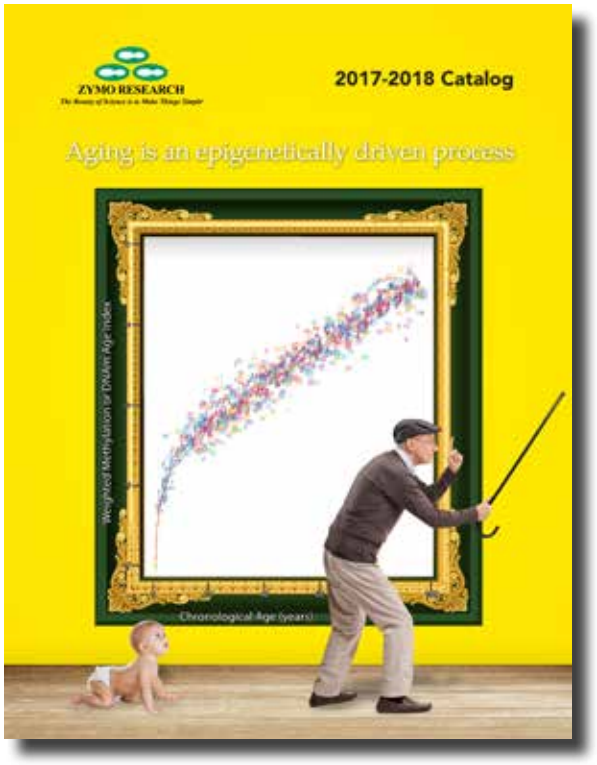
ZYMO RESEARCH

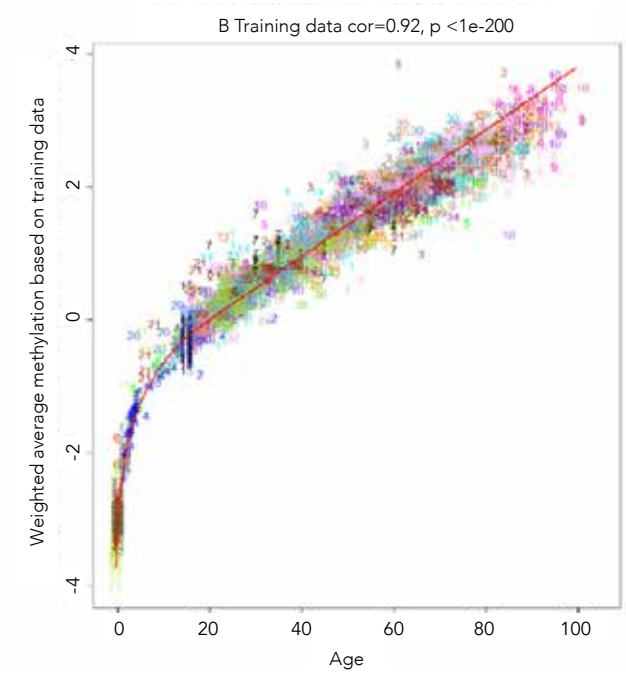
The Beauty of Science is to Make Things Simple

2017-2018 Catalog

Aging is an epigenetically driven process

About the Cover





Heat map of DNA methylation levels of the 353 CpGs across samples. The weighted average of the 353 clock CpGs versus chronological age in the training data sets. The rate of change of the redcurve can be interpreted as tick rate. Points are colored and labeled by data set.

The Epigenetic Aging Clock

"Aging is an epigenetically driven process."

- David Sinclair

Aging is inevitable. From the second we are born, our bodies are constantly undergoing cellular alterations for various processes, some universal and some dependent on our personal choices, as time passes. Changes to these cellular processes and their influence on aging can be manipulated, in part, by epigenetic modifications of the genome, such as DNA methylation.

Dr. Steve Horvath from the University of California Los Angeles has developed a predictor of biological age by analyzing epigenetic markers at over 350 CpG sites associated with the aging process. Together, these sites form an aging clock in terms of chromatin states, DNA Methylation and tissue variance.

The cover photo to our catalog is an artistic representation of the progression of aging with an overlay of Dr. Horvath's data depicting the 353 clock CpG sites versus chronological age. As part of Zymo Research's commitment to enhancing the field of epigenetics, we are excited that the Epigenetic Aging Clock will be added as a service to Zymo Research's epigenetic portfolio and can be used for forensic, consumer or academic applications (pg. 50).

This novel epigenetic clock can be used to address a host of questions in developmental biology, cancer and aging research especially when compared to chronological age[1]. Are you aging faster than you should be? How do diseases or drug treatments affect biological aging? Can we slow down the aging process by making lifestyle changes? We invite you to join us as we explore the epigenetic process of aging. What will we discover together?

References: 1. Horvath, Steve. "DNA methylation age of human tissues and cell types." Genome biology 14.10 (2013): 1.

Who We Are

Since its inception in 1994, Zymo Research has been proudly serving the scientific community by providing innovative, reliable, and high quality research tools at affordable prices. Our vision "The Beauty of Science is to Make Things Simple" is now truer than ever. Whether it's epigenetics, DNA, RNA, *E. coli*, or yeast based research, our philosophy remains the same: To provide the highest quality products in the industry while ensuring they are both simple to use and reliable in their performance.

Zymo Research stands on three pillars which form the foundation of our company: Innovation, Quality, and Customer Service. These pillars are fundamental to our culture and ensure our products meet your needs.

Innovation

Zymo Research is historically recognized for its innovation of high quality nucleic acid purification technologies. Under the branding DNA Purification Made Simple® and RNA Purification Made Simple®, our technologies are pushing the limits of what is possible with nucleic acid isolation. As The Epigenetics Company™, Zymo Research has also received much attention for its rapidly expanding portfolio of epigenetics products and services. It is our objective to develop and provide the most comprehensive set of tools for DNA, RNA, and epigenetic research and analysis available today. Thousands of peer-reviewed scientific publications from researchers around the world feature our technologies. Through innovation, our scientists have made streamlined DNA methylation detection possible, pioneered the micro-elution column for DNA and RNA purification, developed the simplest and the most sophisticated methods for high-quality plasmid DNA purification, and patented the first RNA purification directly from Trizol® without phase separation among many other leading technologies in the industry.

Quality

We are committed to quality and guarantee that all of our products and service will meet and exceed your expectations. Our products are constantly evaluated by scientists like you to help ensure their reliability and the highest standard of quality.

Customer Service

We strive for excellence in how we support your scientific endeavors. We pledge to be honest and responsible for everything we do with you. We will treat you as we would like to be treated. Together, we will build a brighter future.

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Sample kits are available for the evaluation of selected products (see specific product pages on our website: www.zymoresearch.com). Sample kits must be shipped to a valid business or institution address (no P.O. Boxes). Limit one sample kit of each type (three total per customer).Sample takes 1-2 weeks for delivery.

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Contents

1 Epigenetics

So, what is epigenetics?

The Greek prefix "epi" means "on top of" or "over", so the term "Epigenetics" literally describes regulation at a level above, or in addition to, those of genetic mechanisms. The field of epigenetics was given its name and a vague definition only 50 years ago, but is now a dynamic and rapidly expanding discipline. Through epigenetics, the classic works of Charles Darwin, Gregor Mendel, Jean-Baptiste Lamarck, and others are now seen in a different light. Today, scientists are using epigenetics to investigate the roles of DNA, RNA, proteins, and environment in inheritance.

Epigenetic modifications can result in changes to the structure of chromatin, which is a complex of DNA and proteins, such as histones, that compact and organize DNA in cells. These changes can be as stable and heritable as classical genetic mechanisms, and their regulation is very complicated and essential for many biological processes, including regulation of gene expression, development, and cellular differentiation. Epigenetic regulation can be mediated by DNA methylation and hydroxymethylation, and small and large non-coding RNAs.

DNA methylation is one of the most studied epigenetic modifications, both in terms of basic biology and biomarker discovery. Zymo Research is the industry leader in providing DNA methylation research products, including bisulfite conversion kits, which are considered the industry "gold standard" for the study of DNA methylation. Zymo Research's suite of EZ DNA Methylation™ products are the highest quality, most trusted, and most cited technologies. Furthermore, these innovative products feature the fastest methods available for complete bisulfite conversion of DNA. Zymo Research has also pioneered the use of bisulfite-free methods and locus-specific analysis procedures for the study of DNA methylation.

Zymo Research also offers the most comprehensive products and services to investigate other areas of epigenetics, including DNA hydryoxymethylation, chromatin immunoprecipitation, and chromatin remodeling, as well as small and large non-coding RNAs. We now offer genome-wide and whole-genome epigenetic services for DNA methylation and hydroxymethylation, targeted methylation analysis, ChIP-Seq, and RNA-Seq – simply send in your samples, and you will receive publication-ready data! Zymo Research is committed to enhancing the study of epigenetics by providing researchers of every discipline with the tools and knowledge needed to help unravel the complexities of genetic regulation, cellular differentiation, embryology, aging, cancer, and other diseases.

THE Epigenetics COMPANY™

Quick Product Guide

Epigenetics

DNA Methylation

Bisulfite Methods

EZ DNA Methylation™ Kits

Streamlined procedure for bisulfite conversion of DNA using specialized kits designed for different samples types.

Page 10-15

Format:
Spin-Column
96-Well Plate

Pico Methyl-Seq™ Library Prep Kit

Post-bisulfite library preparation for Whole Genome Bisulfite Sequencing.

Page 27

Non-Bisulfite Methods

***OneStep* qMethyl™ Kits**

Real-time PCR procedure for bisulfite-free determination of methylation status at specific loci.

Page 26

Format:
96-Well Plate

Antibody Methods

5-mC DNA ELISA Kit

High-throughput method for accurate 5-mC detection in genomic DNA.

Page 24

Format:
96-Well Plate

MeDIP Kit

Highly specific enrichment of 5-mC in DNA by immunoprecipitation.

Page 25

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Epigenetics

DNA Hydroxymethylation

Quest 5-hmC™ DNA ELISA Kit

High-throughput method for specific 5-hmC detection in genomic DNA.

Page 30

Format:
96-Well Plate

DNA Degradase™ Plus

Generate single nucleosides for global 5-hmC quantification by LC/MS.

Page 37

Chromatin Analysis

Zymo-Spin™ ChIP Kit

Protein-DNA interaction analysis.

Page 34

Format:
Spin-Column

ChIP DNA Clean & Concentrator®

Two minute DNA clean-up procedure for ChIP DNA.

Page 35

Format:
Spin-Column
96-Well Plate

RNA Methylation

EZ RNA Methylation™ Kit

Fast and reliable bisulfite conversion of RNA for methylation analysis.

Page 16

Format:
Spin-Column

A Roadmap for Navigating the Epigenetic Landscape

Epigenetic analyses does not have to be complicated. The scientists at Zymo Research have created this navigation tool to help new and experienced researchers alike tackle epigenetic analysis with ease. Below you will find an overview of some of the most common techniques used for studying DNA methylation with product and service references from Zymo Reseach to help you along the way.

Bisulfite Treatment:

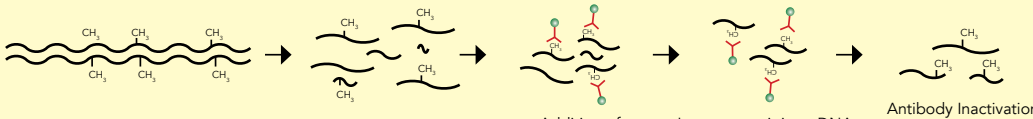
Bisulfite treatment is considered the "gold standard" for the analysis of DNA methylation. Bisulfite treatment converts unmodified cytosine to uracil while methylated cytosines are protected from this conversion. Downstream analyses include methyl-specific PCR (MSP), Bisulfite PCR and Sequencing (BSP), hybridization, pyrosequencing and Next-Generation sequencing.

Bisulfite-Free Methods for Locus Specific Analysis:

Simple bisulfite-free methods for investigation of 5-mC and 5-hmC levels can also be used for rapid screening of DNA methylation. Through the use of Methylation-Sensitive-Restriction-Enzymes (MSRE), differentially modified loci can be quickly and easily distinguished. These methods interrogate a gene's methylation.

Enrichment-Based Methods:

Specific enrichment of methylated DNA and hydroxymethylated DNA is critical for the accuracy of enrichment-based sequencing analysis. This is facilitated by the use of sensitive and specific antibodies or proteins engineered to target DNA with these modifications.



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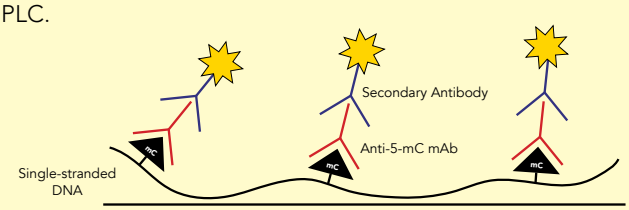
Global Quantification:

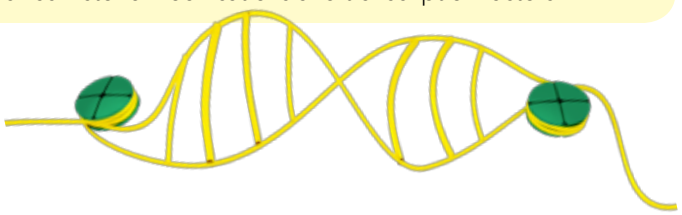
For understanding complicated changes in the epigenome, the simplest place to start is to determine global changes in DNA methylation. ELISAs are a great way to determine overall levels of 5-mC and 5-hmC in DNA samples. Enzymatic methods breaking down DNA to individual nucleosides are also available for analysis of DNA methylation using mass spectrometry or HPLC.



5-mC ELISA

Chromatin Analysis:

Chromatin immunoprecipitation (ChIP) is the prevailing method to investigate protein-DNA interactions on gene expression, such as histone modifications and transcription factors.



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Genome-Wide Analysis:

Assessment of changes in methylation across the genome offers new ways to identify DNA methylation interactions in mechanisms of development, environmental responses, aging, stress, addiction, cancer and various other diseases. Next-Generation sequencing technologies allow high-throughput data analysis and insight into these variations.

Technology Overview: EZ DNA Methylation™

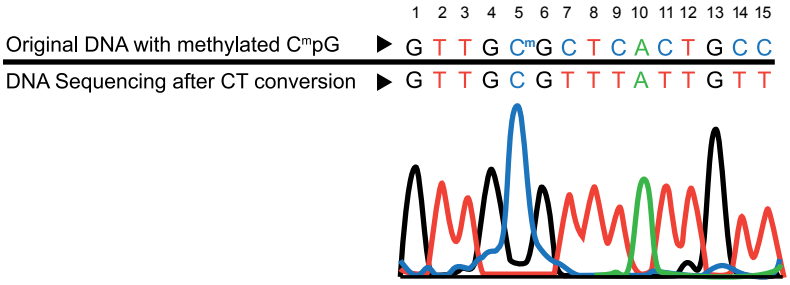
Highlights

- *Conversion efficiency > 99%.*
- *On-column desulphonation and recovery of bisulfite-treated DNA.*
- *Conversion workflows in as little as 1 hour.*
- *Products available for many sample types, including purified DNA, tissue, cells, FFPE, blood, etc.*
- *Recommended as part of Illumina's workflow.*

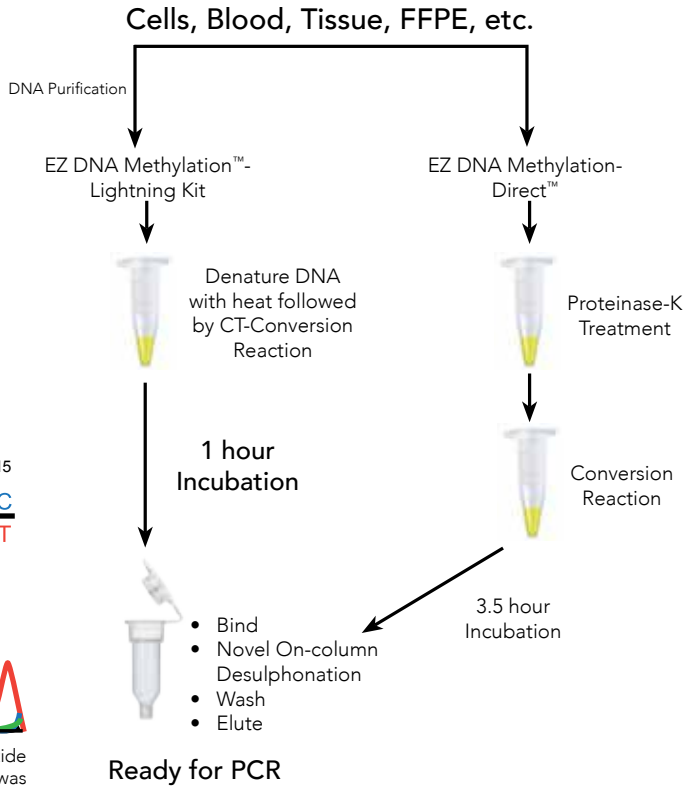
The gold standard for the analysis of DNA methylation, bisulfite treatment converts unmodified cytosine to uracil while methylated cytosines are protected from this conversion. Sequence analysis post-treatment provides site specific information on DNA across the genome. This can be accomplished by PCR, hybridization, MSP, and Next-Generation sequencing.

Bisulfite Technology from Zymo Research

The EZ DNA Methylation™ family of kits from Zymo Research remain the most trusted as well as the most cited technologies available for bisulfite conversion and DNA methylation analysis. These kits have always pushed the limits of epigenetic innovation, from being the first methylation kit to offer on-column desulphonation to reducing conversion time to only 1.5 hours. The EZ DNA Methylation™ kits have been specifically engineered for complete conversion of as little as 50 pg of DNA. Kits are available in single column, 96-well plate and magnetic bead formats.



DNA sequencing results after bisulfite treatment. DNA with methylated $C^{m}pG$ (at nucleotide position 5) was processed using the EZ DNA Methylation-Gold® Kit. The recovered DNA was amplified by PCR and then sequenced directly. The methylated cytosine at position #5 remained intact while the unmethylated cytosines (i.e., positions #7, 9, 11, 14, and 15) were completely converted into uracil following bisulfite treatment and detected as thymine following PCR.



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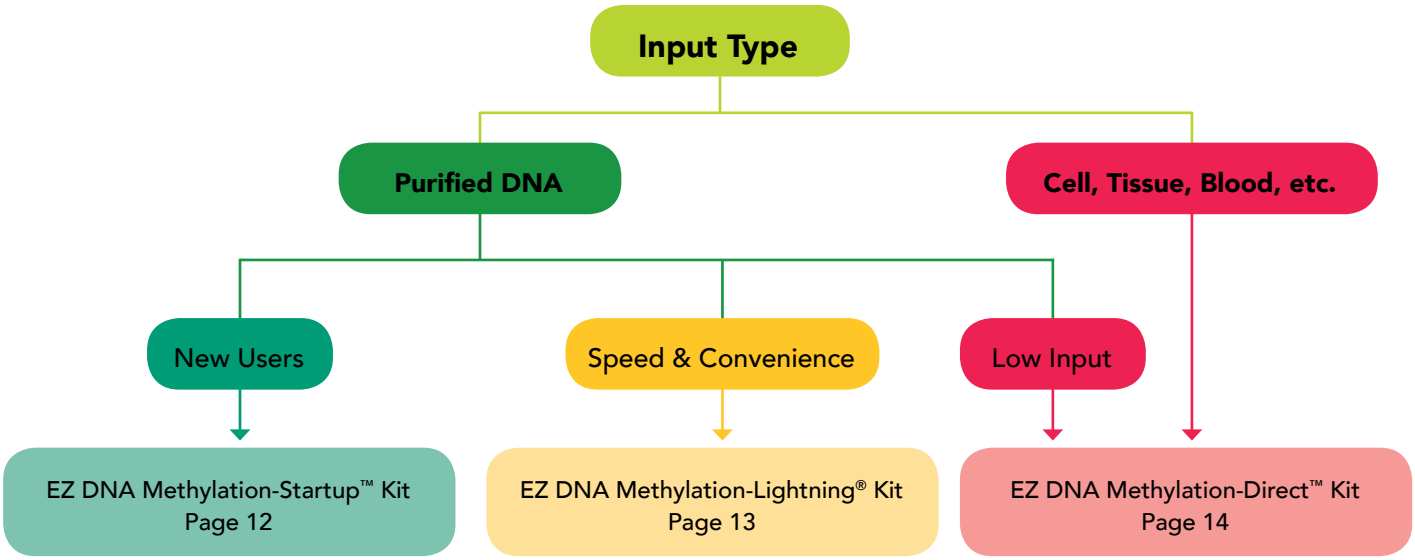
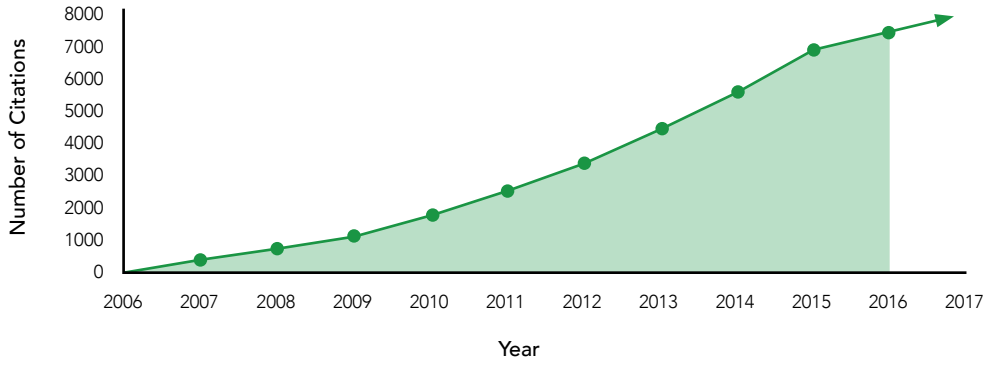
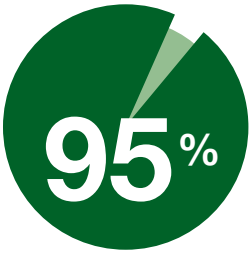
Choosing the right kit is the first step to a successful bisulfite conversion. Zymo Research offers a suite of EZ DNA Methylation™ Kits for a wide variety of sample types and research needs. Check out this quick guide to choose the best kit for your research:



Most-cited Technologies for DNA Methylation Analysis & Detection





of researchers
would recommend our
bisulfite conversion technologies
to a colleague

of researchers
were satisfied with the overall performance
of their EZ DNA Methylation™ Kit

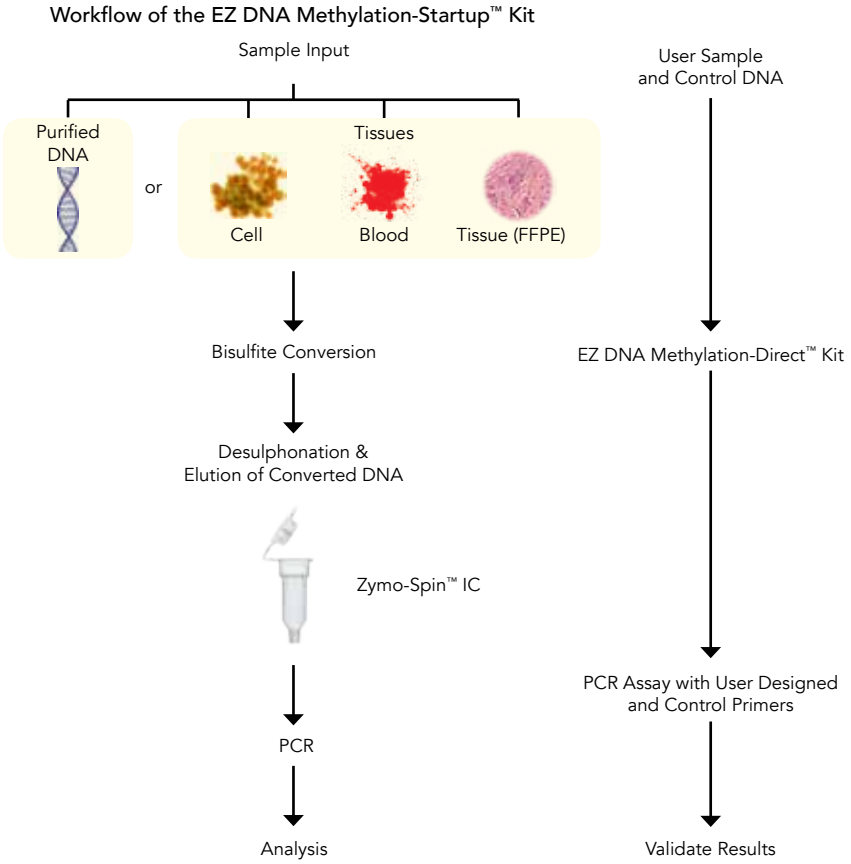
EZ DNA Methylation-Startup™ Kit

Highlights

- *The complete solution for bisulfite conversion. This all-in-one kit contains: reagents for bisulfite conversion, DNA purification, methylated human DNA with control primers, and a robust hot-start PCR polymerase that is specifically formulated for bisulfite converted DNA.*
- *Designed for the first time user requiring a consolidated product to control for bisulfite conversion.*

Description

The EZ DNA Methylation-Startup™ Kit provides the necessary technologies required for complete bisulfite conversion of DNA for PCR and methylation analysis. This kit includes bisulfite conversion reagents that allow for use with purified DNA or direct sampling of blood, cells, and fresh or FFPE tissues without the prerequisite for upstream DNA purification (see EZ DNA Methylation-Direct™ Kit, p. 14). A fully methylated Universal Methylated Human DNA Standard (p. 23) is provided together with a special primer set for PCR to assess conversion efficiency. Finally, a unique Zymo*Taq*™ DNA Polymerase (p. 36) is included for robust amplification of bisulfite-treated DNA.



Product	Cat. No.	Size	Specifications	Uses
EZ DNA Methylation-Startup™ Kit	D5024	50 rxns.	Input: DNA, Cells, Blood, Tissue, FFPE Conversion Efficiency: > 99.5% Format: Spin-Column Elution Volume: ≥ 10 µl DNA Recovery: > 80% Bisulfite Conversion Time: 4 hours Kit Includes: Conversion kit, primers, and qPCR mix	For first time user. Bisulfite treatment; Rapid column desulphonation; Amplified bisulfite-converted DNA

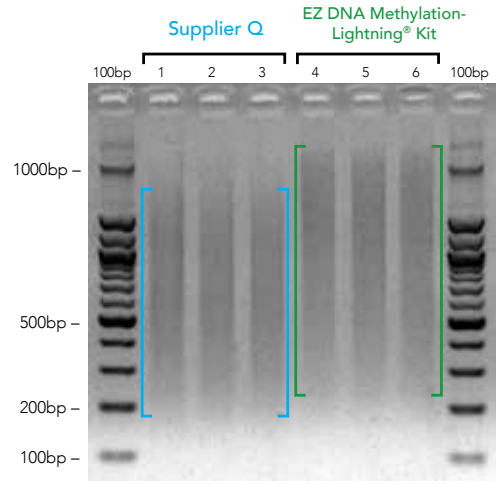
EZ DNA Methylation-Lightning® Kits

Highlights

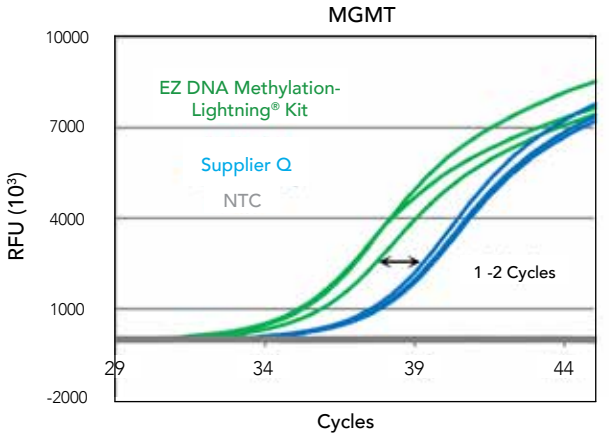
- *Fastest method for complete bisulfite conversion of DNA for methylation analysis.*
- *Ready-to-use conversion reagent is added directly to DNA.*
- *High-yield, converted DNA is ideal for PCR, MSP, array, bisulfite and Next-Generation sequencing.*
- *>99.5% conversion efficiency.*

Description

Bisulfite conversion is considered the gold standard in DNA methylation analysis. The only downside is that the bisulfite conversion process is relatively harsh and will innately damage the DNA, leading to DNA fragmentation and low recovery. The EZ DNA Methylation – Lightning® Kit features the fastest bisulfite conversion method resulting in fully converted DNA with reduced fragmentation and more efficient PCR amplification. The bisulfite converted DNA is ideal for downstream DNA methylation analyses such as PCR, MSP, array, bisulfite and Next-Generation sequencing.



The EZ DNA Methylation-Lightning® Kit yields more intact DNA after bisulfite conversion than the comparable kit from Supplier Q.



The EZ DNA Methylation-Lightning® Kit exhibits more efficient amplification resulting in earlier quantification cycles (Cg) than the comparable kit from Supplier Q.

Product	Cat. No.	Size	Specifications	Uses
EZ DNA Methylation-Lightning® Kit	D5030T	10 rxns.	Input: 100 pg to 2 µg of purified DNA Conversion Efficiency: > 99.5% Format: Spin Column Elution Volume: ≥ 10 µl DNA Recovery: > 80% Bisulfite Conversion Time: 1.5 hours	Rapid bisulfite treatment; Rapid column/plate/bead desulphonation
	D5030	50 rxns.		
	D5031	200 rxns.		
EZ-96 DNA Methylation-Lightning® Kit (shallow-well)	D5032	2 x 96 rxns.	Input: 100 pg to 2 µg of purified DNA Conversion Efficiency: > 99.5% Format: 96-Well Elution Volume: ≥ 15 µl DNA Recovery: > 70% Bisulfite Conversion Time: 1.5 hours	
EZ-96 DNA Methylation-Lightning® Kit (deep-well)	D5033	2 x 96 rxns.		
EZ-96 DNA Methylation-Lightning® Magprep Kit	D5046	4 x 96 rxns.	Input: 100 pg to 2 µg of purified DNA Conversion Efficiency: > 99.5% Format: Magnetic Beads Elution Volume: ≥ 25 µl DNA Recovery: > 70% Bisulfite Conversion Time: 1.5 hours	
	D5047	8 x 96 rxns.		

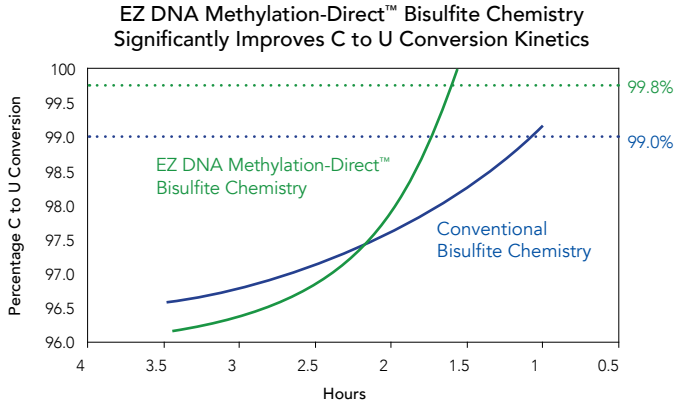
EZ DNA Methylation-Direct™ Kits

Highlights

- *Complete bisulfite conversion of DNA directly from blood, soft tissue, cells, FFPE samples, and LCM samples.*
- *Compatible with small sample inputs - as few as 10 cells or 50 pg DNA.*
- *Desulphonation and recovery of bisulfite-treated DNA with a spin-column, 96-well plate, or magnetic beads.*
- *Low fragmentation.*
- *Includes Proteinase K for tissue digestion.*

Description

The EZ DNA Methylation-Direct™ Kit is a further refinement of our popular EZ DNA Methylation™ and EZ DNA Methylation-Gold® kits. The EZ DNA Methylation-Direct™ Kit features reliable and complete bisulfite conversion of DNA directly from blood, tissue, and cells without the prerequisite for DNA purification. The increased sensitivity of these kits make it possible to amplify bisulfite-converted DNA from as few as 10 cells or 50 pg DNA. Recovered bisulfite-converted DNA is ideal for PCR amplification for downstream analyses including restriction endonuclease digestion, sequencing, microarrays, etc.



EZ DNA Methylation-Direct™ Kit bisulfite chemistry significantly improves C to U conversion kinetics. DNA was converted using either EZ DNA Methylation-Direct™ or conventional bisulfite chemistries. Recovered DNA was amplified by PCR, then cloned. Sequences from individual clones were analyzed and quantitated. This data shows that EZ DNA Methylation-Direct™ bisulfite chemistry improves the rate and extent (> 99.8%) of C to U conversion of DNA as compared to conventional bisulfite chemistry.

Product	Cat. No.	Size	Specifications	Uses
EZ DNA Methylation-Direct™ Kit	D5020	50 rxns.	Input: DNA, Cells, Blood, Tissue, FFPE (as few as 10 cells or 50 pg) Conversion Efficiency: > 99.5% Format: Spin-Column Elution Volume: ≥ 10 µl DNA Recovery: > 80% Bisulfite Conversion Time: 4 hours	DNA digestion; Bisulfite treatment; Rapid column/plate/bead desulphonation
	D5021	200 rxns.		
EZ-96 DNA Methylation-Direct™ Kit (shallow-well)	D5022	2 x 96 rxns.	Input: DNA, Cells, Blood, Tissue, FFPE (as few as 10 cells or 50 pg) Conversion Efficiency: > 99.5% Format: 96-Well Elution Volume: ≥ 15 µl DNA Recovery: > 70% Bisulfite Conversion Time: 4 hours	
EZ-96 DNA Methylation-Direct™ Kit (deep-well)	D5023	2 x 96 rxns.		
EZ-96 DNA Methylation-Direct™ Magprep Kit	D5044	4 x 96 rxns.	Input: DNA, Cells, Blood, Tissue, FFPE (as few as 10 cells or 50 pg) Conversion Efficiency: > 99.5% Format: Magnetic Beads Elution Volume: ≥ 25 µl DNA Recovery: > 70% Bisulfite Conversion Time: 4 hours	
	D5045	8 x 96 rxns.		

