy of highly multiplexed RT-PCR assays
- Permits accurate quantitation of very low levels of RNA

Description	Cat. No.
ThermaGenix™	
Sigma ThermaStop™	**TSTOP**
Sigma ThermaGo™	**TGO**
Sigma ThermaStop™-RT	**TSTOPRT**
dNTPs	
Sigma Deoxynucleotide Set, 100 mM	**DNTP100A**
Water	
Sigma, Sterile-filtered Water, 1.5 mL	**W1754**
Betaine	
Sigma Betaine solution, 5 M	**B0300**
DMSO	
Dimethyl sulfoxide for molecular biology	**D8418**

For more information on ThermaGenix reagents, visit **SigmaAldrich.com/thermagenix**

My Genomics Jams

The molecular biology workflow needn't be a grind. Our portfolio has been considerately designed to help you glide through the day, and with an extensive range of high quality products to choose from, you'll be dancing around your lab bench as if no one is watching.

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

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