EZ DNA Methylation™ Kits

Description

The EZ DNA Methylation™ Kit features simplified procedure that streamline bisulfite treatment of DNA. This kit is the original bisulfite conversion kit from Zymo Research. The EZ DNA Methylation™ Kit is based on the three-step reaction that takes place between cytosine and sodium bisulfite where cytosine is converted into uracil. Innovative desulphonation technologies eliminate otherwise cumbersome precipitations. Designed to reduce template degradation, this kit minimizes DNA loss during treatment and cleanup, while ensuring complete conversion of the DNA. Purified, converted DNA is ideal for PCR amplification for downstream analyses including endonuclease digestion, sequencing, microarrays, etc. These kits are recommended with Illumina's GoldenGate® and Infinium® Assays.

Product	Cat. No.	Size	Specifications	Uses
EZ DNA Methylation™ Kit	D5001	50 rxns.	Input: 500 pg - 2 µg of purified DNA Conversion Efficiency: > 99% Format: Spin Column Elution Volume: ≥ 10 µl DNA Recovery: > 80% Bisulfite Conversion Time: 12-16 hours	Bisulfite treatment; Rapid column/ plate/bead desulphonation
	D5002	200 rxns.		
EZ-96 DNA Methylation™ Kit (shallow-well)	D5003	2 x 96 rxns.	Input: 500 pg - 2 µg of purified DNA Conversion Efficiency: > 99% Format: 96-Well Elution Volume: ≥ 15 µl DNA Recovery: > 70% Bisulfite Conversion Time: 12-16 hours	
EZ-96 DNA Methylation™ Kit (deep-well)	D5004	2 x 96 rxns.		
EZ-96 DNA Methylation™ Magprep Kit	D5040	4 x 96 rxns.	Input: 500 pg - 2 µg of purified DNA Conversion Efficiency: > 99% Format: Magnetic Beads Elution Volume: ≥ 25 µl DNA Recovery: > 70% Bisulfite Conversion Time: 12-16 hours	
	D5041	8 x 96 rxns.		

EZ DNA Methylation-Gold® Kits

Description

The EZ DNA Methylation-Gold® Kit is a refinement of our popular EZ DNA Methylation™ Kit. The EZ DNA Methylation-Gold® Kit consolidates DNA denaturation and bisulfite conversion processes into one step, resulting in a much faster bisulfite conversion. Also, the kits have been streamlined for high yield recovery of DNA following bisulfite treatment. Recovered bisulfite-converted DNA is ideal for PCR amplification for downstream analyses including endonuclease digestion, sequencing, microarrays, etc.

Product	Cat. No.	Size	Specifications	Uses
EZ DNA Methylation-Gold® Kit	D5005	50 rxns.	Input: 500 pg - 2 µg of purified DNA Conversion Efficiency: > 99% Format: Spin Column Elution Volume: ≥ 10 µl DNA Recovery: > 75% Bisulfite Conversion Time: 3 hours	Bisulfite treatment; Rapid column/ plate/bead desulphonation
	D5006	200 rxns.		
EZ-96 DNA Methylation-Gold® Kit (shallow-well)	D5007	2 x 96 rxns.	Input: 500 pg - 2 µg of purified DNA Conversion Efficiency: > 99% Format: 96-Well Elution Volume: ≥ 15 µl DNA Recovery: > 75% Bisulfite Conversion Time: 3 hours	
EZ-96 DNA Methylation-Gold® Kit (deep-well)	D5008	2 x 96 rxns.		
EZ-96 DNA Methylation-Gold® Magprep Kit	D5042	4 x 96 rxns.	Input: 500 pg - 2 µg of purified DNA Conversion Efficiency: > 99% Format: Magnetic Beads Elution Volume: ≥ 25 µl DNA Recovery: > 75% Bisulfite Conversion Time: 3 hours	
	D5043	8 x 96 rxns.		

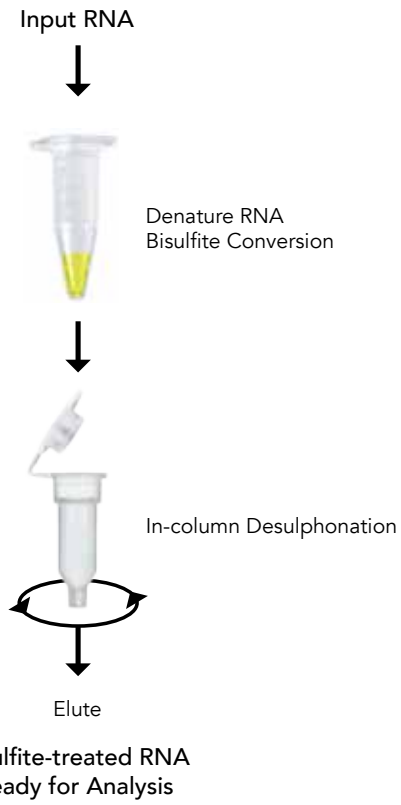
EZ RNA Methylation® Kit

Highlights

- *Fast and reliable bisulfite conversion of RNA for methylation analysis.*
- *Specifically optimized for complete conversion of non-methylated cytosine in RNA.*
- *Ideal for all RNA inputs.*
- *Complete conversion of RNA in as little as 1 hour.*

Description

The EZ RNA Methylation® Kit features rapid and reliable bisulfite treatment and conversion of cytosines in RNA for methylation analysis. The kit streamlines the three-step process for complete conversion of cytosine into uracil, and includes ready-to-use conversion reagent. RNA denaturation and bisulfite conversion processes are combined into a single step. No buffer preparation is necessary. Innovative in-column desulphonation technology eliminates messy precipitation steps, to ensure consistent results. The product has been designed to minimize template degradation, loss of RNA during treatment and clean-up, and to provide complete conversion of cytosine for accurate methylation analysis. Recovered RNA is ideal for RT-PCR, sequencing, library preparation and Next-Generation sequencing.



Product	Cat. No.	Size	Specifications	Uses
EZ RNA Methylation® Kit	R5001	50 preps.	Input: 32 ng - 3 µg of DNA-free RNA Conversion Efficiency: > 99% RNA Recovery: > 70% Processing Time: 50 minutes	Rapid bisulfite treatment; Rapid column/plate/bead desulphonation
	R5002	200 preps.		

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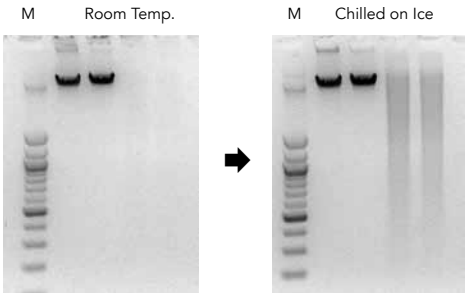
Tips for Bisulfite-treated DNA

Visualizing Bisulfite-Treated DNA

Bisulfite-treated DNA can be visualized in agarose/EtBr gels following electrophoresis using a standard UV-light source. Now that the bisulfite-converted DNA is single stranded and has limited base-pairing at room temperature, it is necessary to cool the gel on ice for 5-10 minutes prior to visualization. This will drive some base pairing between the single-stranded molecules and allow recovered material to be visible.

Quantifying Bisulfite-Treated DNA

Following bisulfite-treatment of genomic DNA, non-methylated cytosine residues are converted into uracil. The recovered DNA is typically A, U, and T-rich. The recovered DNA is now single-stranded and the original base-pairing no longer exists. The absorption coefficient at 260 nm will resemble that of RNA, thus a value of 40 ug/mL for A260 = 1.0 should be used when determining the concentration.



Visualizing bisulfite-treated DNA in agarose/EtBr gels is best done after chilling the gels on ice. In the figures above, bisulfite-treated salmon sperm DNA was desulphonated then purified. The DNA, mostly single stranded, was then separated in a 0.8 % (w/v) agarose/TAE/EtBr gel and visualized with a UV-light source immediately following electrophoresis (room temp) and after chilling the gel on ice for 15 minutes. M is a 100 bp DNA ladder (Zymo Research).

PCR of Bisulfite Converted DNA

Generally, primers of 26 to 32 bases are required for amplification of bisulfite-converted DNA. In general, all Cs should be treated as Ts for primer design purposes, unless they are in a CpG context. See example below.

Template:	5′ - GACCGTTCCAGGTCCAGCAGTGCGCT - 3′
Bisulfite Converted:	5′ - GATCGTTTTAGGTTTAGTAGTGCGTT - 3′
Primers: Reverse:	3′ - ATCATCACRCAA - 5′
Forward:	5′ - GATYGTTTTAGGT - 3′

R = G/A
Y = C/T

Only the reverse primer binds to the converted DNA, the forward primer will bind to the strand generated by the reverse primer. If the primer contains CpG dinucleotides with uncertain methylation status, then mixed bases with C and T can be used (see above). Usually, there should be no more than one mixed position per primer and it should be located toward the 5′ end of the primer. It is not recommended to have mixed bases located at the 3′ end of the primer. Zymo Research's Bisulfite Primer Seeker (http://www.zymoresearch.com/tools/bisulfite-primer-seeker) is a useful resource when designing primers for bisultife PCR.

Usually, 35 to 40 cycles are required for successful PCR amplification of bisulfite-converted DNA. Optimal amplicon size is between 150-300 bp; however larger amplicons (up to 1 kb) can be generated with optimizing PCR conditions. Annealing temperatures between 55 - 60°C typically work well. As most non-methylated cytosine residues are converted into uracil, the bisulfite-treated DNA is usually AT-rich and has low GC composition. Non-specific PCR amplification is relatively common with bisulfite-treated DNA due to its AT-rich nature. PCR using hot start polymerases (e.g., Zymo*Taq*™ DNA Polymerase, p. 36) is strongly recommended for the amplification of bisulfite-treated DNA.

Primer Design for Bisulfite and Methylation Specific PCR

Bisulfite converted DNA can be analyzed by a variety of methods: Bisulfite Sequencing PCR, Methylation Specific PCR, Pyrosequencing, Next-Generation sequencing platforms and many others. The two most common techniques for locus specific determination of methylation are Bisulfite Sequencing PCR and Methylation Specific PCR. Below is a guide to help you choose the best workflow for your needs:

Purify DNA or use EZ DNA Methylation-Direct™ Kits (p. 14)

Bisulfite convert DNA using our EZ DNA Methylation™ Kits and purify bisulfite DNA

Quantify DNA and assess DNA quality
- UV/Vis Spectroscopy
- Agarose Gel

Bisulfite Sequencing PCR (BSP)

Quantitate single base resolution of methylated cytosine with your region of interest.

Design Bisulfite PCR Primers
- Bisulfite PCR primers need to be long, usually between 26-30 bases.
- Amplicon size 150-300 bp.
- Primer can contain a mixed base at the cytosine position.
- 35 to 40 cycles are required for successful amplification.
- Annealing temperatures between 55-60°C typically work well.
- Annealing temperature gradient should be run with every new primer set to ensure optimal amplification of the specific target.

Conduct PCR
- Use a hot start polymerase

Visualize PCR products on agarose gel

Use ZymoClean™ (p. 92) to extract amplicon from gel

Insert PCR product into vector

Clone into *E. coli* and grow (*Mix & Go Cells*, p. 147)

Sequencing with vector-specific primers by Sanger Sequencing

Methylation Specific PCR (MSP)

Qualitative identification of a few methylated cytosine with your primer binding regions.

Design Methylation Specific Primer Sets
- Need to design methylated and non-methylated primer sets.
- Place 2 to 4 CpG sites in each primer set with the CpG sites located as close as possible to the 3' end of each of the primers.
- An optimal primer will have at least 4 non CpG cytosines to distinguish between converted and non-converted templates.
- An ideal melting temperature is 55 - 62°C for both primer sets. Melt temperatures between each primer set must not be bigger than a 1-2°C difference. It is okay if the non-methylated primer set is longer to help increase the melting temperature so it is similar to the methylated set.
- Amplicon length should be a max of 300 bp.
- Check your primers for hairpins and dimers. Also be sure to BLAST® your primers.

Validate your primer sets with the proper controls and proper conditions. Check out our MSP Guide!

Conduct PCR with a hot start polymerase like Zymo*Taq*™ (pg. 36)

Visualize PCR products on agarose gel

Frequently Asked Questions

Should the input DNA be dissolved in TE, water, or some other buffer prior to treatment with Zymo Research's bisulfite kits?

Water, TE, or modified TE buffers can be used to dissolve DNA and do not interfere with the conversion process.

Why am I not getting complete conversion of DNA using the EZ DNA Methylation-Direct™ Kit?

1) If sampling solid tissue, then it is most likely that too much sample was processed, resulting in incomplete DNA conversion.
2) If sampling FFPE tissue, then it is probable that the DNA was extensively damaged and/or cross-linked resulting in incomplete DNA conversion.
3) If debris is not removed by centrifugation from the Proteinase K digestion, it may interfere with the bisulfite conversion process resulting in incomplete conversion of the DNA.

Which Taq polymerase(s) do you recommend for PCR amplification of bisulfite-converted DNA?

We recommend a "hot-start" DNA polymerase (e.g., Zymo*Taq*™ DNA Polymerase, p.36).

Why are there two different catalog numbers for the EZ-96 DNA Methylation™ product lines?

The two different catalog numbers are used to differentiate between the binding plates that are included in the kits. Deep and shallow-well binding plates are available to accommodate most rotors and microplate carriers. The table below shows a comparison of the two binding plates. It is recommended to use the deep-well binding plates if possible.

	Silicon-A™	**Zymo-Spin™ I-96**
Style	Shallow-well	Deep-well
Dimensions of Binding Plate (H x W x L)	19 mm x 83 mm x 125 mm	35 mm x 83 mm x 125 mm
Height of Binding / Collection Plate Assembly	43 mm	60 mm
Binding Capacity / Minimum Elution Volume	5 µg / 30 µl per well	5 µg / 15 µl per well
EZ DNA Methylation Kits' Cat. No.	D5003, D5007, D5022, D5032	D5004, D5008, D5023, D5033

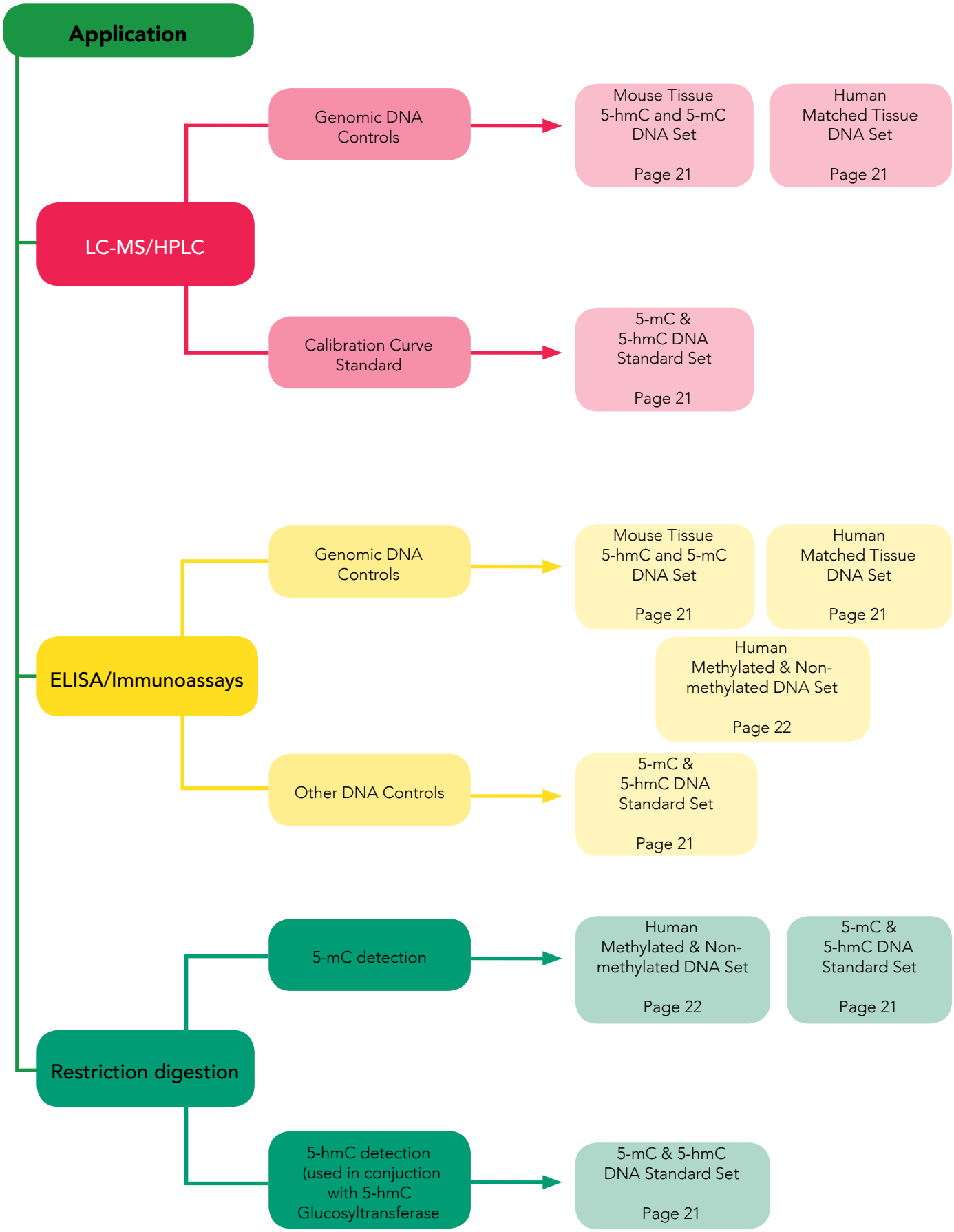
Are your bisulfite kits compatible with technologies from Illumina®?

Yes. The EZ DNA Methylation™ Kit technologies from Zymo Research are recommended by Illumina® for GoldenGate® and Infinium® Assays.

What downstream analytical procedures can be used for DNA bisulfite-converted with the EZ DNA Methylation™ Kits?

DNA converted using any of our EZ DNA Methylation™ kits is ideal for subsequent analysis by canonical sequencing methods, Ms-SNuPE, COBRA, Bisulfite-PCR, MSP, Bisulfite-sequencing, mass spectroscopy (e.g., EpiTYPER® from Sequenom), as well as other methods for analysis.

Choose Your Epigenetic Standards



Matched DNA Sets

Highlights

- *Set of organ-specific human genomic DNA originating from a single individual.*
- *Precisely quantified levels of 5-methylcytosine & 5-hydroxymethylcytosine via LC/MS.*
- *Useful control for detection methods of 5-methylcytosine or 5-hydroxymethylcytosine.*

Description

Matched DNA Sets are an ideal control for detection and/or quantification methods against 5-mC and 5-hmC as both modified cytosines are present at physiologically relevant levels and loci.

The Human Matched Tissue DNA Set is a set of organ-specific human genomic DNAs, originating from a single individual. The Mouse Tissue 5-hmC & 5-mC DNA Set contains organ-specific mouse genomic DNAs, isolated from a pool of 8-10 week old Swiss Webster mice. The levels of 5-mC and 5-hmC have been precisely quantified by mass spectrometry (LC/MS). Percentages of each modified cytosine are listed below.

5-mC & 5-hmC DNA Standard Set

Highlights

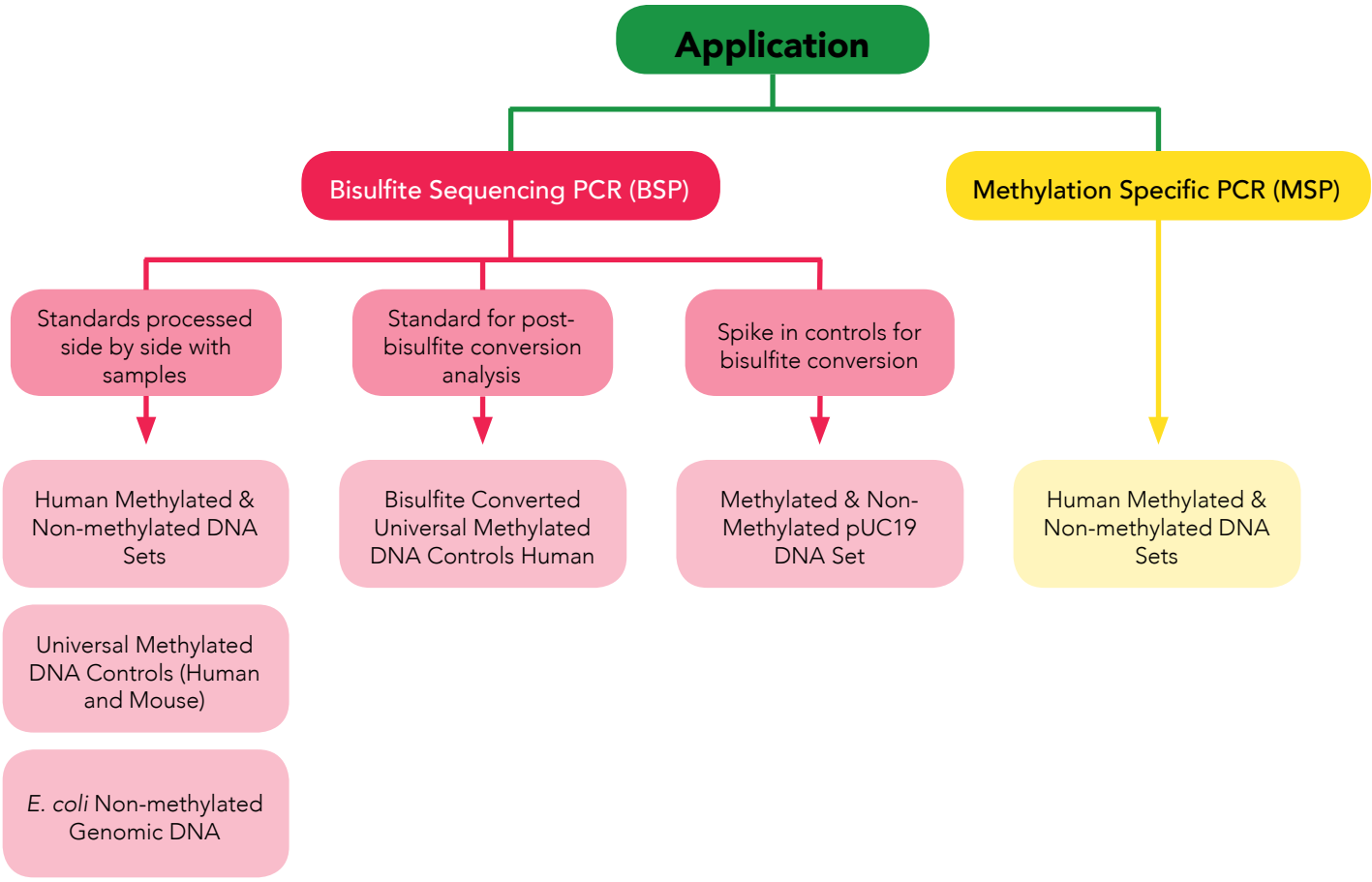
- *Control DNA for 5-methylcytosine (5-mC) and 5-hydroxymethylcytosine (5-hmC) quantitation applications (i.e. - mass spectrometry, HPLC, TLC, etc.).*
- *Substrate for studies involving 5-hmC interacting proteins.*

Description

The 5-mC & 5-hmC DNA Standard Set features three DNA standards, which contain linear dsDNA, which have the same sequence. Each of the three standards are identical except in cytosine modification: 1) 100% unmodified cytosines 2) 5-mC 3) 5-hmC. Since the sequence and extent of cytosine modification is known, this DNA standard set is ideal for use in calibration of various applications intended for quantitation of cytosine modifications.

Product	Cat. No.	Size	Specifications	Uses
Human Matched DNA Set	D5018	1 set	Source: Human Male Concentration: 250 ng/µl	Control for bisulfite conversion; DNA methylation quantitation
Mouse 5-hmC & 5-mC DNA Set	D5019	1 set	Source: Swiss Webster Mice Concentration: 250 ng/µl	
5-mC & 5-hmC DNA Standard Set	D5405	1 set	DNA Amount: 2 µg each DNA Concentrations: 50 ng/µl each	Cytosine modification studies (i.e 5-mC & 5-hmC); HPLC; Mass Spec; TLC

Choose Your Epigenetic Standards (cont.)



Human Methylated & Non-Methylated DNA Sets

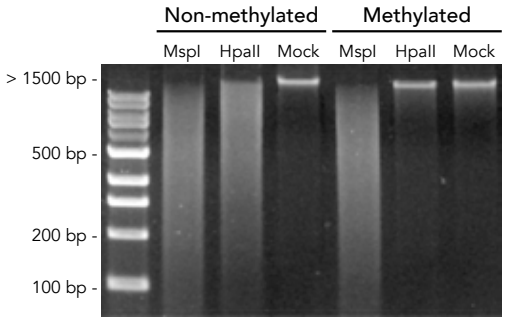
Highlights

- *Purified, non-methylated and methylated human DNA for use as negative and positive control in methylation detection applications.*
- *Standards can be assayed in parallel with samples to monitor bisulfite conversion efficiency.*
- *Ideal controls for bisulfite sequencing PCR (BSP) and methylation specific PCR (MSP).*
- *Each standard is provided with primer set to amplify a fragment of DNA after bisulfite conversion.*

Description

The Human Methylated & Non-methylated DNA Set consists of two control DNAs (a CpG methylated human DNA standard and a non-methylated human DNA standard), with a set of specifically designed primers that can be used in conjunction with the EZ DNA Methylation™ family of products (p. 12-15). These DNA sets can be included as a positive and negative control to assess the efficiency of bisulfite-mediated conversion of DNA.

The non-methylated human DNA is purified from the HCT116 DKO (double knock-out) cell line, which contains genetic knockouts of both DNA methyltransferases DNMT1 (-/-) and DNMT3b (-/-). The methylated DNA standard is purified HCT116 DKO DNA that has been enzymatically methylated at CpG sites.



An assay for complete methylation by M.SssI methylase. Non-methylated and methylated DNA from HCT116 DKO cells was digested with restriction enzymes MspI and HpaII. MspI digests both non-methylated and methylated DNA. HpaII is sensitive to CpG methylation.

Universal Methylated DNA Standards

Highlights

- *Purified, methylated DNA for use as a control to assess bisulfite conversion efficiency.*
- *Provided with a primer set to amplify a fragment of DNA after bisulfite conversion.*

Description

The Universal Methylated DNA Standards are designed for use as positive controls to assess the efficiency of bisulfite-mediated conversion of DNA in combination with the EZ DNA Methylation™ family of products (p. 12-15). The control DNAs can be assayed in parallel with samples to monitor the bisulfite conversion reaction. Each primer set has been designed to amplify a fragment of the supplied DNA following bisulfite treatment.

Additional Bisulfite Conversion Controls

Description

The Methylated & Non-methylated pUC19 DNA Set consists of control DNAs and a set of specifically designed primers. The set is ideal as a "spike-in" control to assess bisulfite conversion efficiency within the same reaction as the sample, or to produce known mixtures of methylated and non-methylated DNA for assay calibration. The non-methylated pUC19 DNA is pUC19 isolated from a methylation-negative strain of bacteria (Dam–, Dcm–), and the methylated pUC19 DNA is pUC19 enzymatically methylated at all cytosines in the dinucleotide sequence 5′...CpG...3′ by CpG Methylase (p. 38).

E. coli non-methylated genomic DNA is from a Dam– and Dcm– strain (ER2925) of *E. coli*. It works perfectly as a negative control for DNA methylation analyses requiring DNA with absolutely no methylation.

ER2925 Genotype: ara-14 leuB6 fhuA31 lacY1 tsx78 glnV44 galK2 galT22 mcrA dcm-6 hisG4 rfbD1 R(zgb210::Tn10)TetS endA1 rpsL136 dam13::Tn9 xylA-5 mtl-1 thi-1 mcrB1 hsdR2.

Product	Cat. No.	Size	Specifications	Uses
Human WGA Methylated & Non-methylated DNA Set	D5013	1 set	Format: HCT116 DKO Genomic DNA Concentration: 250 ng/µl	Control for bisulfite conversion; DNA methylation quantitation
Human Methylated & Non-methylated DNA Set	D5014	1 set	Format: HCT116 DKO Genomic DNA Concentration: 250 ng/µl	
Universal Methylated Human DNA Standard	D5011	1 set	Format: Male Genomic DNA Concentration: 250 ng/µl	
Universal Methylated Mouse DNA Standard	D5012	1 set		
Bisulfite-converted Universal Methylated Human DNA Standard	D5015	1 set	Format: Bisulfite-converted Male Genomic DNA Concentration: 20 ng/µl	
E. coli Non-methylated Genomic DNA	D5016	5 µg	Format: *E. coli* Genomic DNA Concentration: 250 ng/µl	
Methylated & Non-methylated pUC19 DNA Set	D5017	5 µg	Format: Linearized Plasmid Concentration: 1 ng/µl	

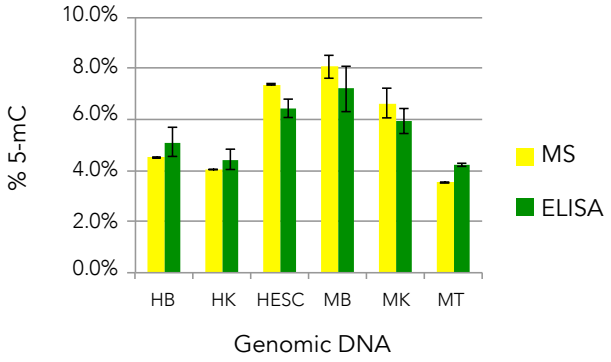
5-mC DNA ELISA Kit

Highlights

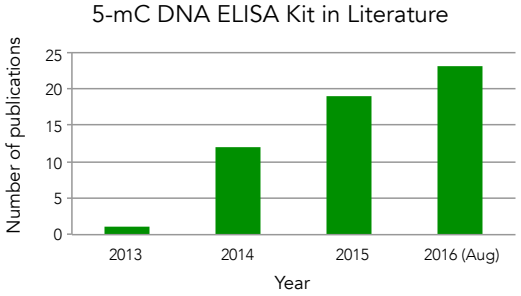
- *Specific quantitation of 5-methylcytosine (5-mC) DNA from a variety of samples.*
- *Ideal for global 5-mC detection, tissue-specific 5-mC quantitation, high-throughput compound screening, and more.*
- *The streamlined workflow can be completed in less than 3 hours.*

Description

The 5-mC DNA ELISA Kit empowers researchers to accurately quantitate 5-mC, for any DNA sample, in less than 3 hours. The kit features an Anti-5-mC Monoclonal Antibody (see pg. 25) that is both sensitive and specific for 5-mC. The assay is compatible with a wide range of input DNA from vertebrate, plant, and microbial sources as well as fragmented DNA and percent 5-mC in a DNA sample. All samples can be accurately quantified from a standard curve generated with specially designed controls included with the kit.



The 5-mC DNA ELISA Kit can quantify 5-mC in numerous DNA samples with close correlation to LC-MS analysis. Percent 5-mC was calculated for the following genomic DNA samples: human brain (HB), human kidney (HK), human embryonic stem cell (HESC), mouse brain (MB), mouse kidney (MK), and mouse testes (MT). The percent 5-mC detected in DNA samples by 5-mC DNA ELISA Kit (ELISA) strongly correlates to mass spectrometry (MS) data of 5-mC found in the respective gDNA sample.



Since it's release in 2013, the number of publications citing the Zymo Research 5-mC DNA ELISA Kit is steadily increasing (Source: Google Scholar)

Product	Cat. No.	Size	Specifications	Uses
5-mC DNA ELISA Kit	D5325	1 x 96 rxns.	DNA Input: 10 - 200 ng Detection: ≥ 0.5% 5-mC per 100 ng Assay Time: 3 - 4 hours	Global 5-mC detection and quantitation
	D5326	2 x 96 rxns.		

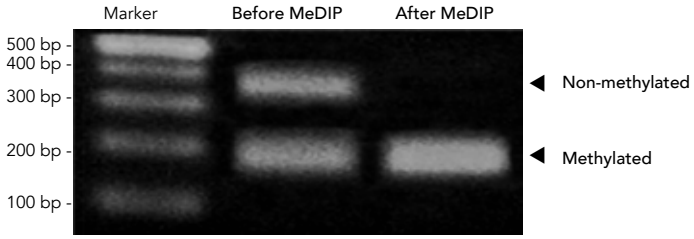
Anti-5-Methylcytosine Monoclonal Antibody (Clone 10G4)

Highlights

- *Specifically binds to 5-methylcytosine in ssDNA context.*
- *No detectable cross reactivity with non-methylated cytosine.*

Description

The mouse Anti-5-Methylcytosine Monoclonal Antibody (Clone 10G4) is exceptional at differentiating between methylated and non-methylated cytosines in DNA. The antibody binds to 5-mC in single-stranded DNA, with no detectable cross reactivity to non-methylated cytosines. This product is ideal for immuno-based assays such as methylated DNA Immunoprecipitation (MeDIP), ELISA and dot blot.



Methylated DNA is efficiently enriched using the Anti-5-Methylcytosine Monoclonal Antibody. DNA was immunoprecipitated using the mouse Anti-5-Methylcytosine 10G4 Antibody from a mixed methylated/non-methylated DNA population. Methylated DNA can be cut with NcoI whereas non-methylated DNA is resistant to NcoI digestion. The DNA (post-IP) was subsequently amplified by PCR and digested with NcoI. Products were then separated in a 2.0% (w/v) agarose/TAE/EtBr gel. The image above demonstrates specific enrichment of methylated versus non-methylated DNA by the Anti-5-Methylcytosine 10G4 Antibody.

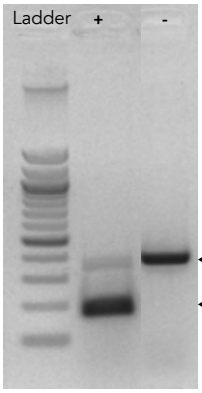
Methylated-DNA IP Kit

Highlights

- *Robust enrichment & immunoprecipitation of 5-mC containing DNA.*
- *Includes a highly specific anti-5-methylcytosine monoclonal antibody for defined, reproducible results.*
- *Eluted, ultra-pure DNA is ideal for use in subsequent molecular based analyses (e.g., assembling genomic libraries and determining genome-wide methylation status).*

Description

The Methylated-DNA IP Kit is designed for enrichment of 5-mC-containing DNA from any pool of fragmented genomic DNA for use in genome-wide methylation analysis. It features a highly specific Anti-5-Methylcytosine Monoclonal Antibody for the immunoprecipitation of methylated DNA in only a few hours. This kit is capable of achieving over one hundred-fold enrichment of methylated DNA vs. non-methylated DNA. Recovered DNA is suitable for many downstream applications to analyze genome-wide DNA methylation including PCR, bisulfite treatment, whole-genome amplification, ultra-deep sequencing, and microarray. Control DNA and primers are included to monitor the success of the assay.



Nco1

Methylated DNA is efficiently enriched using the Methylated DNA IP Kit. DNA was immunoprecipitated using the mouse Anti-5-Methylcytosine antibody from mixed methylated/non-methylated DNA population. The DNA (post IP) was amplified and digested with Nco1 and separated on 1.4% agarose gel. Enriched methylated DNA was digested by Nco1.

Product	Cat. No.	Size	Specifications	Uses
Anti-5-Methylcytosine Monoclonal Antibody (Clone 10G4)	A3001-15	15 µg/15 µl	Isotype: IgG1 Concentration: 1 mg/ml Buffer: PBS (pH 7.4) 0.01% Thimerosal Short Term Storage: 4°C Longe Term Storage: -80°C	Immunoprecipitation of methylated DNA; ELISA; Immunoblotting; Immunofluorescence
	A3001-30	30 µg/30 µl		
	A3001-50	50 µg/50 µl		
	A3001-200	200 µg/200 µl		
Methylated-DNA IP Kit	D5101	10 rxns.	Format: Magnetic Beads Optimal DNA Input: 50 - 500 ng Elution Volume: 10 µl Enrichment Factor: > 100 fold Processing Time: 4 hours	Immunoprecipitation of methylated DNA; PCR; Sequencing

OneStep qMethyl™ Kits

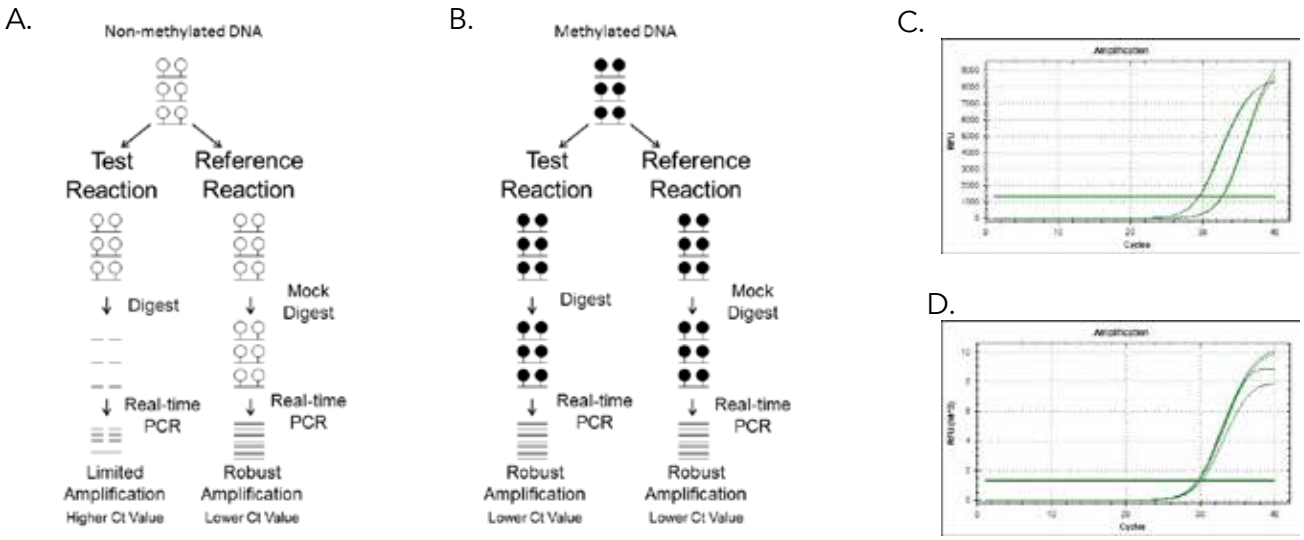
Highlights

- *Single step, bisulfite-free DNA methylation analysis.*
- *Includes reagents and controls for quantitative detection and reliable performance.*
- *Ideal for rapid screening of single and multi-locus DNA methylation.*

Description

The *OneStep*™ qMethyl™ Kit provides a simple, straightforward, and bisulfite-free procedure for rapid, locus-specific DNA methylation assessment via the selective amplification of a methylated region of DNA.

This is accomplished by splitting any DNA to be tested into two parts: a "Test Reaction" and a "Reference Reaction" (see figure below). DNA in the Test Reaction is digested with Methylation Sensitive Restriction Enzymes (MSREs) while DNA in the Reference Reaction is not. The DNA from both samples is then amplified using real-time PCR in the presence of SYTO®9 fluorescent dye and then quantitated. The "Lite" version allows real-time PCR to be performed with other fluorescent dyes or molecular probes of the researcher's choosing.



Rapid bisulfite-free methylation analysis is efficiently performed using the *OneStep* qMethyl™ Kit. Schematics A and B (above) illustrate the sample workflow of Non-methylated DNA and Methylated DNAs. Test Reaction samples are MSRE digested while the Reference Reaction samples are not (mock digested). Following digestion, DNA from both samples is used for real-time PCR. The white lollipops in the image represent unmethylated cytosines and black lollipops methylated cytosines in CpG dinucleotide context. Following real-time PCR, amplification plots (C and D) demonstrate non-methylated DNA exhibits large differences in the Ct values for Test and Reference Reactions (C) while highly methylated DNA samples exhibit little difference (D).

Product	Cat. No.	Size	Specifications	Uses
OneStep™ qMethyl™ Kit	D5310	1 x 96 well	Format: 96-Well Plate Detection Dye: SYTO® 9 DNA Input: 20 ng in 5 µl Thermocycler Compatibility: Roche LightCycler 480®, Bio-Rad CFX96™, ABI 7500 or similar Processing Time: ~4 hours	Bisulfite-free DNA methylation analysis; Rapid screening of multiple loci or single locus across multiple samples
OneStep™ qMethyl™-Lite	D5311	1 x 96 well		

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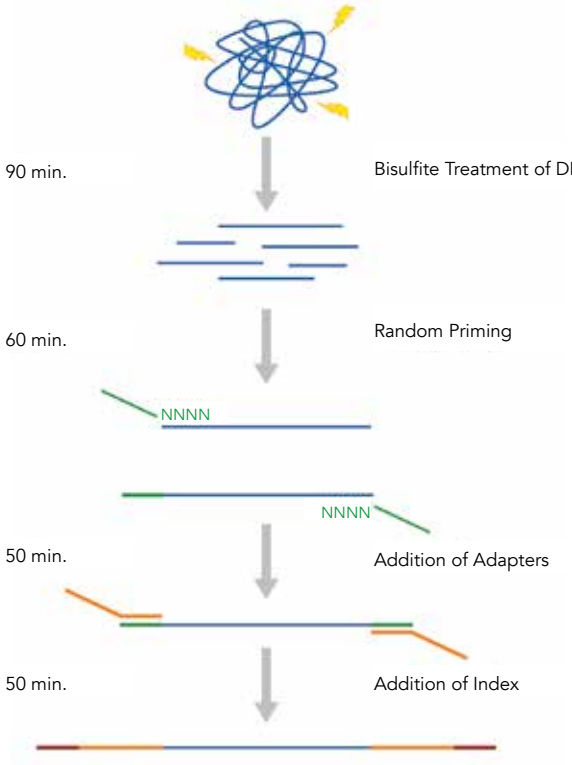
Pico Methyl-Seq™ Library Prep Kit

Highlights

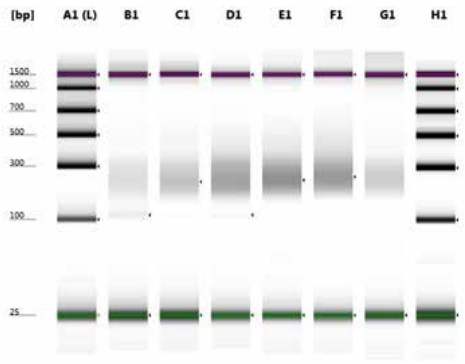
- *All-inclusive kit for bisulfite conversion followed by Whole Genome Bisulfite Sequencing (WGBS) library preparation.*
- *Accommodates ultra-low DNA input and compatible with FFPE samples.*
- *Simple, ligation- and gel-free workflow can be completed in a few hours.*

Description

The Pico Methyl-Seq™ Library Prep Kit provides a streamlined workflow for making WGBS libraries. Input DNA is randomly fragmented during the initial bisulfite treatment step followed by three rounds of amplification with uniquely designed primers. The procedure can accommodate as little as 10 pg input DNA (including that derived from FFPE samples), making it ideal for methylation analysis of precious, limited, and target-enriched samples.



Pico Methyl-Seq libraries ready for sequencing



Agilent 2200 TapeStation® D1K gel of libraries prepared (from B1-G1) using 10 pg, 20 pg, 100 pg, 1 ng, 10 ng, and 100 ng, respectively.

Product	Cat. No.	Size	Specifications	Uses
Pico Methyl-Seq™ Library Prep Kit	D5455	10 preps.	DNA Input: 10 pg - 100 ng DNA Samples: Genomic DNA, FFPE DNA Sequencing Platform Compatibility: Illumina's TruSeq chemistries for Hi-Seq™ and MiSeq™ sequencing platforms	DNA methylation library preparation for WGBS
	D5456	25 preps.		

The Double Helix Epigenetic Switch™: 5-methylcytosine and 5-hydroxymethylcytosine Exert Opposite Forces on Base Pairing of DNA Double Helix

Ron Leavitt, James Yen, Xi-Yu Jia
Zymo Research Corporation

Abstract

DNA base pairing governs the fundamental function of DNA in life. Importantly, annealing and unwinding of base-paired double helical DNA strands are essential for DNA replication and transcription processes. Moreover, epigenetic DNA base modifications have become recognized to be involved in regulation of DNA at all levels in higher organisms. Our recent research into DNA base modifications has shown that 5-methylcytosine (5-mC) and 5-hydroxymethylcytosine (5-hmC) modifications dramatically change the properties of C:G base pairing. In contrast to the 5-mC:G pairing, which increases the base pairing stability relative to normal C:G pairing, we find that 5-hmC:G base pairing greatly decreases stability relative to both C:G and 5-mC:G base pairing. It is evident that cytosine epigenetic modifications provide another layer of hidden codes, which serve as a "lock", neutral and "unlock" mechanism on DNA beyond the canonical genetic codes. We call this the Double Helix Epigenetic Switch™.

Introduction

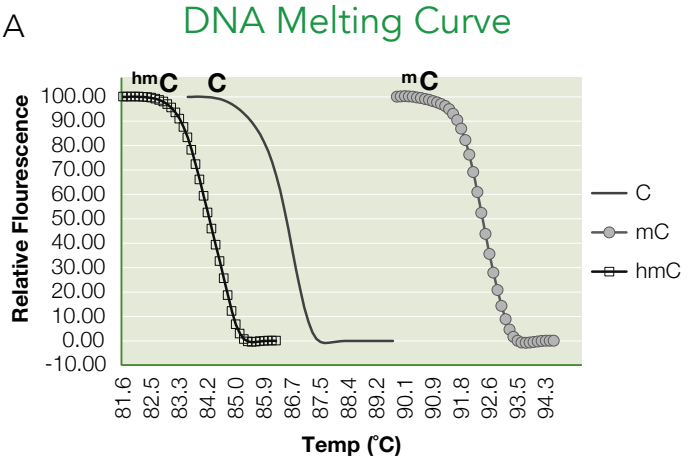
DNA is the blueprint for life, coding all of the genes needed in each cell within each tissue in all organisms on Earth. It has been over half a century since the discovery of the DNA double helix and uncovering of genetic codes. In the last decade, the development of epigenetic understanding has further elucidated some fundamental mechanisms of how genes are organized, regulated and inherited through elaborated epigenetic regulation mechanisms. (In addition, the century old debate on nature versus nurture has finally begun to converge into a more complete picture of biology, where genetics and epigenetics are both considered. It is now clear that both nature and nurture are important).

Cytosine modifications in both 5-mC and 5-hmC are two important epigenetic markers and their involvement in gene regulation has been intensively studied in the last decade. Although fundamental A:T and C:G base pairings are well known for the DNA double helix structure, the direct biochemical effects of epigenetically modified bases of 5-mC and 5-hmC on DNA has not been thoroughly investigated. Here we report the 5-mC and 5-hmC base modification effects on C:G base pairing and the overall effects on dsDNA stability.

Results and Discussion

5-mC and 5-hmC exert opposite forces on DNA stability. High resolution melting (HRM) analysis was used to measure the dsDNA stability. This analysis directly measures DNA as either dsDNA (base-paired) or single stranded (denatured) status. This was used as a measurement of DNA stability for different cytosine modifications in a 897bp DNA fragment (5-methylcytosine & 5-hydroxymethylcytosine DNA Standard Set, D5405, Zymo Research) with relative evenly distributed G, A, T and C. The C was either 100% native C, or 100% 5-mC or 5-hmC.

A



B

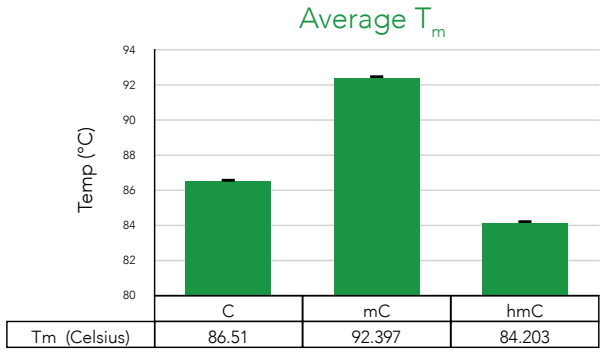


Figure 1. 5-Hydroxymethylcytosine decreases thermodynamic stability of DNA. Procedure: (A) Melting curves of DNA standards containing 100% of their cytosine as either unmodified cytosine (C), 5-methylcytosine (5-mC), or 5-hydroxymethylcytosine (5-hmC) were analyzed by high resolution melting (HRM). Samples were done in triplicate and averages were plotted. (B) Tm's were calculated by finding the 50% relative fluorescence levels.

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The 5-mC containing DNA showed a dramatic increase in DNA melting temperature, on the other hand, the 5-hmC showed a dramatic decrease in DNA melting temperature (Fig 1A). When the 50% DNA melting point was used for measurement, 5-mC could increase the effective DNA denaturation temperature by 6°C while 5-hmC decreased the effective DNA denaturation temperature by over 2°C in relation to native C. When measuring 5-hmC vs 5-mC, the melting temperature difference was shown to be over 8°C for the same DNA (Fig 1B).

The above observed results were demonstrated using a relatively large DNA fragment (897bp) and represented the collective effect of the whole fragment.

Next, we measured the single cytosine base modification effect on dsDNA stability. To do this, a synthetic 52bp template was designed with a modified C in the middle (Figure 2A). In this set up, the DNA melting temperature changes will result from the effect of the single modified base. As shown in Figure 2B, the effect of the DNA melting temperature could be observed reproducibly, even on a single base modification. This demonstrates that the modifications are affecting the strength of the C:G base pairing. Clearly the 5-hmC:G bond is noticeably weaker than the 5-mC:G bond and the normal C:G bond strength is somewhere in between. This and several other experiments (data not shown here) showed similar results, all of which concluded that the 5-mC increases the dsDNA stability.

A

Template

CACTATCATAAATAAATATTATAA →

GTGATAGTATTTATTTATAATATTTCGACTCTACAACTCTATTCACCAAACA

B

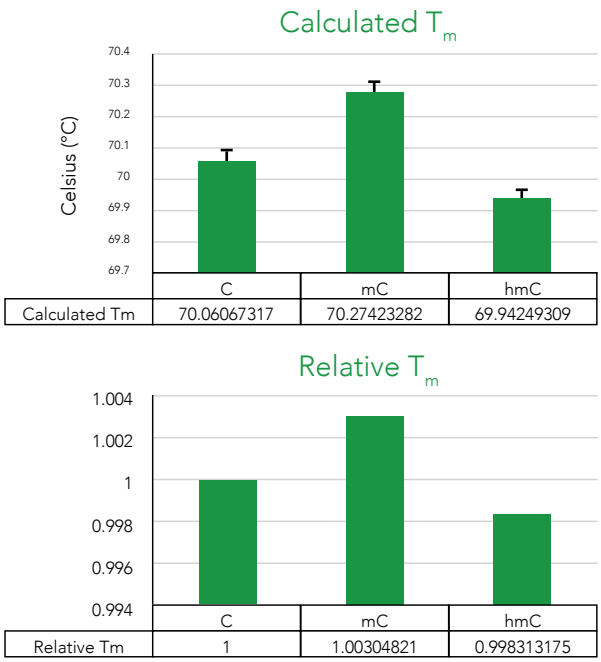
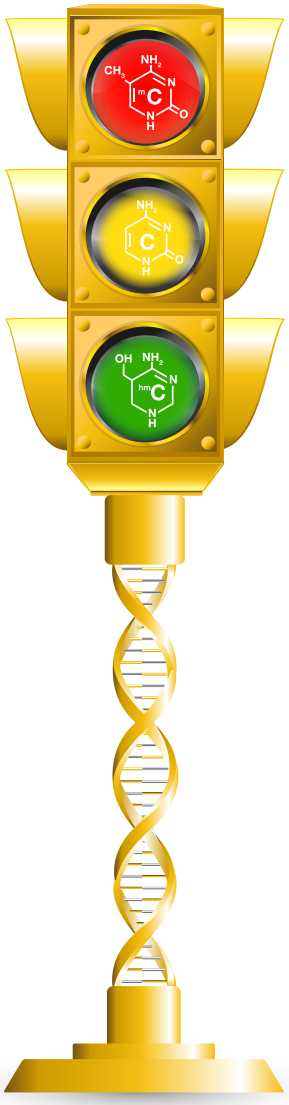


Figure 2. 5-Hydroxymethylcytosine decreases thermodynamic stability of DNA
Procedure: Template was created by primer extension with a dNTP mix containing either cytosine, 5-methylcytosine, or 5-hydroxymethylcytosine. (A) Templates were designed to incorporate either cytosine on the extended strand. Template strand (bottom strand 52mer) and elongation primer (italicized bold 24mer). (B) Melting curves were analyzed by high resolution melting (HRM). Tm's were calculated by finding the 50% relative fluorescence levels.

Conclusions

Taken together, these results present a unique view of the dynamics of epigenetic modifications. The cytosine modifications not only cause structural changes on the DNA backbone, which may affect the protein binding directly due to the changed chemical structure, but these modifications can also affect the stability of the double helix directly. It is well known that DNA unwinding is an essential step in transcription initiation and DNA replication. It is conceivable that the cytosine mC and hmC modifications also serve as a DNA intrinsic "molecular switch." We call this the Double Helix Epigenetic Switch™ for its potential to be in a locked, neutral and unlocked status. Thus, cytosine epigenetic modifications give dsDNA another coding dimension beyond the primary code. Together, genetic and epigenetic information render dsDNA into life's blueprint.



Like the lights on a traffic signal, 5-mC is generally associated with gene silencing whereas 5-hmC often acts as the green light for gene transcription. The Double Helix Epigenetic Switch™ serves as a lock, neutral and unlock mechanism giving dsDNA another coding dimension beyond the canonical genetic codes.

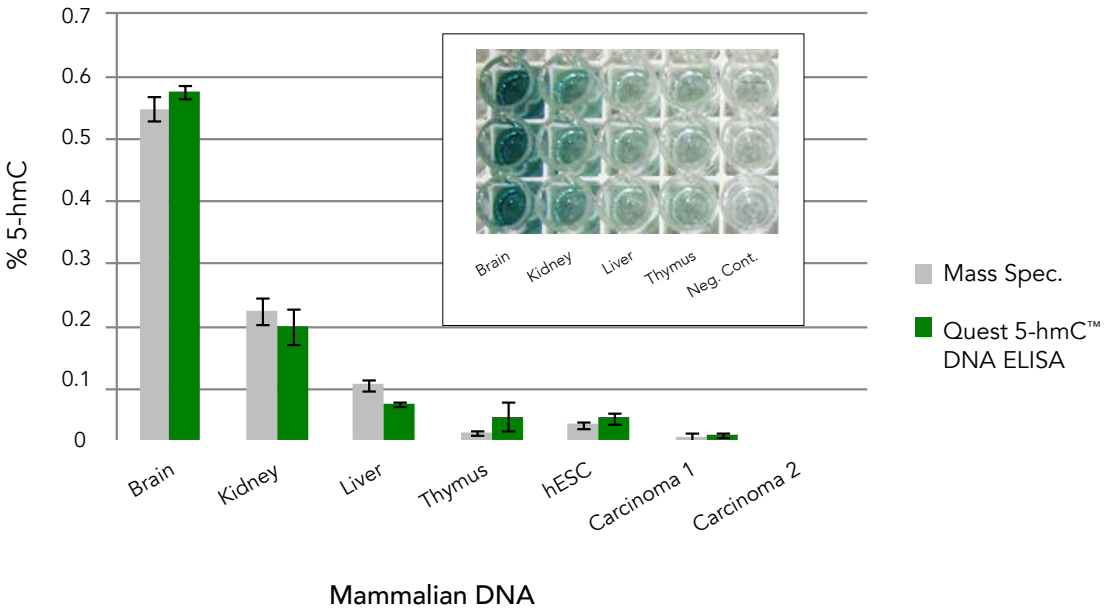
Quest 5-hmC™ DNA ELISA Kit

Highlights

- *Sensitive and specific quantitation of 5-hydroxymethylcytosine (5-hmC) DNA from a variety of samples.*
- *Ideal for global 5-hmC detection, tissue-specific 5-hmC quantitation, high-throughput compound screening, and more.*
- *Streamlined workflow can be completed in as little as 3 hours.*

Description

Ideal for sensitive and specific quantitation, the Quest 5-hmC™ DNA ELISA Kit is and can be used to accurately detect 5-hmC DNA in a variety of samples. The kit is compatible with a wide range of input DNA, including intact genomic DNA as well as enzyme-digested and mechanically sheared fragments. The control DNA set included with this kit has been calibrated to accurately quantify the percent 5-hmC in sample DNA by use of a standard curve. The fast, streamlined workflow is ideal when analyzing and screening large numbers of samples.



5-hmC Quantification. Percent 5-hmC in mammalian DNA samples quantified by mass spectrometry or Quest 5-hmC™ ELISA Kit. Inlaid image represents relative amounts of 5-hmC in triplicate gDNA samples.

Product	Cat. No.	Size	Specifications	Uses
Quest 5-hmC™ DNA ELISA Kit	D5425	1 x 96 rxns.	DNA Input: 25 - 200 ng Detection: ≥ 0.02% 5-hmC per 100 ng Assay Time: 3 - 4 hours	Global 5-mC detection and quantitation
	D5426	2 x 96 rxns.		

Anti-5-hmC Polyclonal Antibody

Highlights

- *High sensitivity to low levels of 5-hydroxymethylcytosine DNA.*
- *No detectable cross reactivity with cytosine and 5-methylcytosine.*

Description

The rabbit Anti-5-hmC Polyclonal Antibody can robustly distinguish between hydroxymethylated DNA and methylated or unmodified DNA with limited to no cross-reactivity. The antibody has been validated in ELISA and immunoprecipitation-based enrichment assays, and is suitable for use in further applications including immunohistochemical labeling and chromatographic blotting.

Quest 5-hmC Detection Kits™

Highlights

- *Method to distinguish 5-hydroxymethylcytosine (5-hmC) within a specific locus.*
- *Convenient and reliable single tube reaction format.*
- *Compatible with various downstream applications (e.g. end-point PCR, qPCR, Next-Generation sequencing, etc.) for complete analysis and quantification of 5-hmC.*

Description

The Quest 5-hmC Detection Kit™ allows for locus-specific detection of 5-hydroxymethylcytosine (5-hmC) using a simple and efficient reaction setup. Traditional methods cannot distinguish 5-hmC from 5-methylcytosine (5-mC). This kit features a robust and highly specific 5-hmC glucosyltransferase enzyme to specifically tag 5-hmC sites, yielding the modified base, glucosyl-5-hydroxymethylcytosine (g-5-hmC).

After glucosylation of 5-hmC, digestion of DNA with g-5-hmC sensitive restriction endonucleases (GSREs) allow 5-hmC to be differentiated from 5-mC. GSREs can efficiently digest DNA when a cytosine, 5-mC, or 5-hmC is present in their recognition site, but it is sensitive to the presence of g-5-hmC. By exploiting this sensitivity, the 5-hmC level of a specific locus can be interrogated by utilizing various downstream applications (e.g. end-point PCR, qPCR, Next-Generation sequencing, etc.).

Product	Cat. No.	Size	Specifications	Uses
Anti-5-Hydroxymethylcytosine Polyclonal Antibody	A4001-25	25 µg/25 µl	Source: Rabbit Isotype: IgG1 Concentration: 1 mg/ml Buffer: PBS at pH 7.5 Storage: -20°C	Immunoprecipitation for 5-hmC DNA; ELISA; Immunoblotting; Immunoflourescence
	A4001-50	50 µg/50 µl		
	A4001-200	200 µg/200 µl		
Quest 5-hmC™ DNA Detection Kit (includes MspI GSRE)	D5410	25 preps.	DNA Input: 100 ng - 1 µg Sequencing Platform Compatibility: Illumina® Truseq® Chemistries, HiSeq® and MiSeq® platforms	5-hmC DNA detection
	D5411	50 preps.		
Quest 5-hmC™ DNA Detection Kit -Lite (GSRE not included)	D5415	25 preps.		
	D5416	50 preps.		

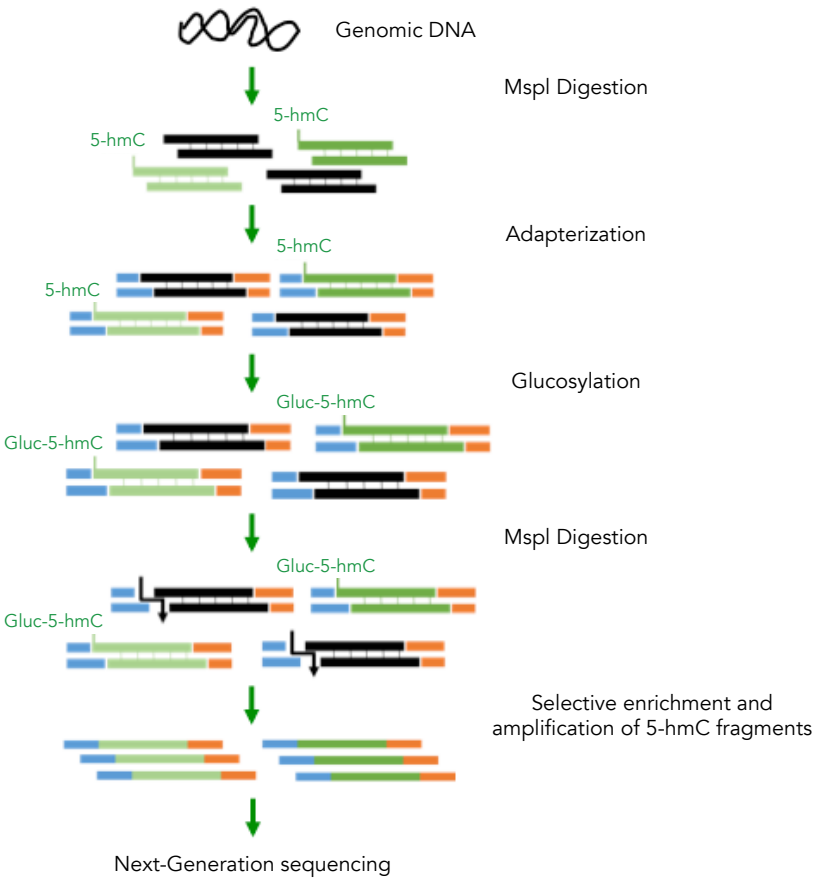
RRHP™ 5-hmC Library Prep Kit

Highlights

- *Innovative library preparation for strand-specific mapping of 5-hmC in DNA.*
- *Streamlined workflow accommodates low (≥100ng) DNA inputs.*
- *Libraries are ready for Next-Generation sequencing (Illumina-compatible).*

Description

The RRHP™ 5-hmC Library Prep Kit is an all-inclusive solution for analysis of genome-wide 5-hydroxymethylcytosine (5-hmC) positions at single-base resolution. The Reduced Representation Hydroxymethylation Profiling (RRHP) method is based on blocking MspI digestion by glucosylating 5-hmC within MspI recognition sites. Fragments lacking glucosylated 5-hmC at the adapter-ligation junction will be cleaved and not amplified by PCR. Therefore, only fragments containing 5-hmC will be successfully amplified and analyzed by Next-Generation Sequencing. Fragments with higher 5-hmC levels will be correlated with higher frequency of sequencing reads. RRHP bypasses the need for bisulfite conversion, which allow for DNA inputs as low as 100 ng, lower sequencing depth, and straight-forward bioinformatics processing.



Product	Cat. No.	Size	Specifications	Uses
RRHP™ 5-hmC Library Prep Kit	D5450	12 preps.	DNA Input: 100 ng - 1 µg Sequencing Platform Compatibility: Illumina® Truseq® Chemistries, HiSeq® and MiSeq® platforms	5-hmC DNA detection
	D5451	25 preps.		

Mirror-Seq™ 5-hmC Library Prep Kit

Highlights

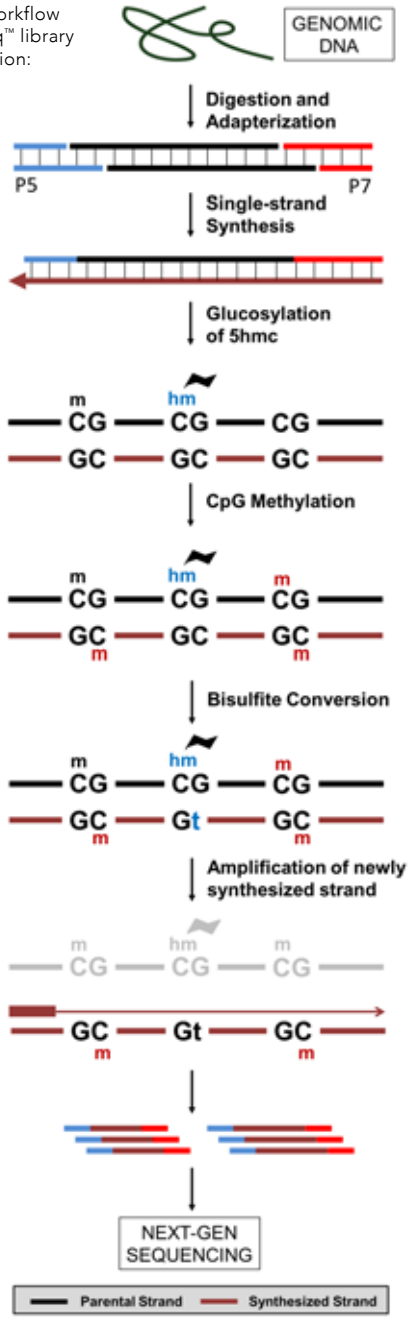
- *Single-base, quantitative detection of 5-hmC.*
- *All-inclusive kit for library preparation.*
- *Completed libraries are ready-to-sequence on Illumina® sequencing platforms.*
- *Includes library spike-in controls to monitor enzymatic reactions prior to sequencing.*
- *Compatible down to 100 ng genomic DNA.*

Description

The Mirror-Seq™ 5-hmC Library Prep Kit is a comprehensive solution for preparing libraries for Next-Generation sequencing of 5-hydroxymethylcytosine (5-hmC). Mirror-Seq™ is a novel method that (Figure 1) is capable of detecting various levels of 5-hmC at single-base resolution (Figure 2). The method interrogates 5-hmC sites by first synthesizing a new strand to mirror the parental strand and, therefore, generating a semi-conservative duplex. Glucosylation of 5-hmC in the parental strand inhibits M.SssI methylation of the complementary CpGs on the synthesized strand. After bisulfite conversion, any thymine present on the synthesized strand indicates the presence of a 5-hmC in the original parental strand.

The Mirror-Seq™ 5-hmC Library Prep Kit includes all of the components required for preparation and purification of libraries. The kit includes the MspI restriction enzyme to enrich for areas of the genome that have high CpG content. Therefore, sequencing results can be overlapped with classical RRBS to determine the methylation profile of a specific cytosine.

Figure 1: Workflow for Mirror-Seq™ library preparation:



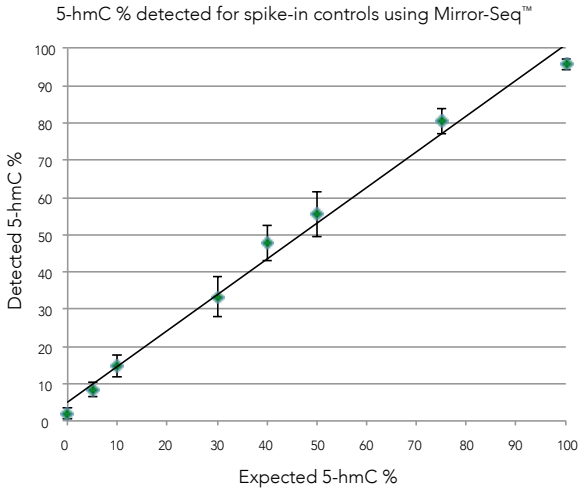


Figure 2: Mirror-Seq™ can detect various level of 5-hmC. Controls with different levels of 5-hmC (ranging from 0-100%) at a single CG site were spiked into genomic DNA prior to Mirror-Seq™ library preparation. The results are averages of six different library preparation.

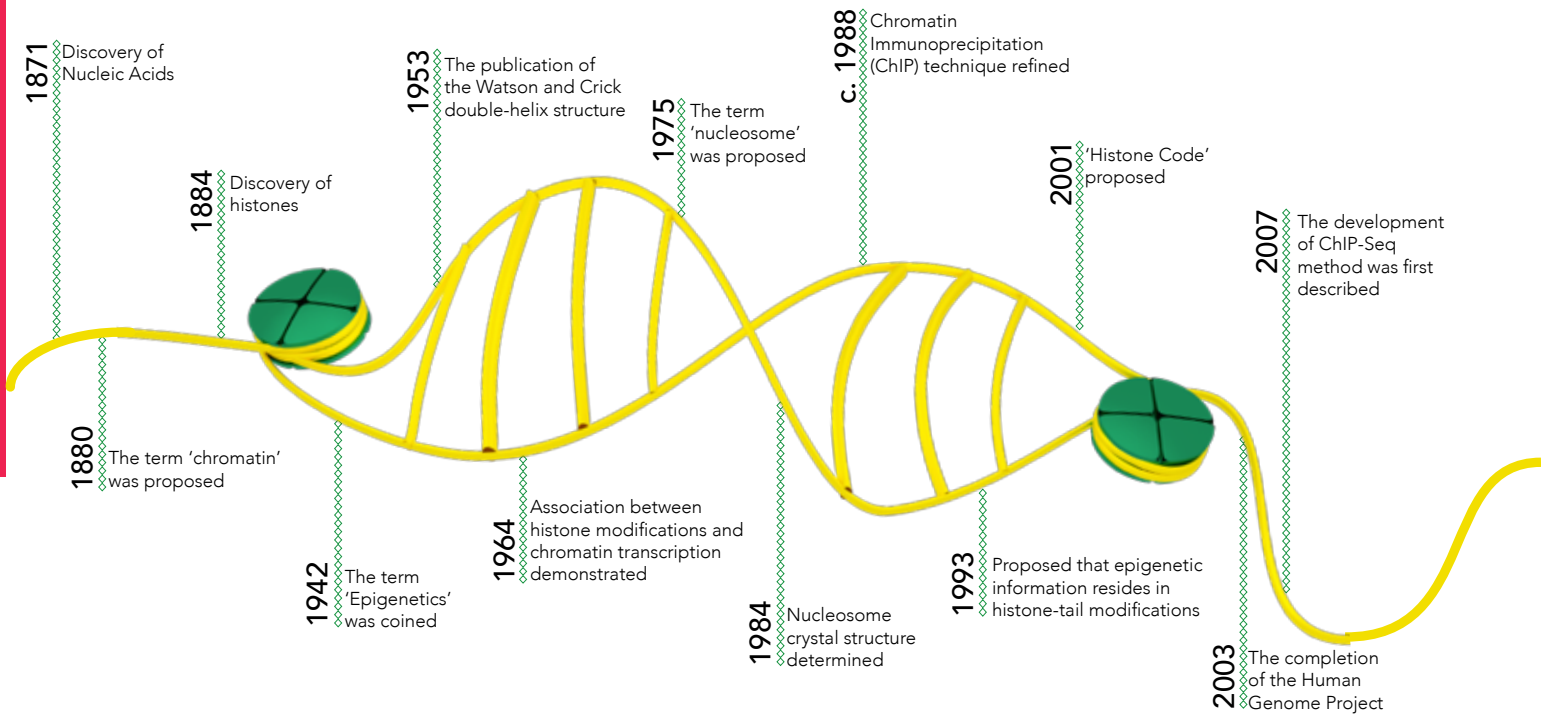
Product	Cat. No.	Size	Specifications	Uses
Mirror-Seq™ 5-hmC Library Prep Kit	D5457	Inquire	DNA Input: 100 ng - 1 µg Sequencing Platform Compatibility: Illumina® Truseq® Chemistries, HiSeq® and MiSeq® platforms	5-hmC DNA detection
	D5458	Inquire		

Chromatin Overview

The field of epigenetics has grown tremendously over the past several decades. Chromatin analyses have been a staple in the field for studying protein-DNA interactions and continue to be at the forefront of understanding cellular processes and disease.

Chromatin analyses use a wide-range of techniques to study nucleosome positions, histone modifications, transcription factors, DNA regulatory proteins, and chromatin structure. These tools are essential for studying everything from development, neurological disorders, and even cancer. While chromatin immunoprecipitation (ChIP) remains the prevailing method used for studying protein-DNA interactions and the dynamics of epigenetic modifications, other techniques such as nucleosomal mapping and chromosome conformation capture are proving to be extremely useful.

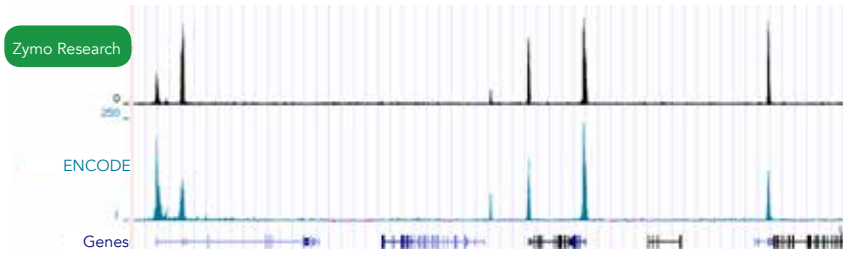
Chromatin history: Our View from the Bridge
Donald E. Olins & Ada L. Olins Nature Reviews Molecular Cell Biology 4, 809-814 (October 2003)
doi:10.1038/nrm1225



Zymo-Spin™ ChIP Kit

Highlights

- *Robust immunoprecipitation and purifiction of DNA.*
- *Unique workflow features a micro-elution (≥6 µl) spin column for purification of ChIP DNA.*
- *High-quality ChIP DNA is ideal for ChIP-qPCR, ChIP-Seq, and other molecular applications.*



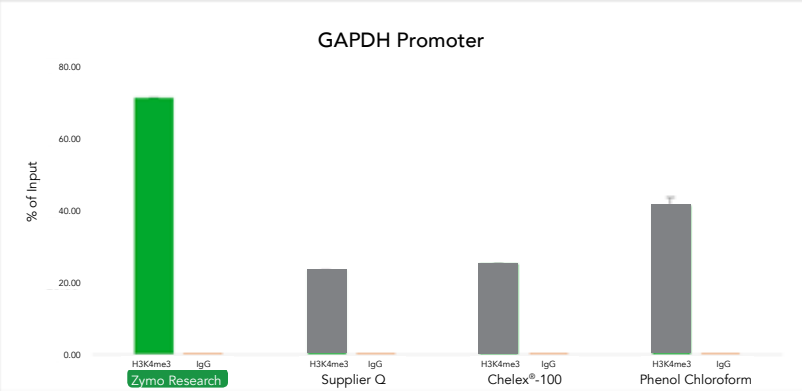
ENCODE Quality ChIP Workflow: Browser tracks depicting H3K4me3 ChIP-Seq assay using the Zymo-Spin™ ChIP Kit. Peaks overlap the same sites identified at the Broad Institute of MIT and Harvard as part of the ENCODE project.

Product	Cat. No.	Size	Specifications	Uses
Zymo-Spin™ ChIP Kit	D5209	10 preps.	Sample Source: Mammalian Cells	Chromatin Immunoprecipitation (ChIP)
	D5210	25 preps.		

ChIP DNA Clean & Concentrator® Kits

Highlights

- *Two minute DNA clean-up from any step in a standard ChIP protocol.*
- *DNA is ideal for PCR, arrays, DNA quantification, Southern blot analysis, sequencing, and other molecular applications.*

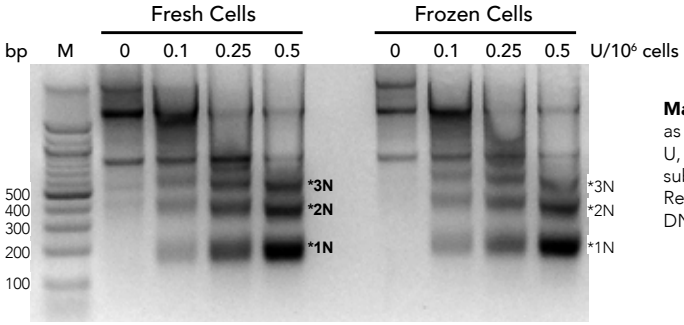


ChIP DNA Purification Comparison: ChIP assays were performed with HeLa cells using ChIP-grade anti-H3K4me3 and rabbit IgG antibodies. Both total and immunoprecipitated chromatin were reverse cross-linked and recovered using either the ChIP DNA Clean & Concentrator® (included in the Zymo-Spin™ ChIP Kit), DNA recovery kit from Supplier Q, Chelex®-100 protocol or phenol-chloroform extraction. The amount of ChIP DNA was determined using qPCR with primers specific to the GAPDH promoter. ChIP DNA enrichment is graphed as % input.

EZ Nucleosomal DNA Prep Kit

Highlights

- *For the isolation of nucleosome-associated DNA from fresh or frozen cells.*
- *Ideal for use in nucleosome mapping studies.*
- *Contains Atlantis dsDNase that replaces conventional micrococcal nuclease for nucleosomal DNA preparation.*
- *Atlantis dsDNase digestion yields homogenous populations of core nucleosomes.*



Mammalian Nucleosomal DNA Preparation: Mammalian nuclei prepared as indicated by the Mammalian Nuclei Prep Protocol was treated with 0.1 U, 0.25 U, and 0.5 U (unit) Atlantis dsDNase for the 20 min at 42°C. DNA was subsequently resolved in a 2% agarose gel. M is a 100 bp DNA ladder (Zymo Research). Asterisks (1N, 2N, 3N) represent mono-, di-, and tri-nucleosomal DNAs, respectively.

Product	Cat. No.	Size	Specifications	Uses
ChIP DNA Clean & Concentrator® (uncapped columns)	D5201	50 preps.	Format: Spin-Column Elution Volume: ≥ 6 µl DNA Size Limit: 50 bp - 23 kb DNA Recovery: 50 bp - 10 kb 70-90%; > 10 kb 70% Binding Capacity: 5 µg Processing Time: 2 minutes	DNA purification from any step in a ChIP assay
ChIP DNA Clean & Concentrator® (capped columns)	D5205	50 preps.		
ZR-96 ChIP DNA Clean & Concentrator®	D5206	2 x 96 preps.	Format: 96-Well Elution Volume: ≥ 10 µl DNA Size Limit: 50 bp - 23 kb DNA Recovery: 50 bp - 10 kb 70-90%; > 10 kb 70% Binding Capacity: 5 µg Processing Time:15 minutes	
	D5207	4 x 96 preps.		
EZ Nucleosomal DNA Prep Kit	D5220	20 preps.	Enzyme Concentration: 0.1 U/µl Storage: -20°C Inactivation: 5X MN Stop Buffer Standard Reaction Time: 45 minutes	Compatible in mammalian cells, yeast, and nuclei

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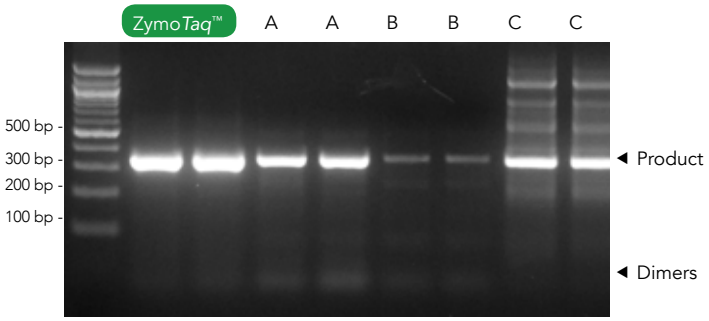
Zymo*Taq*™ DNA Polymerase

Highlights

- *Hot-start DNA polymerase for robust product formation.*
- *Reduces non-specific PCR product formation from difficult templates (e.g., bisulfite-converted DNA).*
- *Compatible with real-time, quantitative PCR, and suitable for TA-cloning.*

Description

Zymo*Taq*™ DNA Polymerase is a hot-start polymerase that is ideal for amplification of bisulfite-converted DNA. Since it is a heat-activated, thermostable DNA polymerase, Zymo*Taq*™ reduces primer dimer and non-specific product formation, whereas conventional polymerases typically exhibit these problems with bisulfite-converted DNA templates. In addition to the amplification of bisulfite-treated DNA for methylation detection, Zymo*Taq*™ DNA polymerase can be used for conventional PCR and real time PCR. The enzyme also has 3′-terminal transferase activity, making it ideal for use in TA-cloning by the addition of "A" overhangs to amplified DNA.



PCR products of immunoprecipitated, methylated DNA vary depending on the hot-start polymerase used. Methylated DNA was immunoprecipitated using the Methylated-DNA IP Kit. DNA (post-IP) was used in a PCR assay comparing Zymo Research's hot-start Zymo*Taq*™ polymerase vs. that of three other suppliers (A, B, and C). Expected amplicon size is 350 bp. PCR products (in duplicate) were separated in a 2.0% (w/v) agarose TAE/EtBr gel. The use of Zymo*Taq*™ generated specific, robust products with minimal non-specific banding compared to others.

Product	Cat. No.	Size	Specifications	Uses
Zymo*Taq*™ DNA Polymerase	E2001	50 rxns.	Provided as a PreMix or as part of a set Enzyme Concentration: 4 U/50 µl One unit (U) is defined as the amount of enzyme required for the incorporation of 10nM dNTPs into an acid-insoluble form in 30 minutes at 72°C	Amplification of bisulfite-converted & CpG rich DNA; Amplification of DNA; TA cloning
	E2002	200 rxns.		
Zymo*Taq*™ PreMix	E2003	50 rxns.		
	E2004	200 rxns.		
Zymo*Taq*™ qPCR PreMix	E2054	50 rxns.		
	E2055	200 rxns.		

Quest*Taq*™ PreMix

Highlights

- *Premixed reagents ideal for PCR or real-time PCR analysis.*
- *Ideal for robust, non-biased amplification of 5-mC, 5-hmC, and g5-hmC modified DNA.*
- *Compatible with a range of fluorescent dyes for use in real-time PCR.*

Description

Quest*Taq*™ PreMix is supplied as a convenient 2X concentrated "master mix" containing all the reagents (i.e., dNTPs, MgCl2, and enhancers) necessary for robust PCR with little or no by-product formation. The Quest*Taq*™ PreMix has been optimized for the non-biased amplification of cystosine, 5-mC, 5-hmC, and glucosyl-5-hydroxymethylcytosine (g-5-hmC) containing DNA, ensuring high yield amplification across a wide range of templates. The Quest*Taq*™ PreMix differs from Quest*Taq*™ qPCR PreMix, in that it excludes SYTO®9 dye from the PreMix solution. It is compatible with real-time and quantitative PCR using fluorescent dyes of the researcher's choosing.

Quest*Taq*™ consistently yields robust amplicons from DNA templates having modified/unmodified cytosines. The figure shows the level (intensity) of an ~900 bp product generated from DNA templates using Quest*Taq*™ PreMix and the polymerases from Suppliers X and Y. Lanes correspond to amplicons from template DNA containing: unmodified cytosine (c), 5-methylcytosine (m), 5-hydroxymethylcytosine (h), or glucosyl-5-hydroxymethylcytosine (g). (M) is a 1 kb DNA Marker.

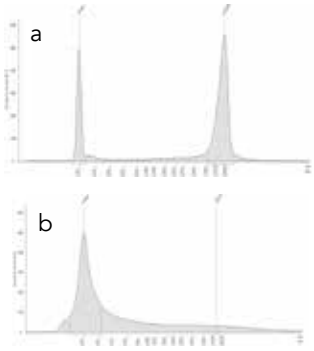
DNA Degradase™ & DNA Degradase Plus™

Highlights

- *One hour, single-enzyme digest vs. conventional 6 - 16 hour multi-step enzyme digestion protocols.*
- *Quick and simple procedure for completely degrading DNA into its individual nucleotide (DNA Degradase™) or nucleoside (DNA Degradase Plus™).*
- *Digested products suitable for downstream analysis by global quantitative methods including HPLC, TLC, and LC-MS.*

Description

DNA Degradase™ and DNA Degradase Plus™ are nuclease mixes that quickly and efficiently degrade DNA to its individual nucleotide or nucleoside components, respectively. DNA Degradase™ is ideal for global DNA methylation analysis, including hydroxymethylation and other demethylation intermediate products, by a number of downstream applications (i.e., LC-MS, HPLC, TLC, etc.). Digestion with the enzyme is a simple single-step procedure that works faster than other available methods.



DNA Degradase Plus™ efficiently degrades DNA. Mouse brain DNA (1 µg) was digested with 5 U of DNA Degradase Plus™ for 1 hr at 37°C and analyzed using Agilent 2200 TapeStation®. Electropherogram of control DNA (a) and DNA Degradase Plus™ digested DNA (b).

Product	Cat. No.	Size	Specifications	Uses
Quest*Taq*™ PreMix	E2050	50 rxns.	Enzyme Concentration: 2 U/10 µl One unit (U) is defined as the amount of enzyme required for the incorporation of 10nM dNTPs into an acid-insoluble form in 30 minutes at 72°C	Non-biased amplification of 5-mC, 5-hmC, g-5-hmC DNA
	E2051	200 rxns.		
Quest*Taq*™ qPCR PreMix	E2052	50 rxns.		
	E2053	200 rxns.		
DNA Degradase™	E2016	500 U	Enzyme Concentration: 10 U/ µl Storage: -20°C Inactivation: 70°C for 20 minutes Standard Reaction Time: 1 hour One unit (U) is defined as the amount of enzyme required to degrade 1 µg of λ DNA in a total reaction volume of 25 µl for 1 hour at 37°C.	Complete digestion of DNA into individual nucleotide/nucleoside components
	E2017	2,000 U		
DNA Degradase Plus™	E2020	250 U	Enzyme Concentration: 5 U/ µl Storage: -20°C Inactivation: 70°C for 20 minutes Standard Reaction Time: 1 hour	
	E2021	1,000 U		

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CpG Methylase (M.SssI)

Highlights

- *For complete, in vitro methylation of DNA for methylation analysis.*
- *Methylation of chromatin DNA for DNA accessibility studies.*
- *Inhibition of endonucleases with overlapping CpG sequence recognition.*
- *[^{3}H]-labeling of DNA.*

Description

Zymo Research's CpG Methylase completely methylates all cytosines (C5) in double-stranded, non-methylated, and hemimethylated DNA possessing a dinucleotide sequence 5'…CpG…3'. The recombinant methylase is isolated from an *E. coli* strain that expresses the methyltransferase gene from Spiroplasma sp. strain MQ1. Reaction conditions have been optimized to maximize the processivity of the enzyme to ensure rapid, complete, and reproducible methylation of DNA for accurate DNA methylation analysis. This product is supplied with 10X Reaction Buffer and S-adenosylmethionine cofactor.

GpC Methylase (M.CviPI)

Highlights

- *For complete, in vitro methylation of DNA for methylation analysis.*
- *Methylation of chromatin DNA for DNA accessibility studies.*
- *Inhibition of endonucleases with overlapping GpC sequence recognition.*
- *[^{3}H]-labeling of DNA.*

Description

Our GpC Methylase completely methylates all cytosines within a 5'…GpC…3' context in double-stranded DNA. The enzyme is specific for both non-methylated and hemimethylated DNA. The recombinant GpC Methylase is isolated from an *E. coli* strain that expresses the methyltransferase gene from Chlorella virus. The reaction conditions are optimized to maximize the processivity of the enzyme to ensure rapid, complete, and reproducible methylation of DNA for accurate DNA methylation analysis. This product is supplied with 10X Reaction Buffer and S-adenosylmethionine cofactor.

Product	Cat. No.	Size	Specifications	Uses
CpG Methylase (M.SssI)	E2010	200 U	Enzyme Concentration: 4 U/ µl Storage: -20°C Inactivation: 65°C for 20 minutes Standard Reaction Time: 2 hours One unit (U) is defined as the amount of enzyme required to protect 1 µg of λ DNA against cleavage by BstUI restriction endonuclease in a total reaction volume of 20 µl for 1 hour at 37°C.	*In vitro* methylation of DNA
	E2011	400 U		
GpC Methylase (M.CviPI)	E2014	200 U	Enzyme Concentration: 4 U/ µl Storage: -20°C Inactivation: 65°C for 5 minutes Standard Reaction Time: 2 hours One unit (U) is defined as the amount of enzyme required to protect 1 µg of λ DNA against cleavage by HaeIII restriction endonuclease in a total reaction volume of 20 µl for 1 hour at 37°C.	*In vitro* methylation of DNA
	E2015	1,000 U		

dsDNA Shearase™ Plus

Highlights

- *The simplest method for generating random-ended dsDNA fragments.*
- *Fragment size is conveniently controlled by adjusting the enzyme concentration.*
- *dsDNA Shearase™ Plus-generated fragments are ideal for library construction, Next-Generation sequencing, and methylated DNA immunoprecipitation (MeDIP).*

Description

Digestion with dsDNA Shearase™ Plus is the simplest method for DNA fragmentation, as it circumvents the use of otherwise costly and cumbersome mechanical shearing devices. dsDNA Sherase™ Plus is an endonuclease that cleaves phosphodiester bonds in DNA to yield oligonucleotides with 5′-phosphate and 3′-hydroxyl termini. It has a particularly strong preference for double-stranded DNA (dsDNA) and generates random-ended DNA fragments of the desired size in a single step. Sequencing data demonstrates that this enzyme does not introduce any detectable bias in the sequencing library preparation. It is compatible with low volume inputs, thus minimizing sample loss. Digested DNA is easily purified in ≥ 6 µl with recommended DNA Clean & Concentrator® technology (p. 84) making it ideal for use in end modification (linker & adapter) procedures and other applications.

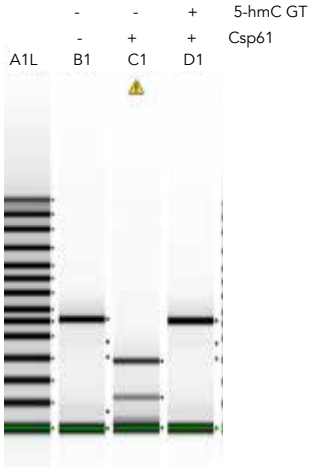
5-hmC Glucosyltransferase

Highlights

- *Highly processive enzyme for specific modification of 5-hydroxymethylcytosine (5-hmC) with a glucose moiety.*
- *Ideal for locus specific and global quantification of hydroxymethylated DNA.*

Description

The 5-hmC Glucosyltransferase is a highly active enzyme that specifically tags 5-hydroxymethylcytosine in DNA with a glucose moiety yielding glucosyl-5-hydroxymethylcytosine, which in turn can be used for sequence specific, genome-wide, or global 5-hmC detection.



5-hmC Glucosyltransferase demonstrates high activity and specificity. 1 µg of 5-hmC Control DNA (Cat #D5405) was incubated with 4 U of 5-hmC Glucosyltransferase for 1 hour at 37°C and digested with 10 U Csp61. Results analyzed using Agilent 2200 TapeStation® show digestion of DNA not treated with 5-hmC Glucosyltransferase (C1) and no digestion of DNA treated with 5-hmC Glucosyltransferase indicating all 5-hmC residues were fully glucosylated (D1).

Product	Cat. No.	Size	Specifications	Uses
dsDNA Shearase™ Plus	E2018-50	50 U	Enzyme Concentration: 1 U/µl Storage: -20°C Inactivation: 65°C for 5 minutes Standard Reaction Time: 20 minutes One unit (U) is defined as the amount of enzyme required to protect 1 µg of λ DNA against cleavage by HaeIII restriction endonuclease in a total reaction volume of 20 µl for 1 hour at 37°C.	DNA fragmentation
	E2018-200	200 U		
dsDNA Shearase™ Plus with DNA Clean & Concentrator®-5	E2019-50	50 U + 50 preps.		
	E2019-200	200 U + 200 preps.		
5-hmC Glucosyltransferase	E2026	100U	Enzyme Concentration: 2 U/ µl Storage: -20°C Standard Reaction Time: 2 hours One unit (U) is defined as the amount of enzyme needed to protect 1 µg of 5-hmC DNA Standard (D5405-3, p. 125) from Csp6I digestion.	5-hmC detection; 5-hmC enrichment
	E2027	200U		

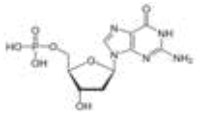
dNTPs

Highlights

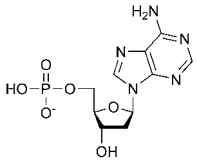
- *Ready to use dNTP Mix (dATP, dTTP, dGTP, dCTP) of ultra high purity; >99% trisphosphate by HPLC.*
- *Readily incorporated into PCR amplicons with ZymoTaq™, QuestTaq™ or other DNA polymerases.*
- *Free of endo-, exodeoxyribonuclease, ribonuclease, phosphatase and nicking activities.*

Description

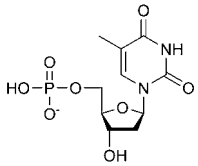
dNTP Mix and dATP, dTTP, dGTP, dCTP from Zymo Research are of ultra-high purity and can be used to generate DNA by PCR using Zymo*Taq*™ or other DNA polymerases.



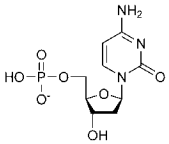
dGTP



dATP



dTTP



dCTP

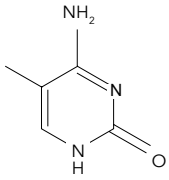
Methylated & Hydroxymethylated Nucleotides

Highlights

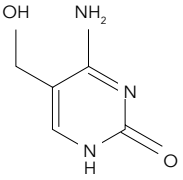
- *Ready to use 5-Hydroxymethylcytosine mix (dATP, dTTP, dGTP, d5hmCTP) and 5-Methylcytosine dNTP mix (dATP, dTTP, dGTP, d5mCTP) is of ultra-high purity; >99% trisphosphate by HPLC.*
- *Readily incorporated into PCR amplicons with ZymoTaq™, QuestTaq™ or other DNA polymerases.*
- *Free of endo-, exodeoxyribonuclease, ribonuclease, phosphatase and nicking activities.*

Description

Methylated & hydroxymethylated nucleotides are of ultra-high purity and can be used to generate DNA by PCR using Zymo*Taq*™, Quest*Taq*™ or other DNA polymerases.



5-mC



5-hmC

Product	Cat. No.	Size	Uses
dNTP Mix (10 mM)	D1000	500 µl	PCR mixes
	D1000-1	100 µl	
dATP (100 mM)	D1005	250 µl	
dTTP (100 mM)	D1010	250 µl	
dGTP (100 mM)	D1015	250 µl	
dCTP (100 mM)	D1020	250 µl	
5-Methylcytosine dNTP Mix (10 mM)	D1030	250 µl	
5-Methyl dCTP (10 mM)	D1035	100 µl	
5-Hydroxymethylcytosine dNTP Mix (10 mM)	D1040	250 µl	
5-Hydroxymethyl dCTP (100 mM)	D1045	100 µl	


Apple
(Malus domestica)


Alligator
(Alligator mississippiensis)


Cow
(Bos taurus)


Barrel Clover
(Medicago truncatula)


Chicken
(Gallus gallus domesticus)


Platypus
(Ornithorhynchus anatinus)


Salmon
(Salmo salar)


Rat
(Rattus norvegicus)


Mouse
(Mus musculus)

Explore Epigenomics

with Next-Gen sequencing services

Shown here are some of the diverse species analyzed by our team


Human
(Homo sapien)


Baboon
(Papio anubis)


Dog
(Canis lupus familiaris)


Oppossum
(Didelphimorphia)


Zebra Finch
(Taeniopygia guttata)


Fruit Fly
(Drosophila melanogaster)


Bean
(Phaseolus vulgaris)


Wine Grape
(Vitis vinifera)


Pig
(Sus scrofa domesticus)

Explore Epigenomics with the Most Comprehensive Services for Epigenetic Analysis!

Following the publication of the sequence of the human genome in 2001, and more recently the ENCODE Project in 2012, it has become clear that genes and chromatin are far more complicated than previously anticipated. DNA once believed to be "junk" has been found to code for specific non-coding transcripts and to contain important regulatory elements. It is now apparent that investigating one or a few genes is no longer sufficient to answer the questions currently posed by researchers in the fields of molecular biology, genetics, and systems biology. Genome-wide genetic and epigenetic analyses need to be considered for complete assessment of the regulation of cellular processes.

Zymo Research makes these analyses available to every researcher with a repertoire of genome-wide services. All Next-Gen Epigenetic Services feature state-of-the-art sample prep technologies, Illumina® certified sequencing, cutting-edge bioinformatics, and competitive pricing. All services can be combined for the most comprehensive analysis possible. Zymo Research's Epigenetic Services can be applied to a broad range of sample sources including human, mouse, plant, platypus, spotted hyena, and more! Let Zymo Research do the work for you and receive customizable, publication-ready data.

The scientists at Zymo Research have been developing industry leading epigenetic technologies and workflows for more than a decade. Zymo Research remains committed to pioneering new research tools and services to meet the future challenges of the rapidly growing field of epigenetics. Explore epigenomics with Zymo Research today!

illumina CSPro CERTIFIED SERVICE PROVIDER

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All services are customizable and can be combined to suit your needs!
Please contact us at services@zymoresearch.com to inquire today.

1 Epigenetic Services

Epigenetic Analysis

Expression Services

Microbiomic Services

Epigenetic Aging Clock Service

Additional Services

www.zymoresearch.com | info@zymoresearch.com | tel: (949) 679-1190 | toll-free: (888) 882-9682 | fax: (949) 266-9452

Epigenetic Biomarker Discovery Program

From Collection to Conclusion

Zymo Research offers a new Epigenetic Biomarker Discovery Program for the development of epigenetic lab diagnostic tests. Whether you are interested in developing epigenetic tests for cancer, developmental disorders, autoimmune diseases, obesity and other anomalies, Zymo Research provides a solution for sample collection through to commercial development. The experts at Zymo Research can help you at any step in the development pipeline by offering a portfolio of products and services for sample collection and purification, biomarker discovery, biomarker validation, platform selection and commercial development.

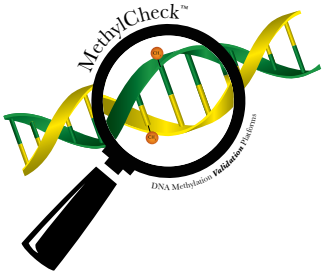
Sample Collection & Purification

Zymo Research offers specialized collection devices and purification kits for tissues, feces, urine, blood and other biological specimens. Sample collection begins with DNA/RNA Shield™ which is an innovative stabilization reagent that allows samples to be stored and transported at ambient temperatures. DNA/RNA Shield™ does not require the need for refrigeration or specialized equipment and makes shipping your precious specimens to Zymo Research easy.

Biomarker Discovery: Epigenetic NGS Services

With the latest Next-Generation sequencing technologies for DNA methylation analysis, Zymo Research provides comprehensive services and bioinformatics analysis to help discover epigenetic biomarkers in your specific sample set. Zymo Research's Illumina® certified MethylSeq® platforms are each designed to suite your specific coverage need.

Epigenetic Biomarker Validation



Zymo Research offers the simplest way to validate epigenetic biomarkers with our MethylCheck™ sequencing platform. Whether you have genome-wide DNA methylation (450K/850K array or RRBS) data or a particular gene region in mind, our scientists will design, validate, and evaluate site-specific DNA methylation changes.

Platform Selection

Once you have your specific biomarkers narrowed down and validated, Zymo Research will help you select the most sensitive and cost-effective platform for your lab diagnostic test. A wide range of citation-leading bisulfite and bisulfite-free methods are available to implement your test.

Commercial Development

PANGEA LABORATORY

Zymo Research's associates, Pangea™ CLIA-certified lab, will help you to bring your lab diagnostic test to the market.

Explore Epigenomics with Zymo Research and inquire today at www.zymoresearch.com/services

Epigenetic Analysis

5-mC DNA Methylation

Zymo Research offers four platforms for genome-wide DNA methylation analysis at single nucleotide resolution, each designed to suit your specific coverage needs. The main difference between the platforms is the percentage of the total genome actually being sequenced. All platforms accommodate a wide range of sample types, including any species with a reference genome, low-input (>10 ng), and FFPE samples.

Classic RRBS (Reduced Representation Bisulfite Sequencing) combines restriction enzyme digestion with bisulfite sequencing to enrich for a CpG-dense fraction of the genome. The Classic RRBS platform allows for a maximum amount of methylation data using a minimal amount of sequencing at a significantly reduced cost. This combination makes Classic RRBS the perfect platform for pilot studies. Classic RRBS covers ≥70% all CpG islands, >75% all gene promoters, and detects 1.5-2 million unique CpG sites at 5-10x average minimum coverage*.

Methyl-MiniSeq® is an expanded version of Classic RRBS. The system is extremely robust and the read depth is impressive, making it ideal for biomarker discovery using identification and analysis of differentially methylated regions. The low cost of this platform relative to the sequence data it produces also makes Methyl-MiniSeq® a good platform for pilot studies. Methyl-MiniSeq® covers ≥85% all CpG islands, >80% all gene promoters, and captures approximately 4 million unique CpG sites at 5-10x average minimum coverage*.

Methyl-MidiSeq® extends coverage to include a large majority of genetic regulatory elements (enhancers), gene bodies, and repeat DNA sequences that Classic RRBS and Methyl-MiniSeq® do not capture due to low CpG density in those regions. Methyl-MidiSeq® allows for the detection of 8-9 million unique CpG sites at 5-10x coverage.

Methyl-MaxiSeq® is a whole-genome bisulfite sequencing (WGBS) option that provides DNA methylation information at single nucleotide resolution in CpG, as well as in the less common CHG and CHH contexts, across all regions of the genome.

The Basic Service package for each platform includes sample standardization, library construction, sequencing, and raw data alignment. The Full Service package offers additional down-stream bioinformatics processing and statistical analysis.

*Coverage estimates based on the human genome.

Service Option	Classic RRBS	Methyl-MiniSeq®	Methyl-MidiSeq®	Methyl-MaxiSeq®
Capable with low DNA input?	Yes	Yes	Yes	Yes
Single-base Resolution?	Yes	Yes	Yes	Yes
Methylome Coverage*	1.5 - 2 million sites	3 - 4 million sites	8 - 9 million sites	Entire methylome
Quantitative Analysis?	Yes	Yes	Yes	Yes
Genomic Regions covered	Nearly all CpG islands and gene promoters	Twice as many unique CpG sites compared to Classic RRBS	Also includes gene bodies and regulatory regions (90% of enhancers)	Entire methylome
Notes	Efficient genome-wide analysis	Robust biomarker discovery	Expanded methylation analysis	Complete methylation analysis

* calculation based on human genome
** depends on capture efficiency and methylation levels

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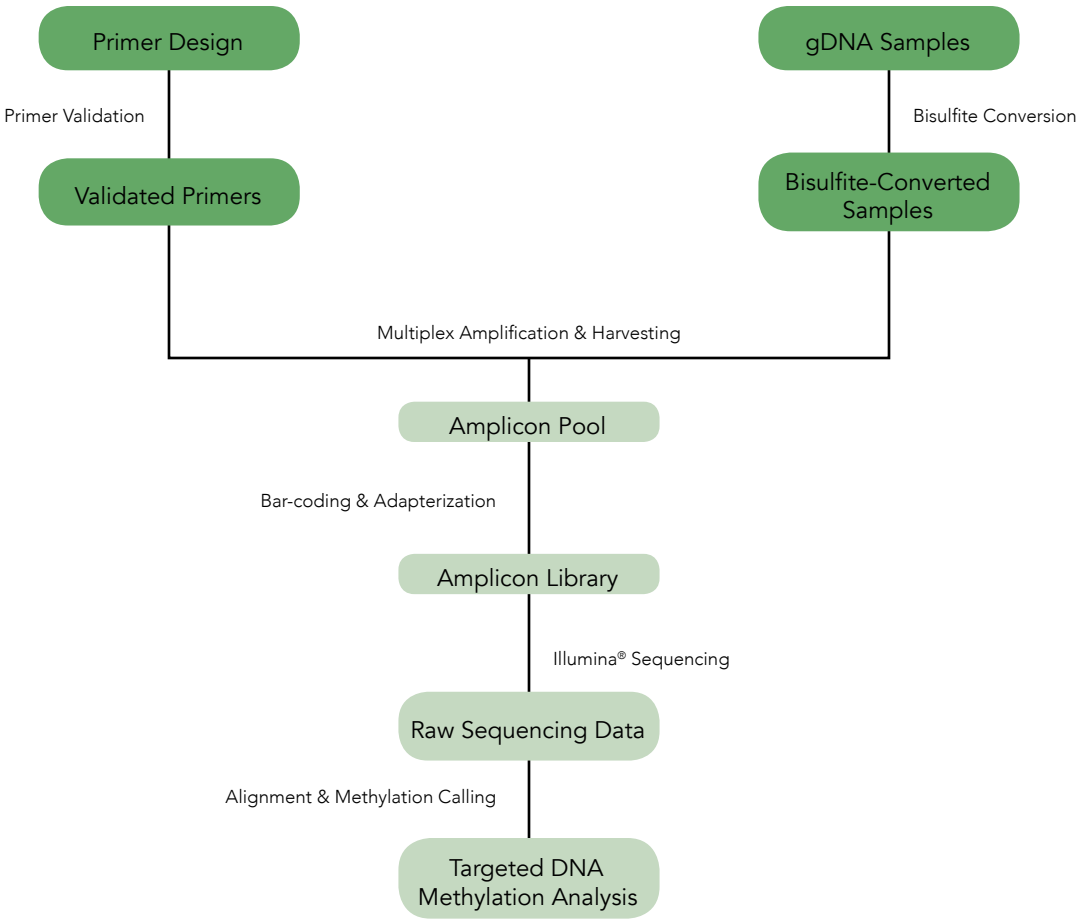
MethylCheck™ Bisulfite Sequencing

Zymo Research makes epigenetic biomarker validation simple with our MethylCheck™ platform. Whether you have methylation array (27K/450K/850K) data that you would like to validate in a large sample cohort or have a specific gene region in mind, our scientists are available to design, validate, and evaluate site-specific DNA methylation changes. Simply send us your samples and regions of interest, and we will perform every step through data analysis, sending you back publication-quality graphs and figures.

The Targeted Bisulfite Sequencing Service Includes:

- Primer Design and Validation
- Targeted Amplification
- Adapterization and Barcoding
- Sequencing with Illumina® Technology
- Sequence Alignment to Reference Genome
- DNA Methylation Analysis



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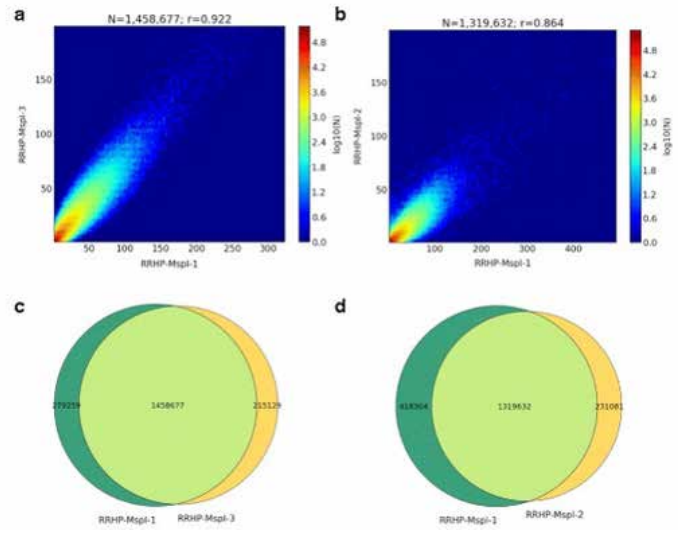
5-hmC DNA Hydroxymethylation

Zymo Research's platforms for the analysis of DNA hydroxymethylation has unparalleled sensitivity and coverage of 5-hydroxymethylcytosine (5-hmC). With traditional bisulfite-conversion methods, 5-hmCs cannot be distinguished from 5-mCs. Therefore, Zymo Research has developed two platforms, Mirror-Seq™ 5-hmC and Reduced Representation Hydroxymethylcytosine Profiling (RRHP®), compatible with Next-Generation sequencing to ensure high coverage and sensitivity for the detection of 5-hmC at single-base resolution. Mirror-Seq™ allows single-base quantification of 5-hmC sites while RRHP® allows genome-wide profiling for 5-hmC with reduced sequencing requirements.

RRHP®

This service is for genome-wide profiling of 5-hydroxymethylcytosine in DNA at single-nucleotide resolution. RRHP® also allows strand-specific determination of the location of the 5-hmC modification as well as quantification of 5-hmC levels. Data from RRHP® can be combined with DNA methylation data from Methyl-MiniSeq® (p. 44), allowing for direct comparison of DNA methylation and hydroxymethylation in the same sample. RRHP® is compatible with low DNA inputs and has the added advantage of providing read data for simultaneous SNP detection.



Replicate sample 5-hmC levels show very strong correlation when assessed using the RRHP® platform.
(Petterson A, Chung TH, Tan D, Sun X, Jia XY. Genome Biol. 2014 Sep 24;15(9):456.)

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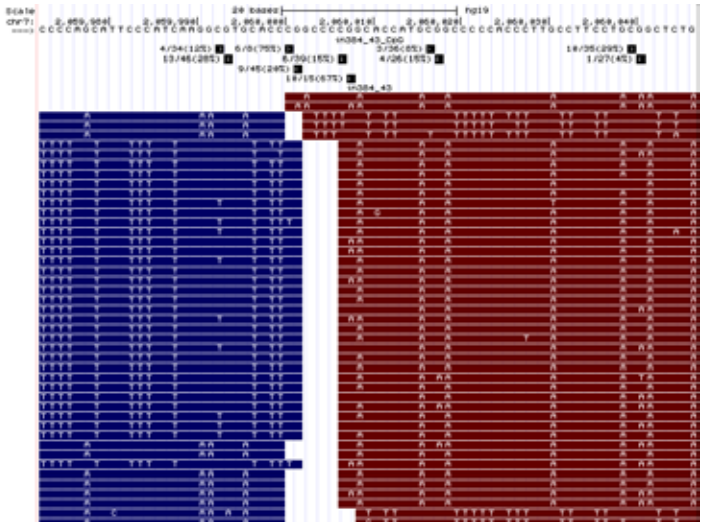
Mirror-Seq™

This innovative platform allows for the detection of 5-hmC at single-nucleotide resolution with high sensitivity and low background. The method consists of three main steps: (1) synthesis of a new mirroring strand to generate a semi-conservative duplex, (2) enzymatic treatment, and (3) bisulfite conversion. The glucosyltransferase enzyme specifically glucosylates 5-hmC residues in the parental strand. As a result, methylation of the mirroring CpG site is inhibited, making the cytosine susceptible to bisulfite conversion. Other CpG sites mirroring a non-5-hmC site are efficiently methylated and resistant to bisulfite conversion. After sequencing of the synthesized mirroring strand, any converted cytosine in a CG context detected indicates the presence of a 5-hmC in the original parental strand.

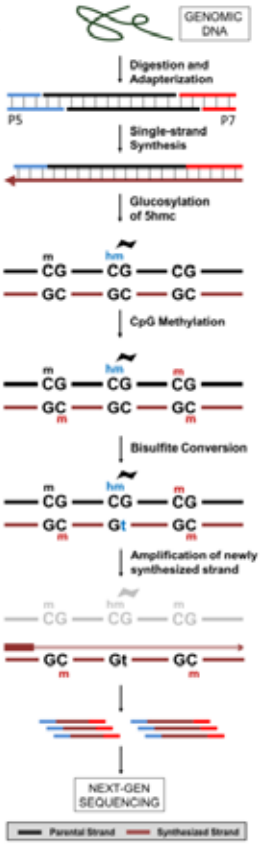
With Zymo Research's Mirror-Seq™ service, you would simply submit purified DNA, and we will perform the library preparation, pre-sequencing quality controls, Next-Generation sequencing, and bioinformatics analysis. Using our bioinformatics pipeline, we can efficiently map the bisulfite-converted sequence and quantitate strand-specific 5-hmC levels. Also, we can perform additional analysis to help identify differentially hydroxymethylated sites. Mirror-Seq™ service is available in different genome-wide scales as well as locus-specific analysis.

Advantages of Mirror-Seq™ services:

- Single-base quantification of 5-hmCs for all species with a reference genome
- Compatible with inputs as low as 100 ng
- Pre-sequencing QC ensures efficient library preparation and accurate detection of 5-hmCs



UCSC genome browser tracks for hydroxymethylation calling and sequencing reads using Mirror-Seq™. The presence of 5-hmC at CpG sites are indicated by the presence of a thymine on the positive strand (blue) or adenine on the negative strand (red). Tracks on top indicate the percentage of 5-hmC at specific CG dinucleotides for both DNA strands.



Workflow for Mirror-seq™ library preparation.

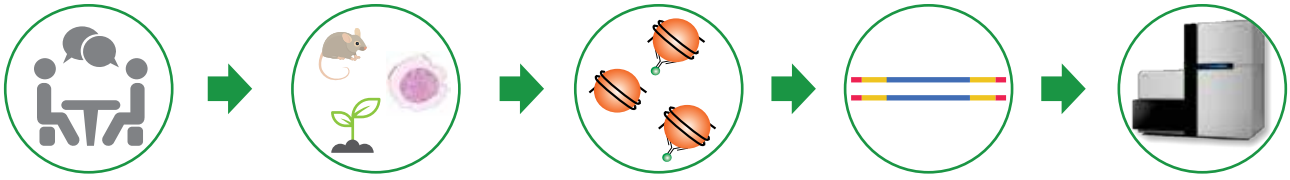
Explore Epigenomics with Zymo Research and inquire today at www.zymoresearch.com/services

ChIP-Seq

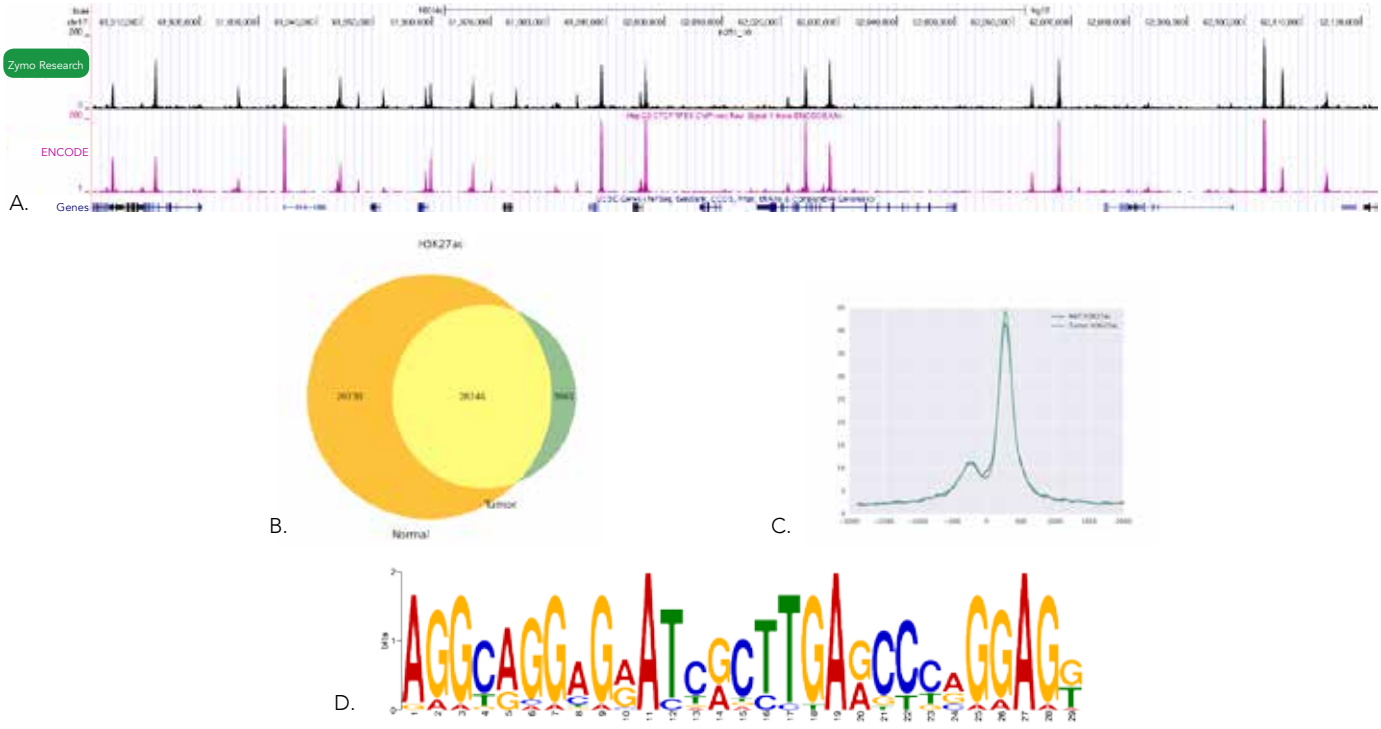
Chromatin Immunoprecipitation Sequencing (ChIP-Seq) is a technique that combines chromatin immunoprecipitation with the quantitative power and genome-wide coverage of Next-Generation sequencing. It is a powerful tool for genome-wide mapping of DNA interactions with transcription factors, histone modifications, and chromatin binding proteins and is essential for understanding the effect of DNA-protein interaction on gene regulation.

Zymo Research can perform the ChIP for you, using an optimized chromatin shearing/ enrichment procedure. Zymo Research's ChIP-Seq service is fully customizable and allows you to perform the ChIP assay yourself and send in the enriched chromatin for library construction and Next-Generation sequencing.

Simply send us your samples and we will handle the rest!



Free Consultation → Sample Submission → ChIP Assay → Construction of ChIP-Seq Libraries → Illumina® Certified Sequencing and Bioinformatics Analysis



Example of Zymo Research's ChIP-Seq Services Data Output: A. Browser tracks for visualization of peak regions. B. Venn diagram showing sample comparison data. C. Peak density profile to analyze peak locations relative to transcriptional start sites. D. Motif analysis to analyze bound genomic regions.

Explore Epigenomics with Zymo Research and inquire today at www.zymoresearch.com/services

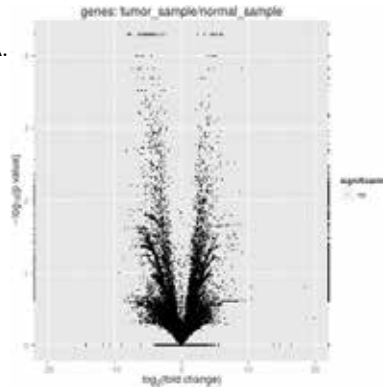
RNA-Seq

Zymo Research's RNA-Seq service makes Next-Generation transcriptome analysis available to every researcher, without the need for expensive equipment or bioinformatics expertise. Now you can achieve transcriptome-wide coverage of total RNA, or small RNA with the latest Next-Generation sequencing technology.

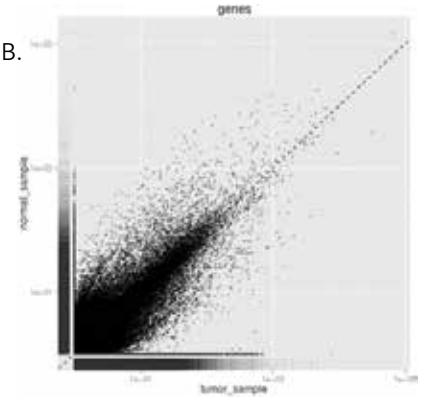
Useful for:

- Gene expression studies
- miRNA analysis
- Non-coding RNA investigations
- Discovering splice variants, SNPs, and RNA editing sites
- And much more!

A.



B.



A) Volcano plot showing the relationship between expression fold change and significantly different expression. B) Scatterplot for expression bias identification. C) The Database for Annotation, Visualization and Integrated Discovery (DAVID) pathway analysis was used to identify enrichment of biological processes amongst the top 100 significantly differentially methylated genes. Metabolic pathways were highly represented.

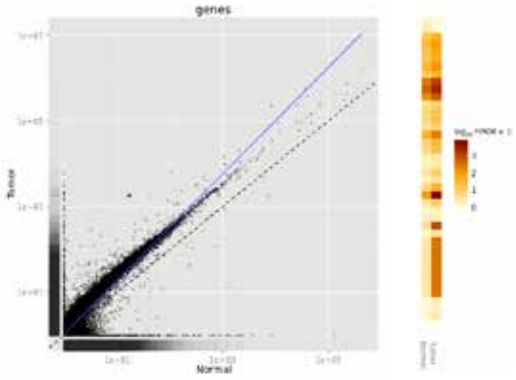
C.

Annotation Cluster 1	Enrichment Score: 7.492493953533086				
Category	Term	Count	P-Value	Fold Enrichment	FDR
GOTERM_BP_FAT	GO:0016054~organic acid catabolic process	12	1.68E-12	23.9751883	2.51E-09
GOTERM_BP_FAT	GO:0046395~carboxylic acid catabolic process	12	1.68E-12	23.9751883	2.51E-09
GOTERM_BP_FAT	GO:0009063~cellular amino acid catabolic process	9	5.55E-10	29.35197686	8.31E-07
GOTERM_BP_FAT	GO:0009063~cellular amino acid catabolic process	9	1.70E-09	25.5889029	2.55E-06
GOTERM_BP_FAT	GO:0006575~cellular amino acid derivative metabolic process	6	8.30E-04	8.015800909	1.236062
GOTERM_CC_FAT	GO:0005829~cytosol	8	0.5042612	1.182834008	99.97043

Let Zymo Research's scientists do the work, starting with RNA purification and sample prep all the way through the bioinformatic analyses with the delivery of a report with publication-ready figures directly to you. Each project is fully customizable to ensure your needs are met!

Many types of analyses are available including total RNA-Seq, small RNA-Seq (miRNA), polyadenylated RNA-Seq, and non-polyadenylated RNA-Seq.

Explore Epigenomics with Zymo Research and inquire today at www.zymoresearch.com/services



Scatterplot and heatmap showing expression bias and gene expression, respectively.

Epigenetic Aging Clock

Highlights

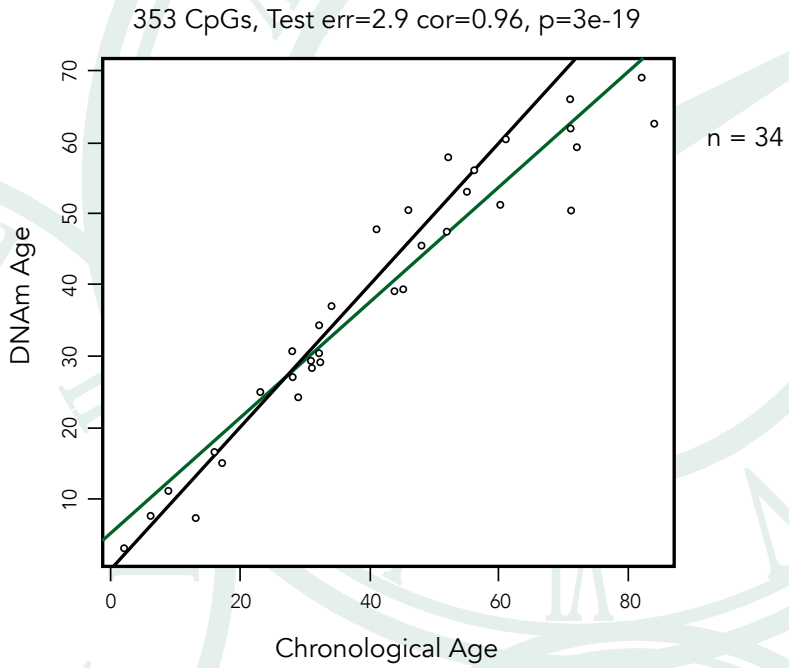
- *Reliably determine the true biological age of any human sample.*
- *Quantify changes in biological age following lifestyle interventions or drug treatments.*
- *Identify disease associated aging alterations.*

A growing number of studies have highlighted the strong correlation of DNA methylation changes with aging. Additionally, accelerated biological aging, as determined by DNA methylation profiling, has been associated with disease phenotypes including Down Syndrome and HIV-1-infection. DNA methylation-based biological age is a valuable surrogate biomarker of molecular aging.

The Epigenetic Aging Clock Service allows you to effectively gauge the biological age of any human tissue sample. With this easy to use service, the only thing you have to do is provide us with the sample. Starting with DNA purification all the way through bioinformatics analysis, Zymo scientists will do the work for you and provide you with an accurate biological age estimate along with a comprehensive report. Enhance any aging study or satisfy your intellectual curiosity with this multi-tissue age predictor.

This profiler is designed to:

- Detect methylation changes at highly informative CpG sites
- Use optimized data analysis workflow to provide an accurate biological age



Predicted epigenetic age of urine samples from healthy donors.

Explore Epigenomics with Zymo Research and inquire today at www.zymoresearch.com/services

Additional Services

Mass Spectrometry

Zymo Research offers DNA composition analysis with LC/MS analysis. Please inquire for more information.

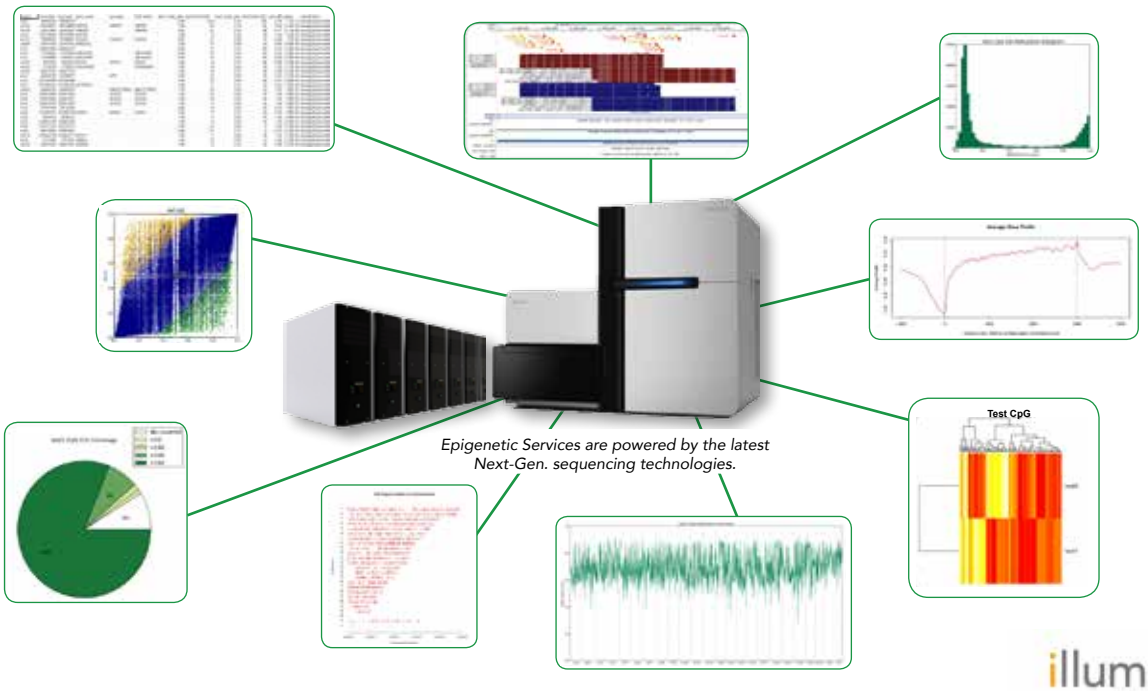
Custom Bioinformatics

Do you have Next-Generation sequencing data that you need analyzed? Zymo Research offers complete bioinformatics solutions to fulfill your needs. Whether it is whole-genome bisulfite sequencing data or ChIP-Seq data, we can help make sense of your overwhelming data sets. We use established as well as customizable bioinformatic pipelines to transform raw sequence data into manageable and interpretable figures and data sets. Simply provide the raw (FASTQ) or aligned (SAM or BAM) data and we will provide you with your desired downstream analyses.

Service Packages

Basic Service Packages for all of the platforms include sample standardization, library construction, Next-Generation sequencing, and raw data alignment.

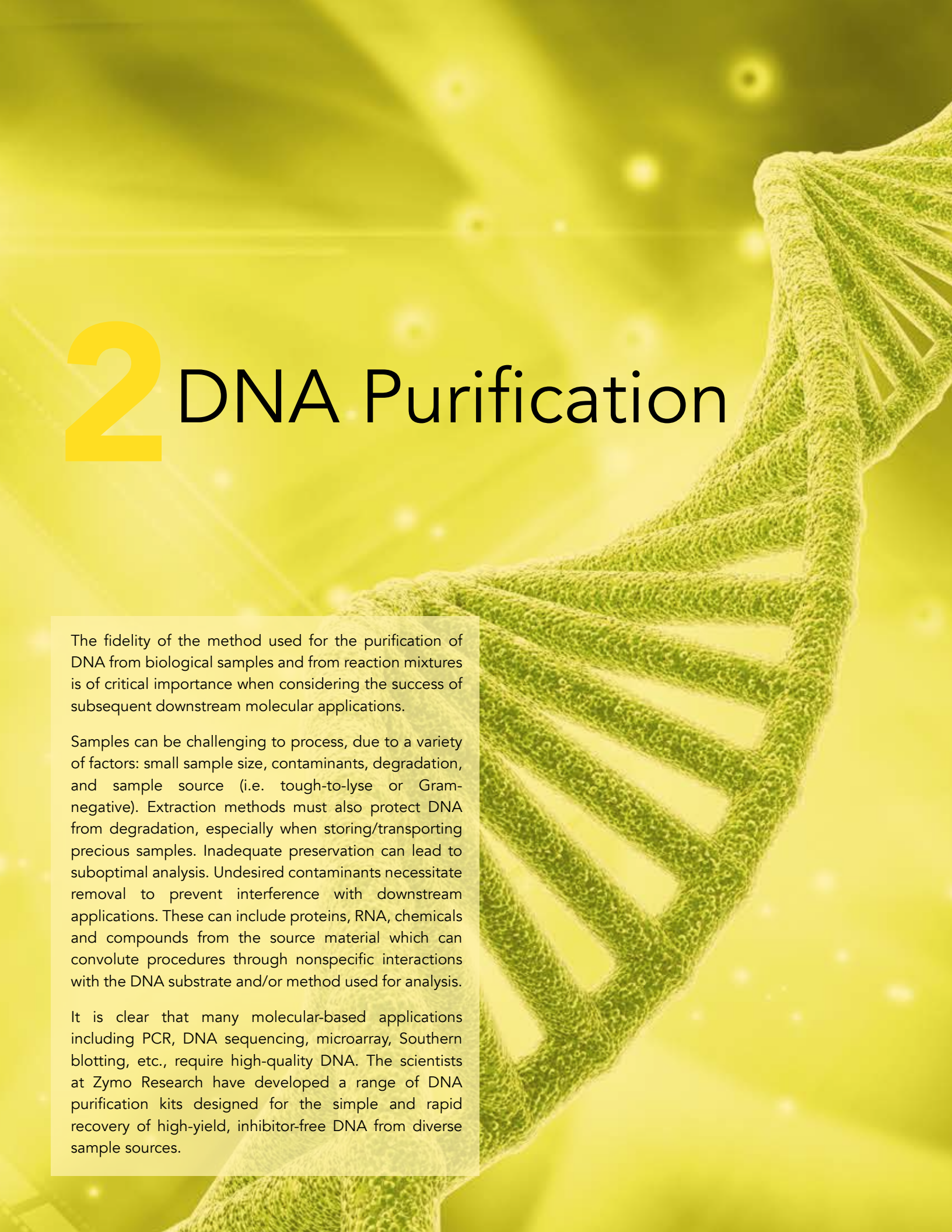
Full Service Packages offer additional down-stream bioinformatic processing and statistical analysis specifically tailored to fit your needs.



Epigenetic Services are powered by the latest Next-Gen. sequencing technologies.

Illumina CSPro® is a registered trademark of Illumina, Inc.

Explore Epigenomics with Zymo Research and inquire today at www.zymoresearch.com/services



2 DNA Purification

The fidelity of the method used for the purification of DNA from biological samples and from reaction mixtures is of critical importance when considering the success of subsequent downstream molecular applications.

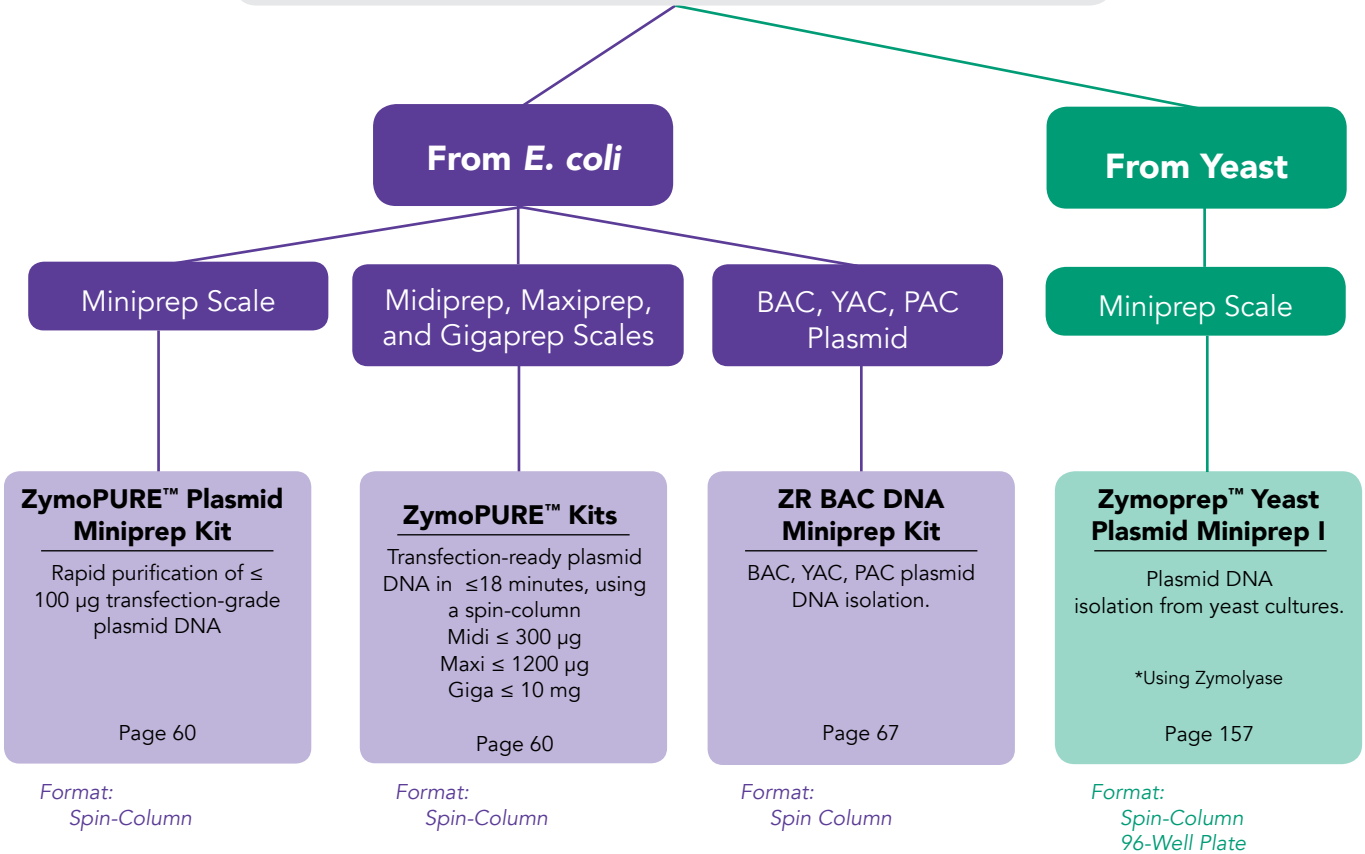
Samples can be challenging to process, due to a variety of factors: small sample size, contaminants, degradation, and sample source (i.e. tough-to-lyse or Gram-negative). Extraction methods must also protect DNA from degradation, especially when storing/transporting precious samples. Inadequate preservation can lead to suboptimal analysis. Undesired contaminants necessitate removal to prevent interference with downstream applications. These can include proteins, RNA, chemicals and compounds from the source material which can convolute procedures through nonspecific interactions with the DNA substrate and/or method used for analysis.

It is clear that many molecular-based applications including PCR, DNA sequencing, microarray, Southern blotting, etc., require high-quality DNA. The scientists at Zymo Research have developed a range of DNA purification kits designed for the simple and rapid recovery of high-yield, inhibitor-free DNA from diverse sample sources.

DNA Purification Made Simple®

Quick Product Guide

Plasmid DNA Purification



ZymoPURE™ Plasmid Miniprep Kit

Rapid purification of ≤ 100 µg transfection-grade plasmid DNA

Page 60

Format:
Spin-Column

ZymoPURE™ Kits

Transfection-ready plasmid DNA in ≤18 minutes, using a spin-column
Midi ≤ 300 µg
Maxi ≤ 1200 µg
Giga ≤ 10 mg

Page 60

Format:
Spin-Column

ZR BAC DNA Miniprep Kit

BAC, YAC, PAC plasmid DNA isolation.

Page 67

Format:
Spin Column

Zymoprep™ Yeast Plasmid Miniprep I

Plasmid DNA isolation from yeast cultures.

*Using Zymolyase

Page 157

Format:
Spin-Column
96-Well Plate

Zyppy® Plasmid Miniprep Kits

Pellet-free plasmid DNA isolation in 8 minutes.

Page 66

Format:
Spin-Column
96-Well Plate
Magnetic Beads

ZymoPURE-EndoZero™

Ultra-low endotoxin levels (≤ 0.025EU/ug) in under 20 minutes

Page 62

Format:
Spin-Column

ZymoPURE-Express™

Pellet free isolation. Culture to transfection in only 15 minutes.

Page 63

Format:
Spin-Column

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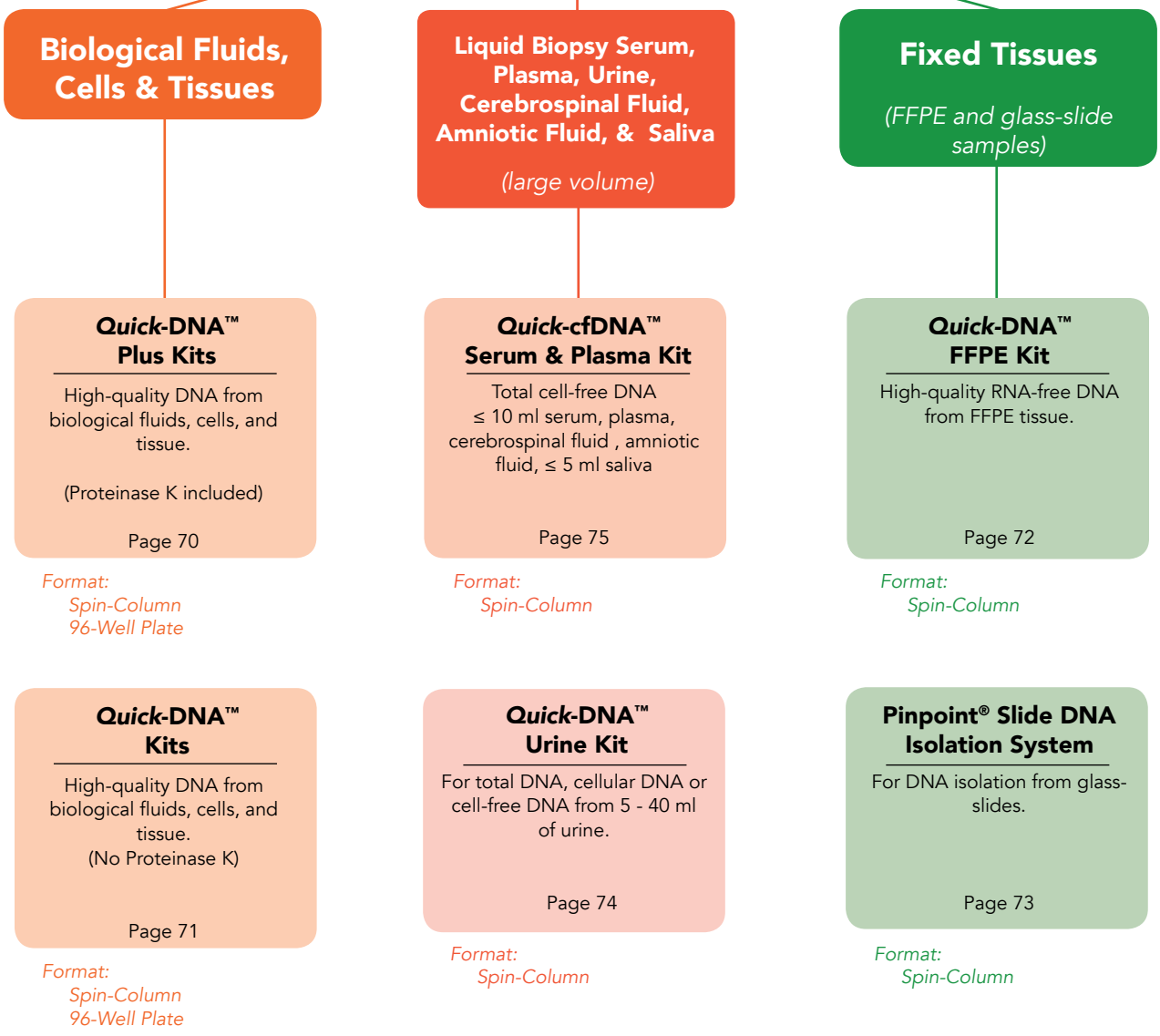
DNA Isolation

Biological Fluids, Cells & Solid Tissues



DNA Isolation

Tough-to-Lyse Samples

Microbial

Cultures

Quick-DNA™ Fungal/Bacterial DNA Kits

Simple and robust isolation.

*BashingBeads™ included

Page 80

Format:
Spin-Column
96-Well Plate

YeaStar™ Genomic DNA Kit

Simple enzymatic procedure utilizing Zymolyase.

Page 158

Format:
Spin-Column
96-Well Plate

Environmental (Fecal, Soil, and Water Filtrate)

ZymoBIOMICS® DNA Kits

Accurate inhibitor-free DNA for microbiomics, metagenomics, and any other molecular applications.

*BashingBeads™ included

Page 138

Format:
Spin-Column
96-Well Plate
MagBead

Quick-DNA™ Fecal/Soil Microbe DNA Kits

High-quality, inhibitor-free DNA

*BashingBeads™ included

Page 79

Format:
Spin-Column
96-Well Plate
MagBead

Plant and Seed

Quick-DNA™ Plant/Seed Kits

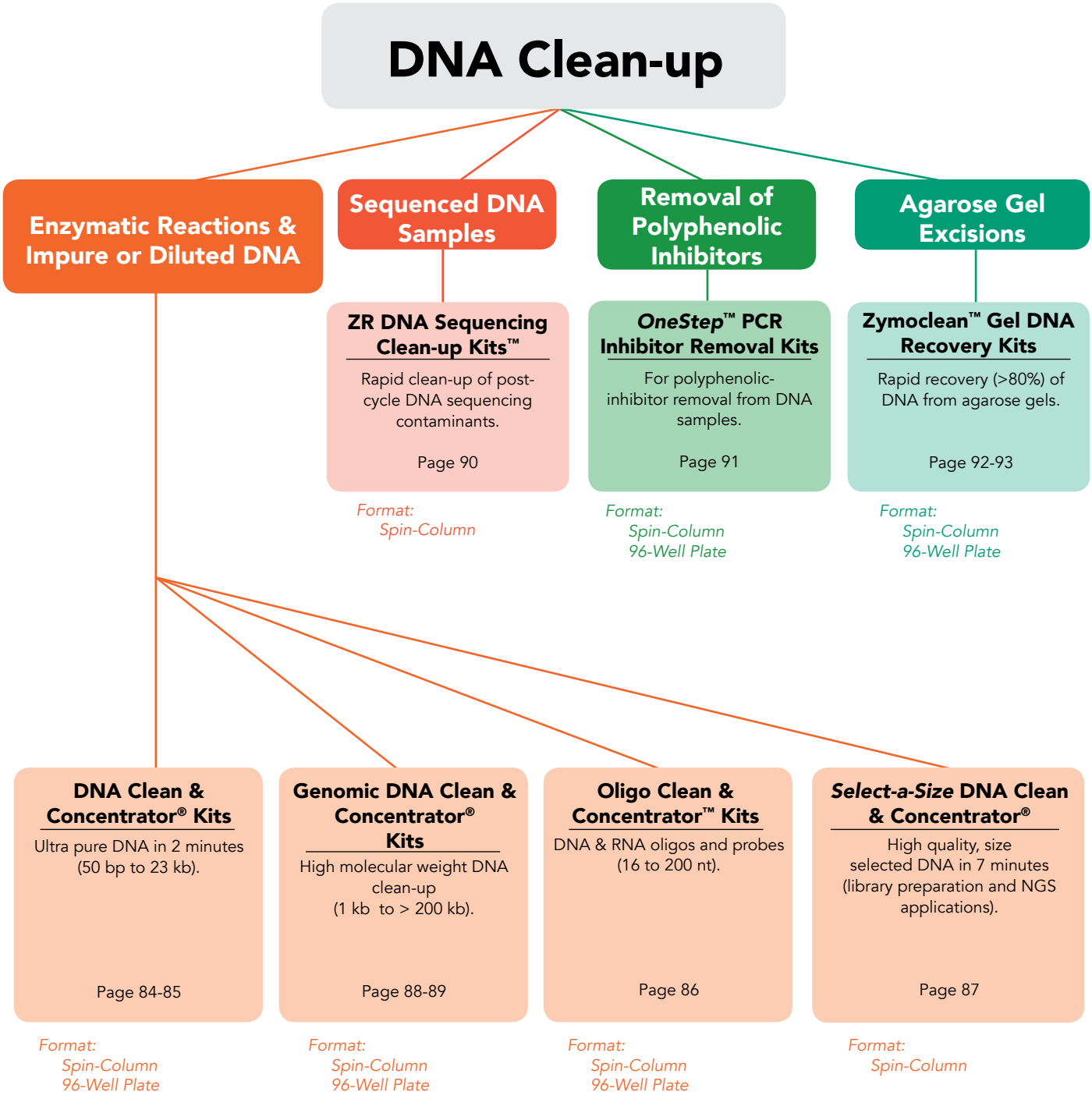
Inhibitor-free DNA from plant tissues.

*BashingBeads™ included

Page 82

Format:
Spin-Column
96-Well Plate

DNA Clean-up


Enzymatic Reactions & Impure or Diluted DNA
Sequenced DNA Samples
Removal of Polyphenolic Inhibitors
Agarose Gel Excisions
ZR DNA Sequencing Clean-up Kits™
Rapid clean-up of post-cycle DNA sequencing contaminants.
Page 90
Format:
Spin-Column
OneStep™ PCR Inhibitor Removal Kits
For polyphenolic-inhibitor removal from DNA samples.
Page 91
Format:
Spin-Column
96-Well Plate
Zymoclean™ Gel DNA Recovery Kits
Rapid recovery (>80%) of DNA from agarose gels.
Page 92-93
Format:
Spin-Column
96-Well Plate
DNA Clean & Concentrator® Kits
Ultra pure DNA in 2 minutes (50 bp to 23 kb).
Page 84-85
Format:
Spin-Column
96-Well Plate
Genomic DNA Clean & Concentrator® Kits
High molecular weight DNA clean-up (1 kb to > 200 kb).
Page 88-89
Format:
Spin-Column
96-Well Plate
Oligo Clean & Concentrator™ Kits
DNA & RNA oligos and probes (16 to 200 nt).
Page 86
Format:
Spin-Column
96-Well Plate
Select-a-Size DNA Clean & Concentrator®
High quality, size selected DNA in 7 minutes (library preparation and NGS applications).
Page 87
Format:
Spin-Column

Plasmid DNA Isolation

Innovation. Pure & Simple.™

Plasmid DNA purification has existed for nearly a half-century. Yet, it has remained unwieldy, requiring time-consuming gravity filtration, centrifugation steps, and isopropanol precipitation.

Zymo Research is making history with our plasmid DNA isolation technologies, which enable streamlined purification that result in ultra-pure, transfection-grade plasmid at superior speeds. Unique colored buffers allow for visualization of complete bacterial lysis and neutralization.

The ZymoPURE™ plasmid kits feature state-of-the-art technology for the simple and robust purification of transfection-grade plasmid DNA. Streamlined methodology avoids time-consuming steps and enables highly-concentrated plasmid DNA to be eluted directly from a microcentrifuge column in minutes.

Imagine recovering plasmid DNA without large-scale centrifugationor cell pelleting directly from culture. The ZymoPURE-Express™ Midiprep Kit allows for *in-situ* lysis and the omission of pelleting and re-suspension steps that are common to all other conventional procedures. Plasmid DNA can be isolated in minutes with our unique Zymo-Spin™ columns.

Does your workflow involve highly sensitive applications, which requires ultra-pure plasmid DNA? The ZymoPURE-EndoZero™ Kits enable you to isolate plasmid DNA with endotoxins levels ≤ 0.025 EU/µg. The kits incorporate the novel EndoZero™ spin-column to reduce endotoxin levels of plasmid DNA without lengthy incubations, gravity flow anion-exchange columns, expensive chromatography columns, or time-consuming centrifugation steps. The result is plasmid DNA ideal for transfection, restriction endonuclease digestion, in vivo studies, bacterial transformation, PCR amplification, DNA sequencing, and other sensitive downstream applications.

Simplify your workflow with Zyppy® technology, which drives the fastest molecular biology grade miniprep kits available. It features a pellet-free alkaline lysis procedure, which bypasses bacterial culture centrifugation. The Zyppy® 96 Miniprep Kits that enable culturing, lysis, and neutralization using the same plate. These kits feature the fastest and simplest high-throughput and automated procedures for purifying high-quality, endotoxin-free plasmid DNA.

Pushing the limits

of plasmid purification

Technology Overview: ZymoPURE™

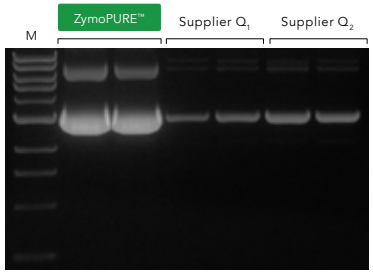
Innovation. Pure & Simple.™

Empower your research with ZymoPURE™ plasmid DNA purification kits. Streamlined methodology and superior technology enables unrivaled speed and performance. Innovative binding technology enables DNA to be purified using a microcentrifuge column via vacuum or centrifuge in as little as 18 minutes. Ultra-pure, transfection-grade plasmid DNA is eluted directly from the spin-column into a 1.5 ml microcentrifuge tube and is ready for sensitive downstream applications.

ZymoPURE™ Technology: Pushing The Limits Of The Spin-Column

Innovative Binding System

up to 4x greater yield

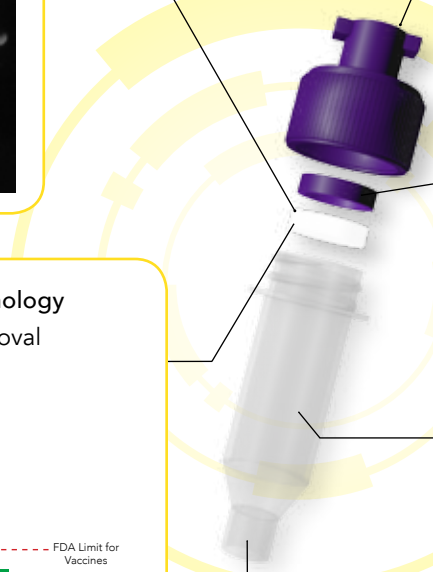


Universally Compatible

Luer Lock cap facilitates vacuum or centrifuge-based processing

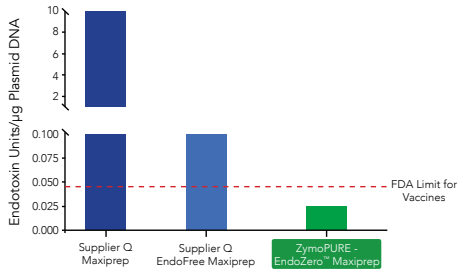
Zymo-Spin™ Column Design

unique 45° angle prevents retention of contaminants



EndoZero™ Column Technology

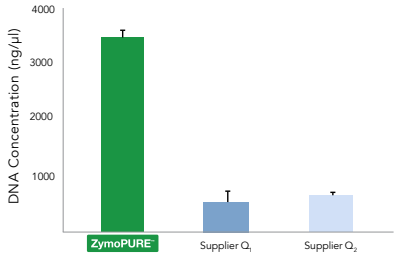
superior endotoxin removal



Available with ZymoPURE-EndoZero™ formats

Concentrated and Ready-to-Use

novel binding system enables elution of >1 mg of plasmid using a spin-column (Mini, Midi, Maxi)

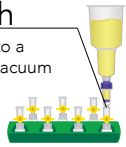


Streamlined, Pellet-free Workflow

direct lysis
no cell pelleting required

neutralize
using Zymo's patented color buffer system

bind/wash
rapid loading onto a spin-column via vacuum or centrifuge



elute
transfection grade plasmid DNA

Available with ZymoPURE-Express™ Plasmid Midiprep Kit

Visit www.zymoresearch.com/zymopure for more information

ZymoPURE™ Plasmid Kits

Highlights

- *Fast, easy, reliable, ultra-pure transfection-ready plasmid DNA directly from a spin-column.*
- *Innovative ZymoPURE™ binding technology enables elution of the highest concentration of plasmid DNA directly from a spin-column using a microcentrifuge.*
- *Routinely recover ≥ 1 µg/µl plasmid DNA that is ideal for transfection and other sensitive downstream applications.*

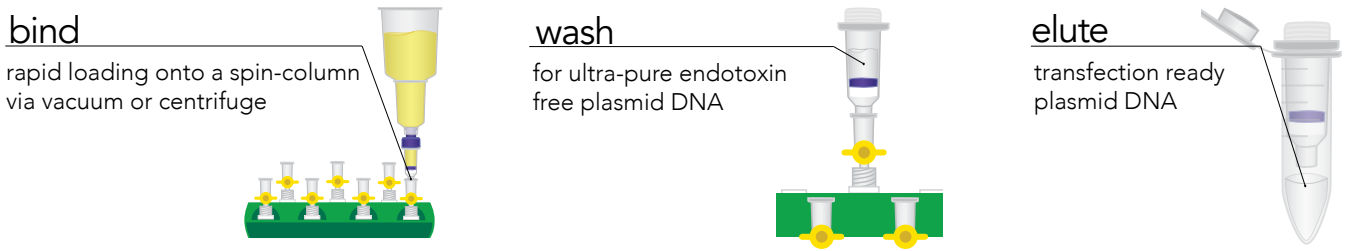
Description

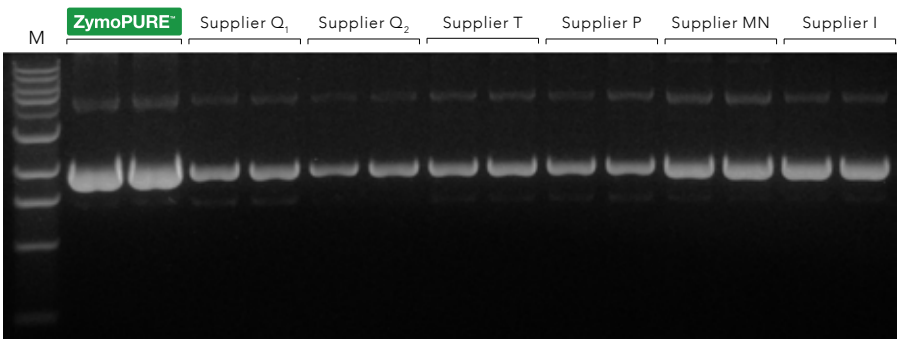
The ZymoPURE™ Plasmid Kits are unrivaled in their performance. These plasmid Mini, Midi, Maxi, and Gigapreps feature a spin-column based method for the purification of high-quality plasmid DNA at record shattering speeds. Plasmid DNA can be isolated in less than 20 minutes for Mini, Midi and Maxipreps, and 45 minutes for Gigapreps. ZymoPURE™ technology uses a modified alkaline lysis method and features novel binding chemistry that yields highly concentrated plasmid DNA (up to 3 µg/µl). The eluted plasmid DNA is ready for immediate use, avoiding the need for subsequent precipitation steps.

The ZymoPURE™ Plasmid Kits contain colored buffers, which permit error-free visualization and identification of complete bacterial cell lysis and neutralization. Syringe filters are included for rapid lysate clearing and the unique spin-column design allows the binding step to be performed using a vacuum or centrifuge.

In addition, the wash regimen has been optimized to ensure the plasmid DNA is free of endotoxins, salt, protein, and RNA. The result is plasmid DNA ideal for transfection, restriction endonuclease digestion, bacterial transformation, PCR amplification, DNA sequencing, and other sensitive downstream applications.

Streamlined Workflow





Superior Yields

Plasmid DNA yield and concentration from the ZymoPURE™ Maxiprep Kit compared to other major suppliers. Plasmid DNA (pGEM®) was isolated from 150 ml of JM109 *E. coli* culture grown overnight following the manufacturer's suggested protocol (in duplicate). One (1) µl of eluted plasmid DNA was visualized post agarose gel electrophoresis. M, ZR 1 kb DNA Marker (Zymo Research).

pGEM® is a registered trademark of Promega Corporation.

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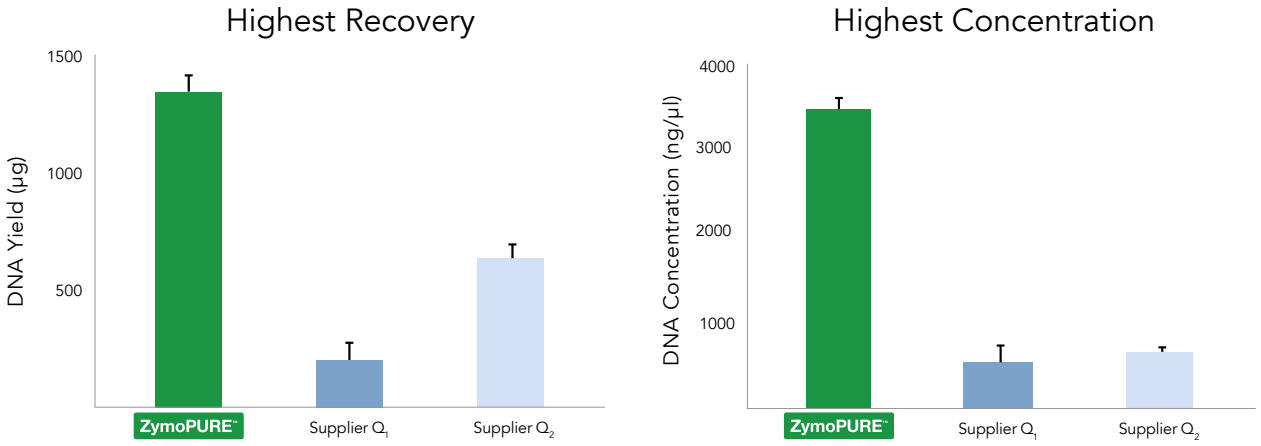
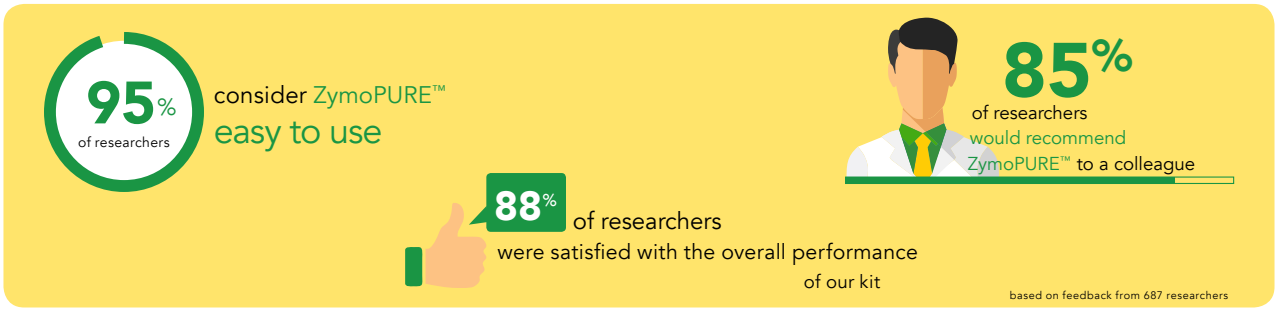


Yield and concentration for plasmid DNA isolated using the ZymoPURE™ Maxiprep Kit compared to two separate kits from Supplier Q. Plasmid DNA (pGL3®) was isolated from 150 ml of JM109 *E. coli* culture grown overnight following the manufacturer's suggested protocol (in duplicate).

Highly Rated



Product	Cat. No.	Size	Specifications	Uses
ZymoPURE™ Plasmid Miniprep Kit	D4208T	10 preps.	Format: Spin-Column, Vacuum Manifold, or Centrifugation Sample Volume: 5 ml Processing Time: ≤ 15 minutes Elution Volume: 25 µl Max DNA Yield: ≤ 100 µg DNA Size Limits: ≤ 25 kb Endotoxin Levels: ≤ 1 EU/µg	Plasmid recovery from *E. coli* culture
	D4209	50 preps.		
	D4210	100 preps.		
	D4211	400 preps.		
	D4212	800 preps.		
ZymoPURE™ Plasmid Midiprep Kit	D4200	25 preps.	Format: Spin-Column, Vacuum Manifold or Centrifugation Sample Volume: 50 ml Processing Time: 18 minutes Elution Volume: ≥ 100 µl DNA Yield: ≤ 300 µg DNA Size Limits: ≤ 25 kb Endotoxin Levels: ≤ 1 EU/µg	
	D4201	50 preps.		
ZymoPURE™ Plasmid Maxiprep Kit	D4202	10 preps.	Format: Spin-Column, Vacuum Manifold or Centrifugation Sample Volume: 150 ml Processing Time: 18 minutes Elution Volume: ≥ 200 µl DNA Yield: ≤ 1.2 mg DNA Size Limits: ≤ 25 kb Endotoxin Levels: ≤ 1 EU/µg	
	D4203	20 preps.		
ZymoPURE™ Plasmid Gigaprep Kit	D4204	5 preps.	Format: Spin-Column, Vacuum Manifold Sample Volume: 2.5 L Processing Time: 45 minutes Elution Volume: ≥ 2 ml DNA Yield: ≤ 10 mg DNA Size Limits: ≤ 25 kb Endotoxin Levels: ≤ 1 EU/µg	

* Patent Pending

ZymoPURE-EndoZero™ Plasmid Kits

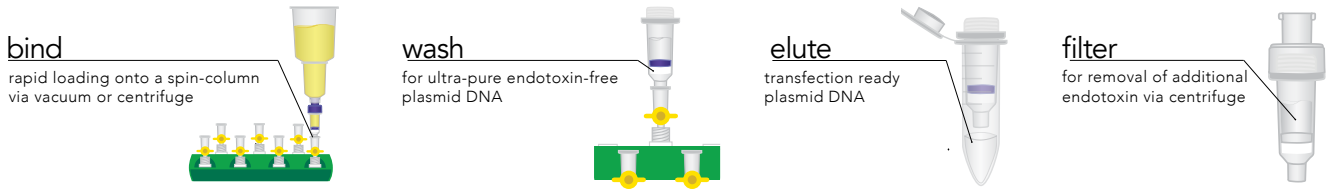
Highlights

- *The fastest spin-column based procedure for purifying up to 10 mg of endotoxin-free plasmid DNA.*
- *Consistently achieve endotoxin levels of ≤ 0.025 EU/µg of plasmid DNA in only 20 minutes.*
- *Plasmid DNA is ideal for transfection in sensitive cells and in vivo research.*

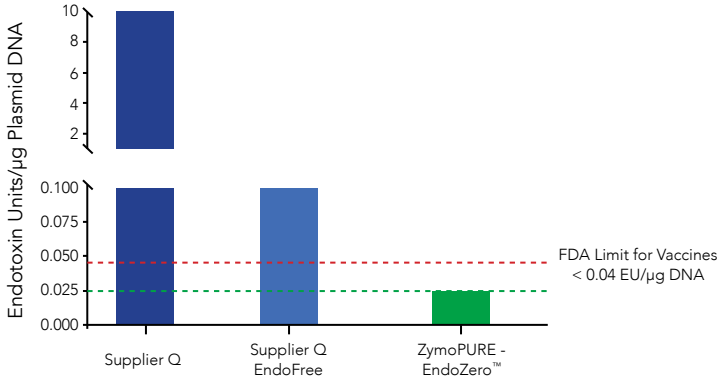
Description

The ZymoPURE-EndoZero™ Plasmid Kits features a spin-column based method for the purification of up to 10 mg of high-quality, endotoxin-free plasmid DNA. The isolated plasmid DNA is ready for immediate use, and does not require subsequent precipitation steps. ZymoPURE™ technology uses a modified alkaline lysis method, and features novel binding chemistry that yields highly concentrated plasmid DNA (up to 3 µg/µl). The kit incorporates our unique EndoZero™ spin-columns to reduce endotoxin levels fewer than 0.025 EU/µg of plasmid DNA without lengthy incubations, gravity flow anion-exchange columns, expensive chromatography columns, or time-consuming centrifugation steps. The result is plasmid DNA ideal for transfection, restriction endonuclease digestion, *in vivo* studies, bacterial transformation, PCR amplification, DNA sequencing, and other sensitive downstream applications. As an added convenience, the ZymoPURE-EndoZero™ Plasmid Kits contain colored buffers that permit error-free visualization and identification of complete bacterial cell lysis and neutralization.

Streamlined Workflow



Lowest Endotoxin Levels Compared To Traditional Plasmid Purification Methods



Product	Cat. No.	Size	Specifications	Uses
ZymoPURE-EndoZero™ Plasmid Maxiprep Kit	D4205	10 preps.	Format: Spin-Column, Vacuum Manifold, or Centrifugation Sample Volume: 150 ml Processing Time: 20 minutes Elution Volume: ≥ 200 µl DNA Yield: ≤ 1.2 mg DNA Size Limits: ≤ 25 kb Endotoxin Levels: ≤ 0.025 EU/µg	Endotoxin-free plasmid recovery from *E. coli* culture
ZymoPURE-EndoZero™ Plasmid Gigaprep Kit	D4207	5 preps.	Format: Spin-Column, Vacuum Manifold, or Centrifugation Sample Volume: 2.5 L Processing Time: 50 minutes Elution Volume: ≥ 2 ml DNA Yield: ≤ 10 mg DNA Size Limits: ≤ 25 kb Endotoxin Levels: ≤ 0.025 EU/µg	

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ZymoPURE-Express™ Plasmid Midiprep Kit

Highlights

- *Innovative pellet-free procedure bypasses the standard cell-pelleting and resuspension steps. No large-scale centrifugation required!*
- *The fastest, easiest, most reliable method for purification of up to 1.2 mg of ultra-pure endotoxin-free plasmid DNA.*
- *Plasmid DNA is eluted directly from a microcentrifuge column and is well-suited for transfection and other sensitive applications.*

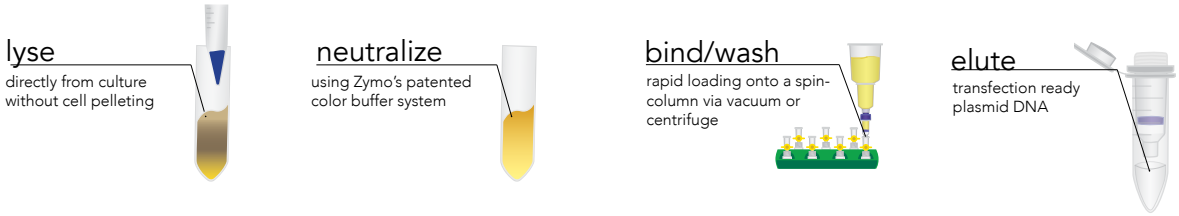
Description

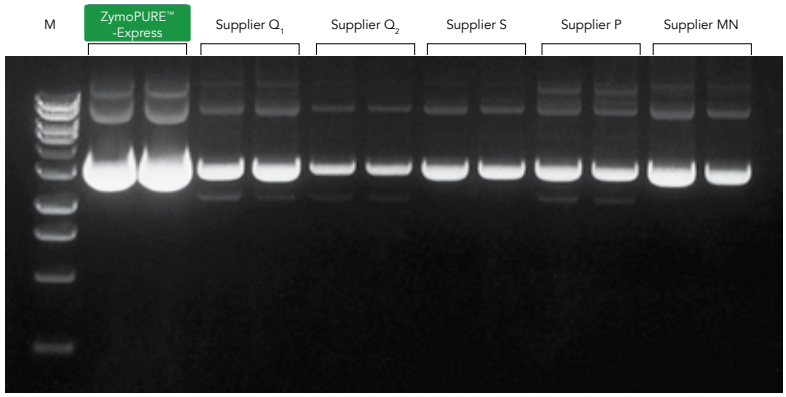
The ZymoPURE-Express™ Plasmid Midiprep Kit is the fastest and easiest method for isolating plasmid DNA from *E. coli*. Utilizing a patented alkaline lysis method, this novel technology can purify up to 1.2 mg of high-quality endotoxin-free plasmid DNA directly from the culture, without pelleting and resuspension steps. Just add the ZymoPURE-Express™ Lysis Buffer directly to your bacterial culture, neutralize, filter debris, and purify using the Zymo-Spin™ V-P microcentrifuge column.

Innovative binding chemistry enables highly concentrated (up to 1.5 µg/µl) DNA to be eluted directly from microcentrifuge column. The wash regimen has been optimized to ensure the plasmid DNA is free of endotoxins, salt, and protein. Purified plasmid DNA is ideal for transfection, restriction endonuclease digestion, bacterial transformation, PCR amplification, DNA sequencing, and other sensitive downstream applications.

As an added convenience, the ZymoPURE-Express™ Plasmid Midiprep Kit contains patented colored buffers that permit error-free visualization and identification of complete bacterial cell lysis and neutralization and syringe filters are included for rapid lysate clearing.

Streamlined Pellet-Free Workflow





Superior Yield

Plasmid DNA yield and concentration from the ZymoPURE-Express™ Midiprep Kit compared to other major suppliers. Plasmid DNA (pGL3) was isolated from 25 ml of JM109 *E. coli* culture grown overnight following the manufacturer's suggested protocol in duplicate. The eluted plasmid DNA was visualized post agarose gel electrophoresis. M, ZR 1 kb DNA Marker (Zymo Research).

Product	Cat. No.	Size	Specifications	Uses
ZymoPURE-Express™ Plasmid Midiprep Kit	D4213	25 preps.	Format: Spin-Column, Vacuum Manifold, or Centrifugation Sample Volume: 25 ml Processing Time: 15 minutes Elution Volume: ≥ 200 µl DNA Yield: ≤ 1.2 mg DNA Size Limits: ≤ 25 kb	Plasmid recovery directly from *E. coli* culture without cell pelleting

Technology Overview: Zyppy® Pellet-free Procedure

Plasmid DNA isolation directly from culture

The Zyppy® Plasmid Miniprep Kit features a pellet-free, modified alkaline lysis method that bypasses bacterial culture centrifugation and resuspension steps common to classical plasmid preparation procedures. Simply add the uniquely formulated 7X Lysis Buffer directly to your bacterial culture, neutralize, and then purify using provided Zymo-Spin™ Column technology. Additionally, the innovative colored buffers included in the kit permit error-free visualization and identification of complete bacterial cell lysis and neutralization. The plasmid DNA is of the highest quality and ready for sensitive downstream applications.

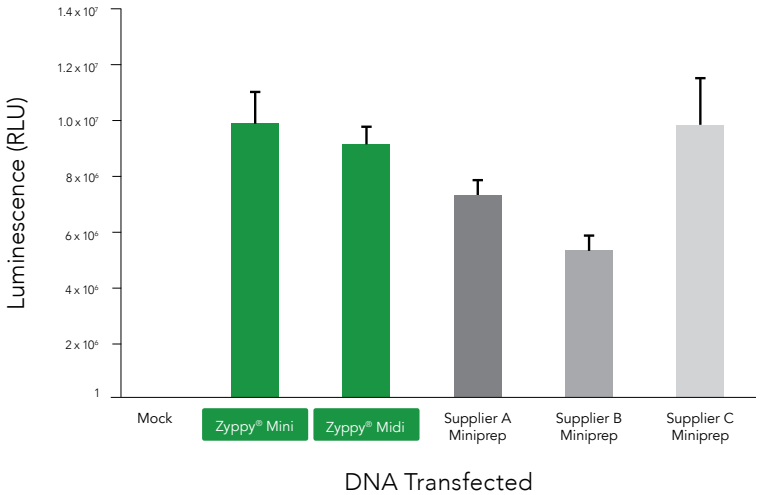
High-quality plasmid DNA in 8 minutes ready for cloning, sequencing, and transfection

1. Add lysis buffer directly to bacterial culture

2. Neutralize

3. Bind, Wash, Elute

Transfection Ready



Luciferase activity in transfected cells. Lysates from cells transfected with plasmid DNA extracted using the pellet-free (Zyppy® system) and non-pellet-free (suppliers A, B, and C) formats were used to measure luciferase activity. The activity is indicated as relative light units (RLU).

High Recovery

EcoRI digestion of plasmid DNA (pGEM®) isolated from *E. coli* culture using the Zyppy® Plasmid Miniprep Kit or the QIAprep™ Spin Miniprep Kit from Qiagen. The amount of DNA loaded was standardized based on culture volume input. Performed in triplicate.

pGEM® is a registered trademark of Promega Corporation.

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High-throughput and Automated Plasmid DNA Purification

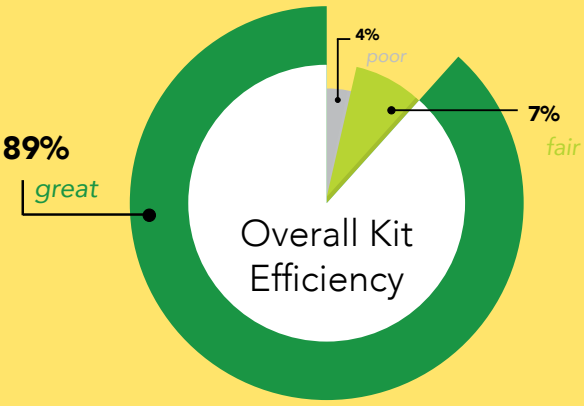
The Zyppy® pellet-free procedure from Zymo Research allows for fully automated, high-throughput plasmid purification. No centrifugation or re-suspension steps common to all other conventional procedures are required. The kit features a modified alkaline lysis system that allows for the direct lysis of *E. coli* in the growth medium. With Zyppy's easy, pellet-free procedure, you can grow, lyse, and process samples in the same plate with no manual manipulation.

Samples grown overnight in a 96-well block are transferred to an automated liquid handler (e.g., Tecan – Freedom Evo®).The uniquely formulated Deep Blue Lysis Buffer is added directly to bacterial cultures in each well. After neutralization, lysate separation steps are expedited using innovative MagClearing Beads to pull down cellular debris. The cleared lysates are then automatically transferred to another plate and MagBinding Beads are added to the cleared lysate and the DNA-bound beads are washed and dried. Once eluted, plasmid DNA is ready for immediate use, or can be stored at -20°C for later use.

Comparison between manual and automated processing. Data shows concentration, recovery volume and total yield for samples processed across a 96-well plate as well as on single spin columns. Half of the plate samples were processed manually, the other half was processed using the Tecan – Freedom EVO®. Plasmid DNA was purified from *E.coli* cells grown at 37°C overnight.

Proven Performance

would recommend
this kit to another researcher



based on feedback from 384 researchers

Zyppy® Plasmid Kits

Highlights

- *The fastest, easiest kits available for high-throughput transfection-quality plasmid DNA purification.*
- *Pellet-free procedure omits conventional cell pelleting and resuspension steps.*
- *DNA quality appropriate for cloning, sequencing, and transfection.*

Description

The Zyppy® Plasmid Kits feature a pellet-free modified alkaline lysis method that bypasses bacterial culture centrifugation and resuspension steps common to classical plasmid preparation procedures. Simply add the uniquely formulated 7X Lysis Buffer directly to your bacterial culture, neutralize, and purify using the provided Zymo-Spin™ Column technology. Additionally, the innovative colored buffers included in the kit enable error-free visualization and identification of complete bacterial cell lysis and neutralization.

The Zyppy® Plasmid Kits are available in a variety of sizes to fit your research needs. Our miniprep's binding capacity is up to 25 µg of DNA per prep, the 96-well miniprep's binding capacity is 10 µg per prep, and our midiprep's binding capacity is up to 120 µg per prep.

The Zyppy® Plasmid Kits are some of the fastest and easiest methods available to separate plasmid DNA from *E. coli* efficiently. The plasmid DNA is of the highest quality, endotoxin-free, and well suited for use in transfection, bacterial transformation, restriction endonuclease digestion, DNA ligation, PCR, transcription, sequencing, and other sensitive downstream applications.

Streamlined Workflow

1. Add lysis buffer directly to bacterial culture

2. Neutralize

3. Bind, wash, elute

Product	Cat. No.	Size	Specifications	Uses
Zyppy® Plasmid Miniprep Kit	D4036	50 preps.	Format: Spin-Column Sample Volume: 600 µl - 3 ml Processing Time: 8 minutes Elution Volume: ≥ 30 µl DNA Yield: ≤ 25 µg DNA Size Limits: ≤ 25 kb	Plasmid recovery directly from *E. coil* culture
	D4019	100 preps.		
	D4020	400 preps.		
	D4037	800 preps.		
Zyppy® 96 Plasmid Miniprep	D4041	2 x 96 preps.	Format: 96-Well Sample Volume: 750 µl Processing Time: 45 minutes Elution Volume: 30 µg DNA Yield: ≤ 10 µg DNA Size Limits: ≤ 25 kb	
	D4042	4 x 96 preps.		
	D4043	8 x 96 preps.		
Zyppy® 96 Plasmid MagBead Miniprep	D4100	2 x 96 preps.	Format: Magnetic Beads Sample Volume: 750 µl Processing Time: 60 minutes Elution Volume: 30 µl DNA Yield: ≤ 10 µg DNA Size Limits: ≤ 25 kb	
	D4101	4 x 96 preps.		
	D4102	8 x 96 preps.		
Zyppy® Plasmid Midiprep Kit	D4025	25 preps.	Format: Spin-Column Sample Volume: 750 µl Processing Time: 15 minutes Elution Volume: ≥ 150 µl DNA Yield: ≤ 120 µg DNA Size Limits: ≤ 25 kb	
	D4026	50 preps.		

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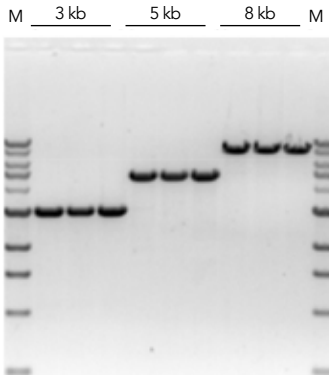
ZR Plasmid Miniprep™ – Classic

Highlights

- Purify high-quality, transfection-grade plasmid DNA for restriction endonuclease digestion, DNA sequencing, transformation, cloning, transfection, *in vitro* transcription reactions, etc.
- Innovative colored P1, P2, and P3 buffers rapidly identify completion of bacterial cell lysis and neutralization steps.
- Unique column design enables zero buffer retention and low (30 µl) elution volume.

Description

The ZR Plasmid Miniprep™ - Classic is designed for efficient isolation of plasmid DNA from *E. coli* using a traditional 3-buffer procedure that is simple, rapid, user-friendly, and reliable. It features a modified alkaline lysis protocol together with a unique Zymo-Spin™ Column to yield high-quality endotoxin-free plasmid DNA in minutes. The buffers are color-coded (red, green, yellow) for easy determination of complete cell lysis and neutralization. Plasmid DNA purified from this kit is well suited for use in restriction endonuclease digestion, sequencing, DNA ligation, cloning, PCR, bacterial transformation, transfection, etc.



Plasmid products. Restriction endonuclease digestion of three different plasmids prepared using the ZR Plasmid Miniprep™-Classic, performed in triplicate. M: ZR 1 kb DNA marker (Zymo Research).

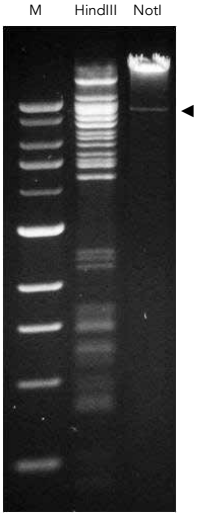
ZR BAC DNA Miniprep Kit

Highlights

- *For spin-column purification of endotoxin-free BAC/PAC plasmid DNA (up to ~200 kb) for sequencing, PCR, restriction endonuclease digestion, etc.*
- *Innovative colored buffers for rapid identification of complete bacterial cell lysis and neutralization steps.*
- *Unique column design enables zero buffer retention and low-volume (≥ 10 µl) elution.*

Description

The Zymoprep™ Yeast Plasmid Miniprep provides all the necessary reagents for plasmid isolation from *S. cerevisiae, C. albicans and S. pombe*, and any fungi whose cell walls are susceptible to yeast lytic enzyme lysis. The procedure is simple and efficient, with no need for glass beads or phenol. Reliably recover plasmid DNA from yeast colonies, patches on plates, or as liquid cultures. The system is ideal for low-copy number and hard to isolate plasmids. Eluted plasmid DNA can be used directly for *E. coli* transformation, PCR, and Southern blot analysis.



HindIII and NotI digestion of BAC DNA. A BAC (~160 kb) from a RPCI-11 human BAC library (CHORI) was purified from DH10B cells (Invitrogen) using the ZR BAC DNA Miniprep Kit. Digestion with NotI removed the ~148 kb insert from the 11.6 kb pBACe3.6 cloning vector 1 (◄). M: 1 kb DNA ladder (Zymo Research).

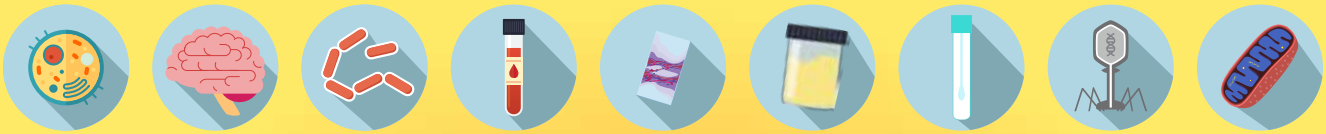
Product	Cat. No.	Size	Specifications	Uses
ZR Plasmid Miniprep™ – Classic	D4015	100 preps.	Format: Spin-Column Sample Volume: 0.5 - 5.0 ml Processing Time: 15 minutes Elution Volume: ≥ 30 µl DNA Yield: ≤ 25 µg DNA Size Limits: ≤ 25 kb	Plasmid recovery from *E. coli* culture
	D4016	400 preps.		
	D4054	800 preps.		
ZR BAC DNA Miniprep Kit™	D4048	25 preps.	Format: Spin-Column Sample Volume: 0.5 - 5.0 ml Processing Time: 15 minutes Elution Volume: ≥ 10 µl DNA Yield: ≤ 10 µg DNA Size Limits: 50 bp to ≥ 200 kb	Large plasmid recovery from *E. coli* culture
	D4049	100 preps.		

Genomic DNA Purification

Innovation. Pure & Simple.™

Zymo Research offers a range of genomic DNA isolation kits that are suitable for extracting high molecular weight DNA from a wide variety of sample types including tissue, fresh and paraffin-embedded tissue sections, cultured cells, saliva, buccal cells, whole blood, plasma, serum, urine, bacteria, fungi, yeast, algae, viruses, and mitochondria. Our genomic DNA isolation kits yield high-quality DNA that is ideal for use in any sensitive downstream applications such as PCR, DNA sequencing, endonuclease digestion, and methylation detection.

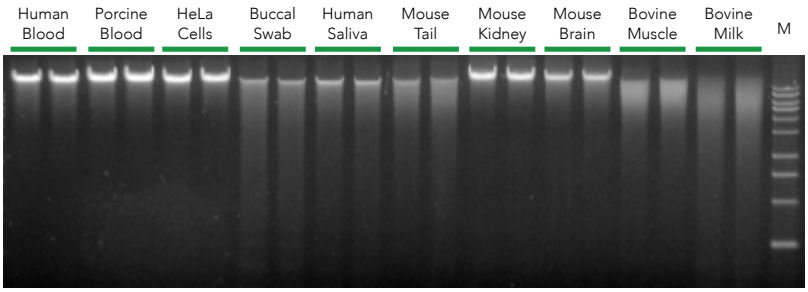
Accommodates a Wide Variety of Samples



Technology Overview: *Quick*-DNA™ Kits

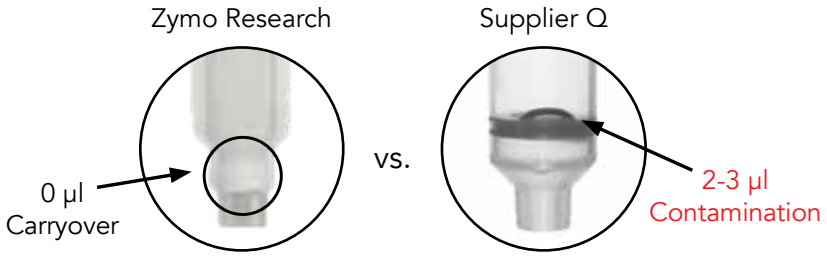
The *Quick*-DNA™ Kits are a simple solution for high-yield, ultra-pure total DNA extraction (e.g., genomic, plasmid, mitochondrial, viral) from any biological fluid, cell culture, or solid tissue sample. *Quick*™ technology ensures the fastest isolation of high-quality DNA by using a streamlined workflow optimized for nearly any sample type. These products feature a novel Zymo-Spin™ Column capable of effectively eluting high molecular weight DNA in as little as 10 µl. DNA is ultra-pure, highly concentrated, and immediately ready for any sensitive downstream application.

High-quality DNA from any sample



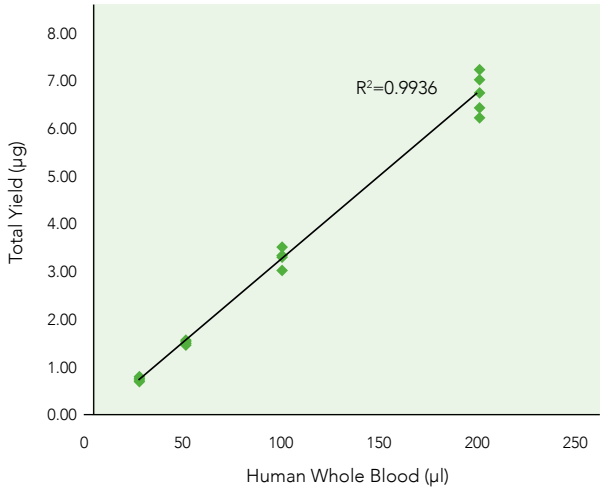
High-quality DNA obtained from a wide range of biological samples using the *Quick*-DNA™ Miniprep Plus Kit. DNA purified using the *Quick*-DNA™ Miniprep Plus Kit is ultra-pure, highly concentrated, and ready for all downstream applications. Input DNA was standardized to 300 ng and analyzed in a 1% (w/v) TAE/agarose/EtBr gel (shown above). The size marker "M" is a 1 kb ladder (Zymo Research).

Purity Redefined



Zymo-Spin™ technology ensures no carryover of buffer, salts, or other PCR inhibitors. DNA is ready for all sensitive downstream applications such as qPCR, Next-Generation sequencing arrays, and methylation analysis.

Reliable & Consistent



DNA yields increase linearly with increasing volumes of human whole blood using the *Quick*-DNA™ Miniprep Plus Kit. Six replicates of 25, 50, 100, and 200 µl of human whole blood were processed.

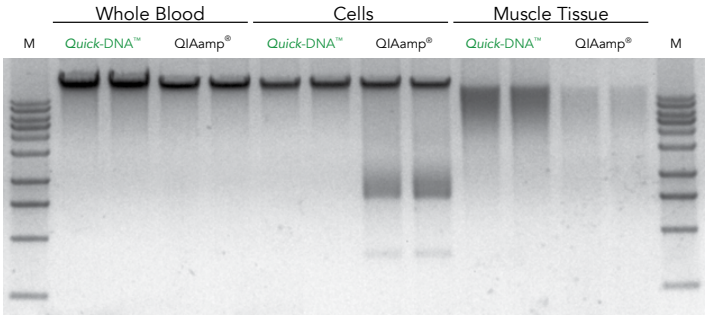
Quick-DNA™ Plus Kits

Highlights

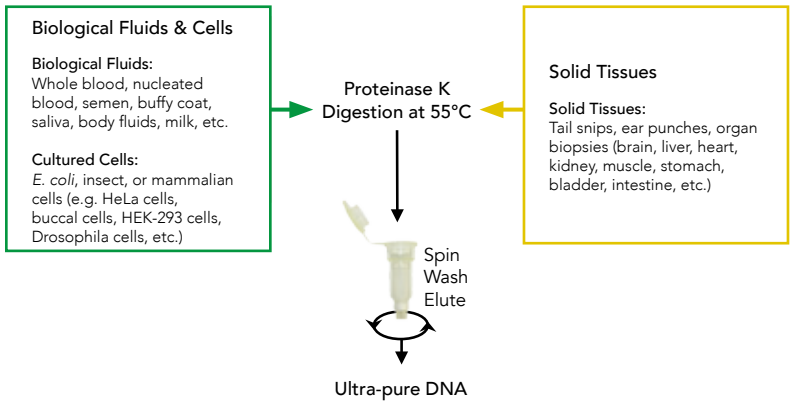
- *Purify high-quality DNA easily and reliably from any sample source (biological fluids, cultured/monolayer cells, solid tissues, etc.).*
- *Zymo-Spin™ technology ensures DNA is ultra-pure and ready for all sensitive downstream applications such as qPCR, DNA-sequencing, arrays, and methylation analysis.*

Description

The *Quick*-DNA™ Plus Kits are the easiest method for high-yield total DNA extraction (e.g., genomic, plasmid, mitochondrial, viral) from any biological fluid, cell culture, or solid tissue sample. Innovative reagents and Zymo-Spin™ Column technologies allow for ultra-pure and concentrated genomic DNA > 50 kb to be eluted in as little as 10 µl. Zymo-Spin™ Columns ensure no buffer retention. Purified DNA is RNA-free, bypassing the need for RNase A treatment and enables accurate quantification. Isolated DNA is ideal for immediate use in sensitive downstream applications including qPCR, DNA-seq, arrays, and methylation analysis.



The *Quick*-DNA™ Miniprep Plus Kit yields highly concentrated DNA without RNA contamination when compared to the QIAamp® (Qiagen) utilizing porcine whole blood, HeLa cells, and bovine muscle tissue. The resulting DNA from each sample was analyzed in a 1% (w/v) TAE/agarose/EtBr gel.



Product	Cat. No.	Size	Specifications	Uses
Quick-DNA™ Microprep Plus Kit	D4074	50 preps.	Format: Spin-Column Elution Volume: ≥ 10 µl Binding Capacity: 5 µg	Lysis method: Proteinase K and chemical denaturation Total DNA isolation from: Fresh/frozen soft tissue; Solid tissue; Cultured cells; Buccal cells/swabs; Buffy coat; Whole blood; Semen; Mitchondria; Viral DNA
Quick-DNA™ Miniprep Plus Kit	D4068T	10 preps.	Format: Spin-Column Elution Volume: ≥ 50 µl Binding Capacity: 25 µg	
	D4068	50 preps.		
	D4069	200 preps.		
Quick-DNA™ Midiprep Plus Kit	D4075	25 preps.	Format: Spin-Column Elution Volume: ≥ 150 µl Binding Capacity: 125 µg	
Quick-DNA™ 96 Plus Kit	D4070	2 x 96 preps.	Format: Spin-Column Elution Volume: ≥ 15 µl Binding Capacity: 5 µg	
	D4071	4 x 96 preps.		

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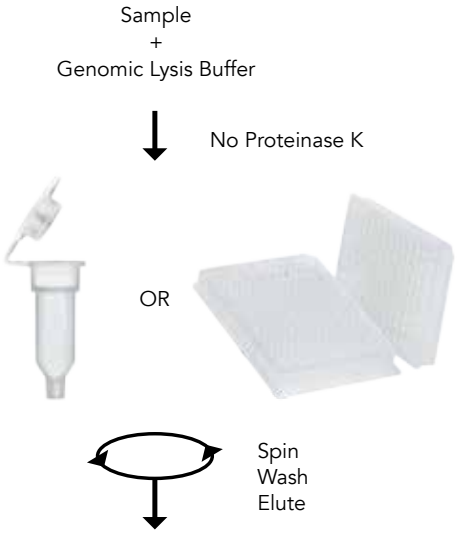
Quick-DNA™ Kits

Highlights

- *Easy purification of high-quality DNA from whole blood, buffy coat, swabs, or cultured cells.*
- *Protocol excludes the use of Proteinase K and organic denaturants for biofluid and cell samples.*
- *Eluted, inhibitor-free DNA is ideal for PCR, endonuclease digestion, bisulfite conversion/ methylation detection, sequencing, genotyping, etc.*

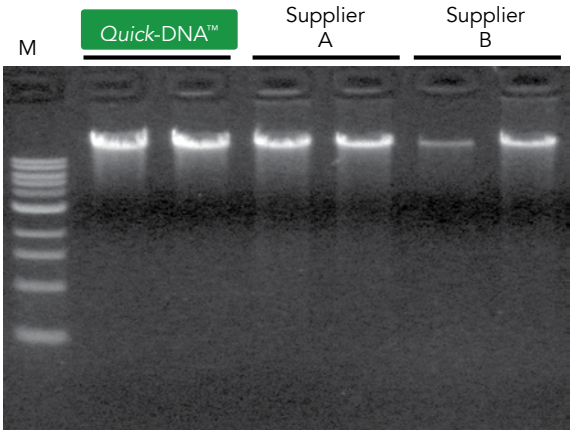
Description

The *Quick*-DNA™ Kits are ideal for easy, rapid isolation of total DNA (e.g., genomic, mitochondrial, viral) from a variety of biological sample sources. Whole blood (fresh or stored), buffy coat, buccal cells, cells from culture, and other biological liquid samples can be processed with these kits. Zymo-Spin™ Column/Plate technology enables high-quality DNA purification in minutes. PCR inhibitors are effectively removed, and the eluted DNA is ideal for PCR, nucleotide blotting, DNA sequencing, restriction endonuclease digestion, bisulfite conversion/methylation analysis, and other downstream applications.



Ultra-pure DNA for...

- ✓ PCR
- ✓ Endonuclease Digestion
- ✓ Genotyping
- ✓ Bisulfite Conversion & Methylation Analysis



DNA isolated from porcine whole blood using the *Quick*-DNA™ Miniprep Kit. Equivalent amounts (100 µl) of blood were processed without Proteinase K using the *Quick*-DNA™ Miniprep Kit in half the time as compared to the kits from suppliers A and B. Equal volumes of eluted DNA were then analyzed (in duplicate) in a 0.8% (w/v) TAE/ agarose/ethidium bromide gel. The size marker "M" is a 1 kb ladder (Zymo Research).

Product	Cat. No.	Size	Specifications	Uses
Quick-DNA™ Microprep Kit	D3020	50 preps.	Format: Spin-Column Elution Volume: ≥ 10 µl Binding Capacity: 5 µg	Lysis Method: Chemical denaturation Total DNA isolation from: Cultured cells; buccal cells/swabs; buffy coat; whole blood; mitochondria without using Proteinase K
	D3021	200 preps.		
Quick-DNA™ Miniprep Kit	D3024	50 preps.	Format: Spin-Column Elution Volume: ≥ 50 µl Binding Capacity: 25 µg	
	D3025	200 preps.		
Quick-DNA™ 96 Kit	D3010	2 x 96 preps.	Format: 96-Well Elution Volume: ≥ 5 µl Binding Capacity: 5 µg	
	D3011	4 x 96 preps.		
	D3012	10 x 96 preps.		

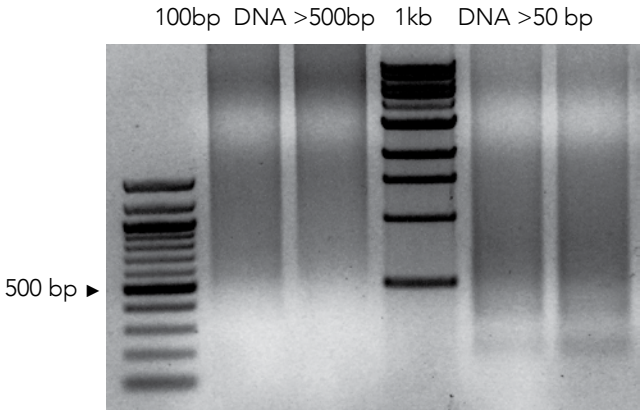
Quick-DNA™ FFPE Kit

Highlights

- *Streamlined purification of high-quality FFPE tissue DNA that is ideal for PCR, Next-Generation library prep, enzymatic manipulations, etc.*
- *Size selection technology; recover total DNA >50 bp or >500 bp.*

Description

The *Quick*-DNA™ FFPE Kit provides a simple and reliable method for high-yield/quality DNA isolation from formalin-fixed, paraffin embedded (FFPE) tissue samples and sections. The unique chemistries of the kit have been optimized for maximum recovery of non-crosslinked, ultra-pure DNA without RNA contamination. Simply digest deparaffinized tissues using the provided Proteinase K, heat, and purify the DNA with the Zymo-Spin™ Columns in the kit. DNA >50 bp or >500 bp can be selectively isolated by altering the lysis buffer conditions as given in the protocol. PCR inhibitors are effectively removed during the isolation procedure, and eluted DNA is ideal for PCR, Next-Generation library prep, enzymatic manipulation, etc. Shown below is a schematic and performance overview of the procedure.



Equivalent amounts of DNA resolved in a 1% agarose/TAE/EtBr gel show binding conditions may be adjusted with the *Quick*-DNA™ FFPE Kit to selectively isolate DNA >50 bp or >500 bp. 100 bp DNA ladder and 1 kb DNA ladder from Zymo Research.

Product	Cat. No.	Size	Specifications	Uses
Quick-DNA™ FFPE Kit	D3067	50 preps.	Format: Spin-Column Sample Size: up to 25 mg tissue Binding Capacity: 25 µg Elution Volume: ≥ 30 µl	DNA isolation from: FFPE blocks; FFPE tissue sections

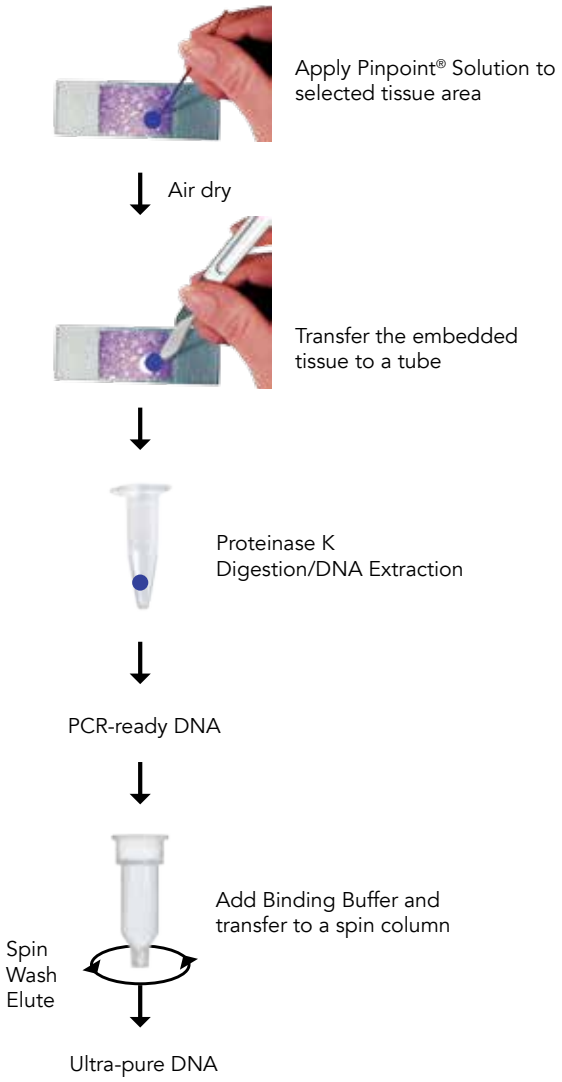
Pinpoint® Slide DNA Isolation System

Highlights

- *Convenient and streamlined method for the isolation of genomic DNA from targeted areas of fresh and FFPE tissue sections (slides).*
- *Features Pinpoint® tissue sampling technology and a one-step DNA extraction method.*

Description

The Pinpoint® Slide DNA Isolation System is an innovative product for the isolation of total DNA from targeted areas of fresh, frozen, and FFPE tissue sections. This eliminates the need for expensive specialized equipment or computer software. Instead, the system combines innovative Pinpoint® tissue sampling technology, Proteinase K digestion, and a one-step DNA extraction method for the isolation of DNA that is ideal for PCR, sequencing, etc.



Product	Cat. No.	Size	Specifications	Uses
Pinpoint® Slide DNA Isolation System	D3001	50 preps.	Format: Spin-Column Binding Capacity: 5 µg Elution Volume: ≥ 10 µl	DNA isolation from targeted ares of: tissue sections; FFPE tissue sections; glass slides

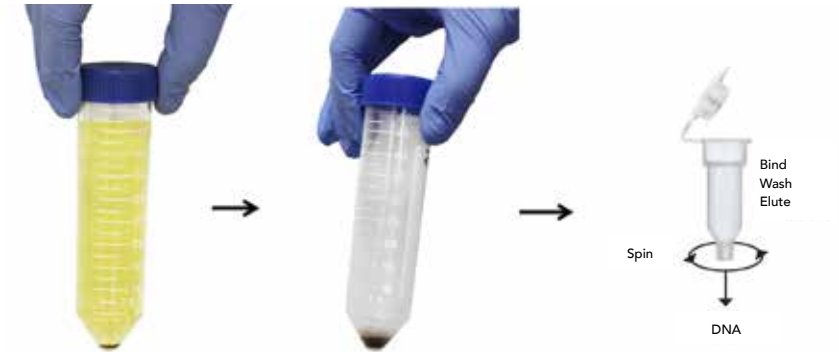
Quick-DNA™ Urine Kit

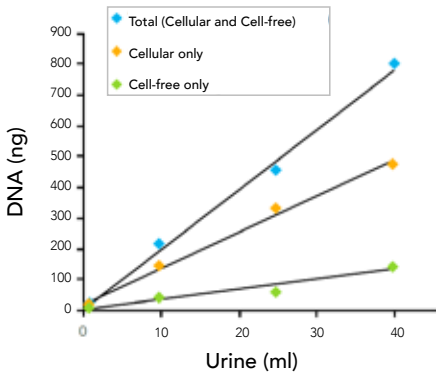
Highlights

- *Purify cellular and/or cell-free DNA easily and reliably from up to 40 ml of urine.*
- *Uniquely formulated urine conditioning reagent allows stabilization of DNA in urine for up to one month at ambient temperature.*
- *Zymo-Spin™ Column technology ensures DNA is ready for all sensitive downstream applications including qPCR, DNA-sequencing, arrays, and DNA methylation analysis.*

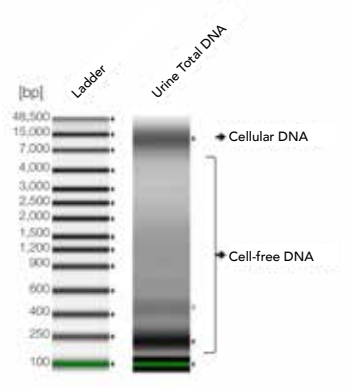
Description

The *Quick*-DNA™ Urine Kit is an innovative product designed for easy, reliable, and rapid isolation of cellular and/or cell-free DNA from up to 40 ml of urine. The product features a uniquely formulated urine DNA stabilization reagent, Urine Conditioning Buffer™, which also functions as a precipitation reagent. Urine Conditioning Buffer™ allows total urine or cell-free urine to be stored at ambient temperature for up to one month. When ready to extract the urine DNA, just add the Clearing Beads, vortex, and centrifuge to collect the precipitate. Following precipitation, chemical lysis and enzymatic digestion are used to extract DNA from the precipitate. The DNA is purified and concentrated using Zymo-Spin™ Columns. Urine DNA isolated from this is ideal for qPCR, array, methylation analysis, and other downstream applications.





DNA yields increase linearly with increasing volumes of urine from healthy subjects extracted using the *Quick*-DNA™ Urine Kit. DNA was isolated from 1 ml, 10 ml, 25 ml, and 40 ml urine. DNA concentration was quantified using the Femto™ Human DNA Quantification Kit (Zymo Research, E2005).



Both intact and fragmented DNA can be effectively purified from urine using the *Quick*-DNA™ Urine Kit. 5 ml of urine from a healthy female donor was processed and DNA was eluted in 20 µl final volume. 1 µl of the sample was analyzed using an Agilent 2200 TapeStation®.

Product	Cat. No.	Size	Specifications	Uses
Quick-DNA™ Urine Kit	D3061	50 preps.	Sample Volume: ≤ 40 ml Column Binding Capacity: 5 µg DNA Size: 100 bp to 23 kb	Cellular and cellular-free DNA isolation from urine

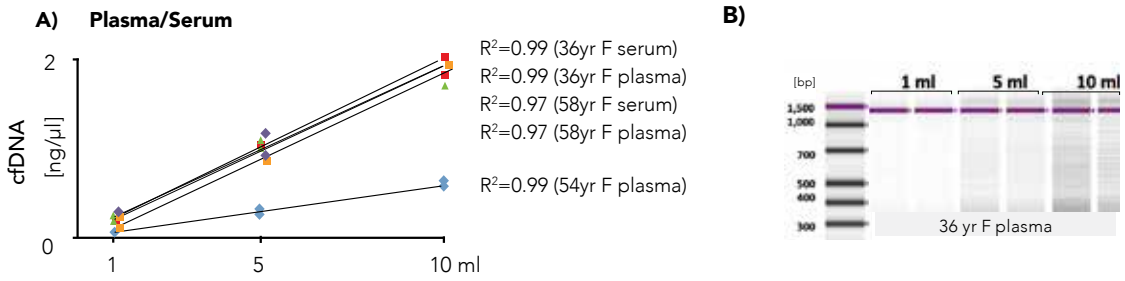
Quick-cfDNA™ Serum & Plasma Kit

Highlights

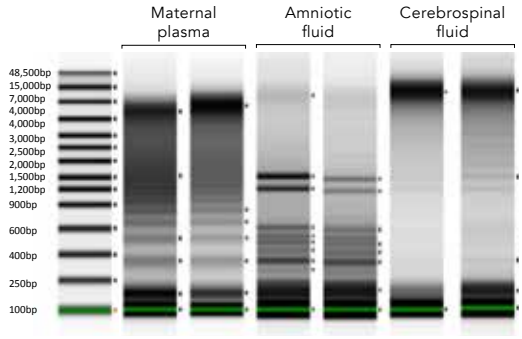
- *High-quality DNA, including cell-free, is easily and robustly purified from up to 10 ml of serum/plasma or up to 1 ml amniotic fluid or cerebrospinal fluid.*
- *Zymo-Spin™ Column technology enables elution of DNA in as little as 35 µl and ensures it is ready for all sensitive downstream applications such as qPCR and Next-Generation sequencing.*

Description

Quick-cfDNA™ Serum & Plasma Kit provides a simple and reliable method for the rapid preparation of high-quality circulating cell-free DNA from serum, plasma, amniotic fluid, and cerebrospinal fluid. A combination of chemical and enzymatic methods are used to efficiently recover total DNA (including cell-free apoptotic, necrotic, mitochondrial, and viral DNA) linearly from a wide range of sample volumes. Zymo-Spin™ Column technology allows for ultra-pure DNA to be eluted in as little as 35 µl water. The resulting DNA is ideal for all subsequent analyses and molecular manipulations such as qPCR, Next-Generation Sequencing and DNA methylation analyses.



Cell-free DNA recovery is directly scalable using the *Quick*-cfDNA™ Serum & Plasma Kit.
(A) Graphs and (B) gel image show the linear recovery of cfDNA from human plasma and serum (healthy female donors), as measured by Agilent 2200 TapeStation® (in duplicates).



Total DNA is efficiently purified from cell-free biological fluids with the *Quick*-cfDNA™ Serum & Plasma Kit. Total DNA, including both high and low molecular weight species, purified (duplicates) from human maternal plasma, amniotic fluid and cerebrospinal fluid was analyzed by Agilent 2200 TapeStation®.

Product	Cat. No.	Size	Specifications	Uses
Quick-cfDNA™ Serum & Plasma Kit	D4076	50 preps.	Compatable with vacuum and centrifuge Processing Volume: ≤10 ml DNA Recovery: ≥ 100bp Elution Volume: ≥ 35 µl	DNA isolation from: Serum; Plasma; Amniotic fluid; Cerebrospinal fluid; saliva; Ideal for cell-free DNA
Quick-cfDNA™ Serum & Plasma Buffer Set	D4076-A	Refill		

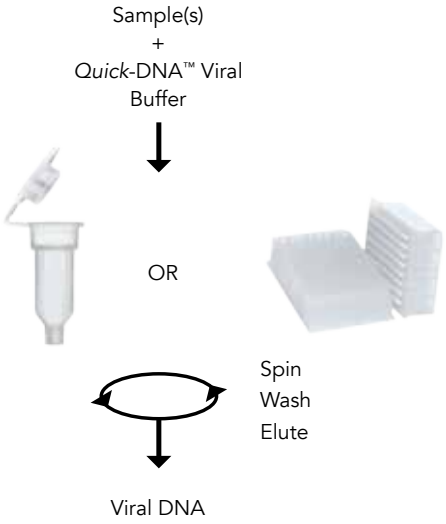
Quick-DNA™ Viral Kits

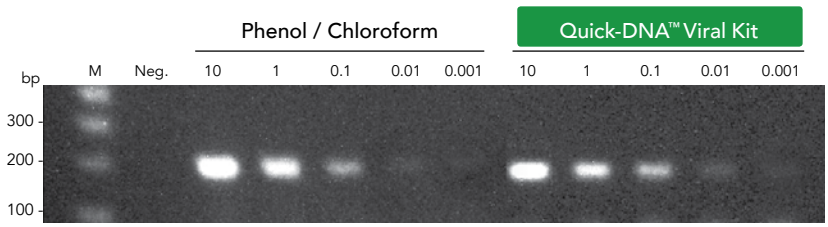
Highlights

- *Quick recovery of viral DNA from a wide range of sources using Zymo-Spin™ Column and Plate technologies.*
- *Column and plate designs allow DNA to be eluted at high concentrations into minimal volumes.*
- *Eluted DNA is suitable for PCR, Southern blotting, and restriction endonuclease digestion.*

Description

The *Quick*-DNA™ Viral Kits provide for the rapid isolation of high-quality viral DNA from a wide range of biological sources. A uniquely designed buffer is included for the efficient denaturation of viral particles in whole blood (fresh and stored), plasma, serum, tissue, ascites, cultured cells, and liquid samples. DNA can be eluted with elution buffer or water, and is ideal for subsequent PCR, nucleotide blotting, and restriction endonuclease digestion procedures.





Viral DNA purification. Human HBV DNA was isolated from 10 to 0.001 µl of human serum using phenol/chloroform or *Quick*-DNA™ Viral Kit. The presence of HBV DNA is evidenced by a ~200 bp PCR amplicon. Lane M is a 100 bp DNA Ladder and "Neg." is the negative control for PCR.

Product	Cat. No.	Size	Specifications	Uses
Quick-DNA™ Viral Kit	D3015	50 preps.	Format: Spin Column Elution Volume: ≥ 6 µl Processing Time: 15 minutes Binding Capacity: 5 µg DNA Size Limits: 100 bp - 50 kb	Viral DNA isolation from: Fresh/frozen soft tissue; Cultured cells; Whole blood
	D3016	200 preps.		
Quick-DNA™ Viral 96 Kit	D3017	2 x 96 preps.	Format: 96-Well Elution Volume: ≥ 10 µl Processing Time: 25 minutes Binding Capacity: 5 µg DNA Size Limits: 100 bp - 50 kb	
	D3018	4 x 96 preps.		

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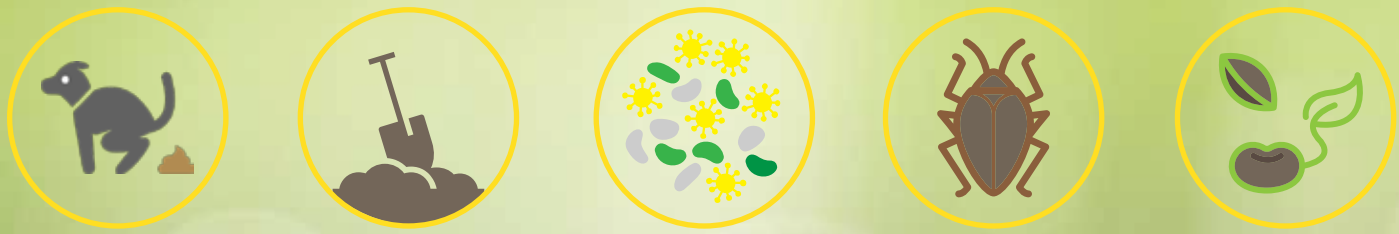
Environmental DNA Purification using *Quick*-DNA™ Kits

Innovation. Pure & Simple.™

Bead bashing is often required for the efficient processing of tough-to-lyse organisms and environmental samples. Our environmental purification kits feature unique BashingBead™ technology, which allows isolation of DNA from samples refractory to conventional lysis procedures including tough-to-lyse tissues, soil samples, feces, plants, seeds, food, arthropods, Gram-positive and negative bacteria, yeast, filamentous fungi, unicellular and filamentous algae, and protozoa. These products lead to high-yield and high-quality DNA suitable for downstream applications such as PCR, sequencing, hybridization, restriction digestion, and other enzymatic processes.

Environmental samples provide a unique challenge not present in other types of sample processing and analysis. Due to the inhibitors typically found in feces and soil, there is a need for inhibitor removal during the DNA purification process. These inhibitors - including humic acid, tannic acid, fulvic acid, heme, and polyphenolic compounds - can significantly affect downstream applications. Our *OneStep*™ PCR Inhibitor Removal technology, featured in every one of our environmental kits, contains all the components needed for efficient removal of contaminants that can inhibit downstream enzymatic reactions (e.g. PCR and RT-PCR) from DNA and RNA preparations.



Technology Overview: BashingBead™ Lysis & Environmental DNA Purification

The BashingBead™ DNA purification kits from Zymo Research are for rapid recovery of PCR-ready DNA from a broad range of tough-to-lyse organisms and environmental samples. Kits have been specifically designed for the efficient recovery of inhibitor-free DNA from plants, seeds, tissues, insects, and microorganisms that inhabit soil, sludge, sediment, or fecal samples. Products are available in spin-column Micro- (5 µg/prep), Mini- (25 µg/prep), Midi- (125 µg/prep) and 96-well (5 µg/well) formats – these formats are diagramed below and on the following pages.

For processing, samples are simply transferred to the provided ZR BashingBead™ Lysis Tubes where samples are rapidly and efficiently lysed by bead beating in novel lysis buffers. Processing the samples can be performed using any bead mill, pulverizer, or vortex that can accommodate standard 2.0 ml, 50 ml tubes, or 96-well blocks, depending on the format of the kit. Following lysis, DNA is isolated using innovative Zymo-Spin™ Column and Plate technologies, and in cases where plant, feces, or soil samples are processed, the DNA is subsequently filtered to remove humic/fulvic acids or polyphenols that can inhibit PCR. The isolation of inhibitor-free DNA is accomplished in as little as 15 minutes.

Microprep & Miniprep Formats

Pulverize Sample with
ZR BashingBead™ Lysis Tube

Filter Lysate with
Zymo-Spin™ IV

Bind, Wash, Elute DNA
with Zymo-Spin™ IC or IIC

PCR Ready Ultra-pure DNA

Continue with the following step for
Quick-DNA™ Fecal/Soil Microbe &
and *Quick*-DNA™ Plant/Seed DNA Kits only.

Polyphenolic Removal with
Zymo-Spin™ IV-µHRC or IV-HRC

PCR Ready, Ultra-pure DNA

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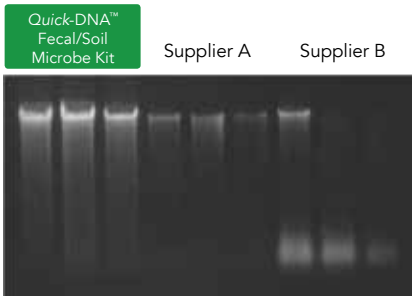
Quick-DNA™ Fecal/Soil Microbe Kits

Highlights

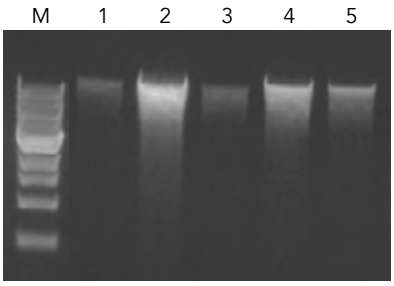
- *Rapid methods for the isolation of inhibitor-free, PCR-quality DNA from fecal, soil, and microbial samples in minutes including tough-to-lyse bacteria, fungi, algae, and protozoa.*
- *Ultra-high density BashingBeads™ are fracture resistant and chemically inert.*
- *Zymo-Spin™ Column and unique filtration technologies effectively removes PCR inhibitors from the DNA product.*

Description

The *Quick*-DNA™ Fecal/Soil Microbe Kits are designed for the simple and rapid isolation of inhibitor-free, PCR-quality DNA from microbes in soil and feces. This kit can be used to isolate DNA from variety of soils (clay, sandy, silty, peaty, chalky, and loamy) and feces (humans, birds, rats, mice, cattle, etc.). Tough-to-lyse bacteria, fungi, protozoa, and algae are all rapidly and efficiently lysed by bead beating with our state-of-the-art, ultra-high density BashingBeads™. Zymo-Spin™ Column or Plate technology is then used to isolate the DNA, which is subsequently filtered to remove humic acids/polyphenols that can inhibit PCR. The procedures can be performed in minutes, and there is no need for organic denaturants or proteinases. Eluted DNA is ideal for downstream molecular-based applications including PCR, arrays, genotyping, methylation detection, etc.



Comparison of DNA yields from rat feces using the *Quick*-DNA™ Fecal/Soil Microbe Kit and kits from suppliers A and B. Equivalent amounts of feces were processed using each kit and then equal volumes of eluted DNA were analyzed in a 0.8% (w/v) agarose/ethidium bromide gel. Samples were processed in triplicate.



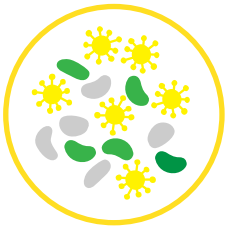
Metagenomic DNA isolated from 5 soil samples. M: 1 kb marker (NEB); 1-5: soil samples (sand, sandy clay loam, hydrophobic sandy loam course, sandy loam, fine gravel).

Product	Cat. No.	Size	Specifications	Uses
Quick-DNA™ Fecal/Soil Microbe Microprep Kit	D6012	50 preps.	Format: Spin-Column Binding Capacity: 5 µg Elution Volume: ≥ 10 µl Processing Time: 15 min.	Total DNA isolation from: Feces; Gram (+) bacteria; Gram (-) bacteria; yeast; filamentous fungi; unicelluar algae; filamentous algae; protist; soil, sludge, clay
Quick-DNA™ Fecal/Soil Microbe Miniprep Kit	D6010	50 preps.	Format: Spin-Column Binding Capacity: 25 µg Elution Volume: ≥ 20 µl Processing Time: 15 min.	
Quick-DNA™ Fecal/Soil Microbe Midiprep Kit	D6110	25 preps.	Format: Spin-Column Binding Capacity: 125 µg Elution Volume: ≥ 150 µl Processing Time: 25 min.	
Quick-DNA™ Fecal/Soil Microbe 96 Kit	D6011	2 X 96 preps.	Format: 96-Well Binding Capacity: 5 µg Elution Volume: ≥ 50 µl Processing Time: 50 min.	
Quick-DNA™ Fecal/Soil Microbe 96 Magbead Kit (includes ZR BashingBead™ Lysis Rack)	D6010-FM	2 X 96 preps.	Format: 96-Well Binding Capacity: 5-20 µg Elution Volume: 50-200 µl Processing Time: 90 minutes	
Quick-DNA™ Fecal/Soil Microbe 96 Magbead Kit (Lysis Matrix Not Included)	D6011-FM			
Quick-DNA™ Fecal/Soil Microbe 96 Magbead Kit (includes ZR BashingBead™ Lysis Tubes)	D6012-FM			

Quick-DNA™ Fungal/Bacterial Kits

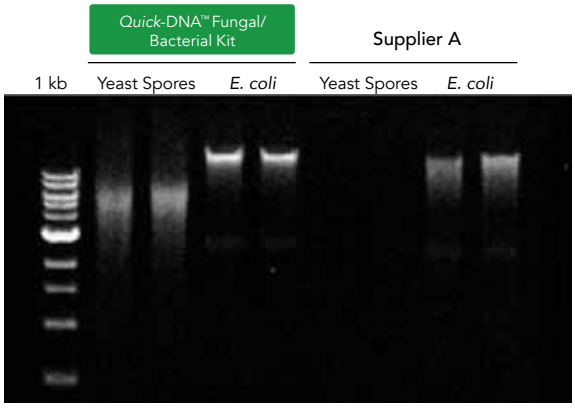
Highlights

- *Simple, efficient isolation of DNA from all types of tough-to-lyse fungi and bacteria in minutes.*
- *Ultra-high density BashingBeads™ are fracture resistant and chemically inert.*



Description

The *Quick*-DNA™ Fungal/Bacterial Kits are designed for the simple and rapid isolation of DNA from tough-to-lyse fungi, including *A. fumigatus, C. albicans, N. crassa, S. cerevisiae, S. pombe,* as well as Gram-positive/negative bacteria, algae, and protozoa. The procedures are easy and can be completed in minutes. Fungal and/or bacterial samples are rapidly and efficiently lysed with our state-of-the-art, ultra-high density BashingBeads™. Zymo-Spin™ technology is then used to isolate the DNA, which is ideal for downstream molecular-based applications including PCR, array, etc.



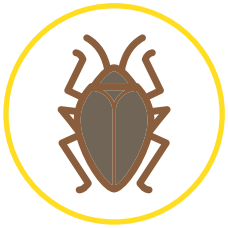
Fungal and bacterial DNA purification. DNA isolated from *Saccharomyces cerevisiae* (spores) and *E. coli* using the *Quick*-DNA™ Fungal/Bacterial Kit is high-quality and structurally intact. Equivalent amounts of yeast and bacteria were processed using the *Quick*-DNA™ Fungal/Bacterial Kit or the kit from Supplier A. Equal volumes of eluted DNA were then analyzed in a 0.8% (w/v) agarose/ethidium bromide gel. The size marker is a 1 kb ladder (Zymo Research).

Product	Cat. No.	Size	Specifications	Uses
Quick-DNA™ Fungal/Bacterial Microprep Kit	D6007	50 preps.	Format: Spin-Column Binding Capacity: 5 µg Elution Volume: ≥ 10 µl Processing Time: 10 minutes	Total DNA isolation from: Gram (+) bacteria; Gram (-) bacteria; Yeast; Filamentous fungi; Unicellular algae; Filamentous algae; Protist; Either fungi or bacteria grown in media
Quick-DNA™ Fungal/Bacterial Miniprep Kit	D6005	50 preps.	Format: Spin-Column Binding Capacity: 25 µg Elution Volume: ≥ 25 µl Processing Time: 10 minutes	
Quick-DNA™ Fungal/Bacterial Midiprep Kit	D6105	25 preps.	Format: Spin-Column Binding Capacity: 125 µg Elution Volume: ≥ 150 µl Processing Time: 20 minutes	
Quick-DNA™ Fungal/Bacterial 96 Kit	D6006	2 x 96 preps.	Format: 96-Well Binding Capacity: 5 µg Elution Volume: ≥ 25 µl Processing Time: 40 minutes	

Quick-DNA™ Tissue/Insect Kits

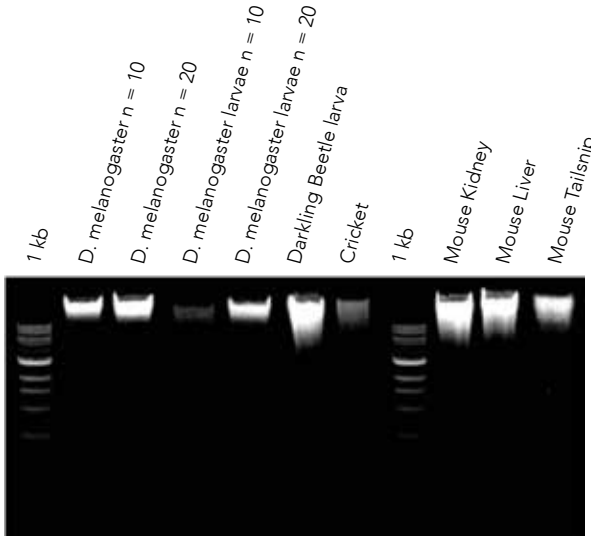
Highlights

- *Simple and efficient isolation of DNA from insects, including mosquitoes, bees, lice, ticks, and D. melanogaster. Also compatible with tough-to-lyse tissues from other organisms.*
- *Ultra-high density BashingBeads™ are fracture resistant and chemically inert.*



Description

The *Quick*-DNA™ Tissue/Insect Kits are designed for the simple and rapid isolation of DNA (e.g., genomic, viral, mitochondrial) from fresh, frozen, or stored insect specimens - including mosquitoes, bees, lice, ticks, and *D. melanogaster*. The procedures are easy and can be completed in minutes. All kits are compatible with mammalian tissues, whole blood, and cultured cells. Samples are rapidly and efficiently lysed by bead beating with our state-of-the-art, ultra-high density BashingBeads™. The DNA is then isolated and purified using our Zymo-Spin™ technology and is ideal for downstream molecular-based applications including PCR, array, genotyping, etc.



DNA yields from various insect and mouse samples using the *Quick*-DNA™ Tissue/Insect Kit. Various amounts of sample were processed with equal volumes of eluted DNA analyzed in a 0.8% (w/v) agarose/ethidium bromide gel. The 1 kb DNA size marker is from Zymo Research.

Product	Cat. No.	Size	Specifications	Uses
Quick-DNA™ Tissue/Insect Microprep Kit	D6015	50 preps.	Format: Spin-Column Binding Capacity: 5 µg Elution Volume: ≥ 10 µl Processing Time: 10 minutes	DNA isolation from: Insects/arthropods; tough-to-lyse tissues; tough-to-lyse organisms; soft & solid tissues (food)
Quick-DNA™ Tissue/Insect Miniprep Kit	D6016	50 preps.	Format: Spin-Column Binding Capacity: 25 µg Elution Volume: ≥ 25 µl Processing Time: 10 minutes	
Quick-DNA™ Tissue/Insect Midiprep Kit	D6115	25 preps.	Format: Spin-Column Binding Capacity: 125 µg Elution Volume: ≥ 150 µl Processing Time: 20 minutes	
Quick-DNA™ Tissue/Insect 96 Kit	D6017	2 x 96 preps.	Format: 96-Well Binding Capacity: 5 µg Elution Volume: ≥ 25 µl Processing Time: 40 minutes	

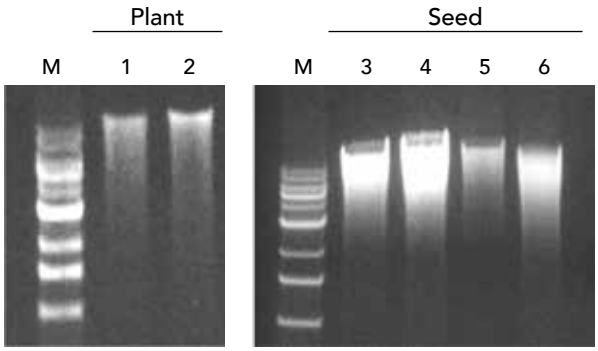
Quick-DNA™ Plant/Seed Kits

Highlights

- *Simple methods for the isolation of DNA from tough-to-lyse plant and seed samples in minutes.*
- *Ultra-high density BashingBeads™ are fracture resistant and chemically inert.*
- *Zymo-Spin™ Column technology coupled with filtration removes polyphenolic PCR inhibitors from the DNA product.*

Description

The *Quick*-DNA™ Plant/Seed DNA Kits are designed for the simple and rapid isolation of inhibitor-free, PCR-quality DNA from a variety of plant sample sources, including leaves, stems, buds, flowers, fruit, seeds, etc. The procedures are easy and can be completed in minutes. Plant samples are rapidly and efficiently lysed by bead beating with our state-of-the-art, ultra-high density BashingBeads™. Polysaccharides, lipids, and polyphenols/tannins are removed from the DNA using our Zymo-Spin™ technology. The eluted DNA is filtered to remove polyphenolics, making it ideal for downstream molecular-based applications including PCR, arrays, etc.



Comparison of DNA yields from various plant and seed samples using the *Quick*-DNA™ Plant/Seed Kit. Equivalent amounts of plant materials were processed with equal volumes of eluted DNA analyzed in a 0.8% (w/v) agarose/ethidium bromide gel. M is a 1 kb DNA size marker (Zymo Research). *Arabidopsis thaliana* (1), juniper (2), corn kernel (3, 4), sunflower seed (5, 6).

Product	Cat. No.	Size	Specifications	Uses
Quick-DNA™ Plant/Seed Microprep Kit	D6022	50 preps.	Format: Spin-Column Binding Capacity: 5 µg Elution Volume: ≥ 10 µl Processing Time: 15 minutes	DNA isolation from: leaves; other plant material; seeds; fruit
Quick-DNA™ Plant/Seed Miniprep Kit	D6020	50 preps.	Format: Spin-Column Binding Capacity: 25 µg Elution Volume: ≥ 25 µl Processing Time: 15 minutes	
Quick-DNA™ Plant/Seed 96 Kit	D6021	2 x 96 preps.	Format: 96-Well Binding Capacity: 5 µg Elution Volume: ≥ 50 µl Processing Time: 50 minutes	

DNA Clean-up

DNA Clean-Up from any Enzymatic Reaction

High-quality, inhibitor-free DNA is crucial for successful PCR, DNA ligation/cloning, sequencing, arrays, etc. Our scientists have developed the most comprehensive technologies for DNA clean-up and concentration from any preparation. Core to these products is the total removal of salts/alcohol from samples with uniquely designed spin-columns and plates that ensure complete elution with no binding/wash buffer carryover. Coupled with uniquely formulated buffers, these technologies assure the purification of high-quality DNA without the inclusion of inhibitors.

Technology Overview: DNA Clean & Concentrator®

Zymo Research pioneered rapid, efficient DNA clean-up and concentration with the introduction of its DNA Clean & Concentrator® (DCC®) product line. Since its inception, the DCC® family of products has evolved into one of the most efficient and versatile methods for cleaning and concentrating DNA from a range of sample sources into minimal elution volumes (i.e., ≥ 6 µl). DNA is effectively desalted and concentrated from PCR, endonuclease digestions, DNA modification reactions, isotope/fluorescence labeling reactions, etc. DNA recovered with the DCC® kits is ideal for use in subsequent sequencing, cloning, ligation, microarray, and endonuclease digestion procedures. The DCC® kits are available as DCC®-5, DCC®-25, DCC®-100, and DCC®-500 formats that are based on the maximal DNA binding capacities (in micrograms) per column treatment. Also, the Genomic DNA Clean & Concentrator® is available for rapid clean-up of large-sized DNA (up to and ≥ 200 kb) making it ideal for genomic DNA clean-up. The Oligo Clean & Concentrator™ provides a streamlined method for efficient recovery and clean-up of DNA fragments and oligonucleotides ≥16 nt. Select-a-Size DCC® is an innovative technology with size selection capabilities that are commonly used for Next-Generation Sequencing cleanups.

Which DNA Clean & Concentrator® Kit should I use?

DNA Clean & Concentrator® Kits

Ultra pure DNA in 2 minutes (50 bp to 23 kb) from PCR, impure preps and enzymatic digestions

Page 84-85

Format:
Spin-Column
96-Well Plate

Genomic DNA Clean & Concentrator® Kits

High molecular weight DNA clean-up (1 kb to > 200 kb)

Page 88

Format:
Spin-Column
96-Well Plate

Oligo Clean & Concentrator™ Kits

DNA & RNA oligos and probes (16 to 200 nt)

Page 86

Format:
Spin-Column
96-Well Plate

***Select-a-Size* DNA Clean & Concentrator®**

High-quality, size selected DNA in 7 minutes (library preparation and NGS applications)

Page 87

Format:
Spin-Column

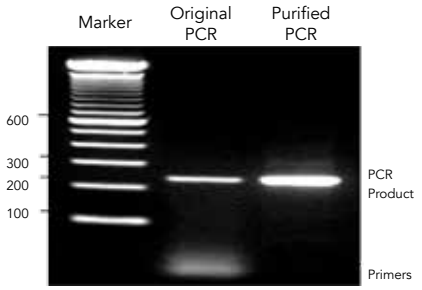
DNA Clean & Concentrator®-5 Kits

Highlights

- *Clean and concentrate up to 5 µg DNA with ≥ 6 µl elution volume in as little as two minutes with 0 µl wash residue carryover.*
- *Column and deep-well filtration plate designs allow DNA to be eluted at high concentrations into minimal volumes of water or TE buffer.*
- *Eluted DNA is optimal for any down stream molecular biology application.*

Description

The DNA Clean & Concentrator®-5 and ZR-96 DNA Clean & Concentrator®-5 kits provide purification of up to 5 µg DNA from PCR, endonuclease digestions, DNA modification reactions, isotope/fluorescence labeling reactions, etc. The kits facilitate the removal of DNA polymerases, modifying enzymes, RNA polymerases, ligases, kinases, nucleases, phosphatases, and restriction endonucleases, as well as free dNTPs and their analogs including radiolabeled and fluorescent derivatives. Eluted DNA is suitable for PCR, arrays, ligation, sequencing, etc.



Clean & Concentrated DNA. DNA samples, such as the PCR products shown here, can be efficiently purified and concentrated using the DNA Clean & Concentrator®-5.

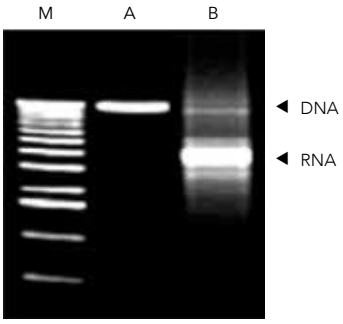
DNA Clean & Concentrator®-25 Kit

Highlights

- *Quick (2 minute) desalting and recovery of ultra-pure DNA from enzymatic reactions (e.g., PCR and endonuclease digestions), cell-free lysates, etc.*
- *Column design allows DNA to be eluted at high concentrations into minimal volumes.*

Description

The DNA Clean & Concentrator®-25 (DCC®-25) is designed for rapid desalting and purification of up to 25 µg DNA from enzymatic reactions (e.g., PCR), endonuclease digestions, or cell-free lysates. Simply add the specially formulated DNA Binding Buffer to your sample and transfer to the supplied Zymo-Spin™ Column. The product features Zymo-Spin™ Column technology, which yields high-quality, purified DNA in just minutes and it is compatible with cDNA and ssDNA. Eluted DNA is suitable for sequencing, microarray analysis, PCR, nucleotide blotting, and restriction endonuclease digestion procedures.



The DNA Clean & Concentrator® yields high-quality DNA for efficient transcription reactions. Lanes: M: 1 kb Marker (Zymo Research); (A) DNA template purified using the DNA Clean & Concentrator®; (B) a 7 kb RNA transcript generated *in vitro* from A.

Product	Cat. No.	Size	Specifications	Uses
DNA Clean & Concentrator® -5 (uncapped columns)	D4003	50 preps.	Format: Spin-Column Elution Volume: ≥ 6 µl Processing Time: 2 minutes Binding Capacity: 5 µg DNA Size Limits: 50 bp - 23 kb	PCR clean-up; Enzyme removal; nucleotide/dye removal; cDNA/ssDNA purification; probe purification; lysate DNA clean-up; M13 phage
	D4003T	10 preps.		
	D4004	200 preps.		
DNA Clean & Concentrator® -5 (capped columns)	D4013	50 preps.		
	D4014	200 preps.		
ZR-96 DNA Clean & Concentrator®-5	D4023	2 x 96 preps.	Format: 96-Well, Deep Well Elution Volume: ≥ 10 µl Processing Time: 15 minutes Binding Capacity: 5 µg DNA Size Limits: 50 bp - 23 kb	
	D4024	4 x 96 preps.		
DNA Clean & Concentrator® -25 (uncapped columns)	D4005	50 preps.	Format: Spin-Column Elution Volume: ≥ 25 µl Processing Time: 2 minutes Binding Capacity: 25 µg DNA Size Limits: 50 bp - 23 kb	
	D4006	200 preps.		
DNA Clean & Concentrator® -25 (capped columns)	D4033	50 preps.		
	D4034	200 preps.		

DNA Clean & Concentrator® -100 & 500 Kits

Highlights

- *Simple, rapid recovery of ultra-pure DNA from PCR, endonuclease digestions, and cell-free DNA preps., etc.*
- *Unique column construction allows sample loading and washing to be performed using a centrifuge, microcentrifuge, vacuum source, or syringe.*

Description

The DNA Clean & Concentrator®-100 & 500 are designed for the rapid desalting and purification of up to 100 µg & 500 µg, respectively, of high-quality DNA from PCR, large format restriction endonuclease digestions, or cell-free lysates. Eluted DNA is ideal for nucleotide sequencing, array analysis, PCR, nucleotide blotting, restriction endonuclease digestion procedures, as well as many other downstream applications requiring high-quality DNA. The entire DNA purification/concentration procedure takes less than 20 minutes.

ZR-96 DNA Clean-up Kit™

Highlights

- *Quick (20 minute), large-scale recovery of ultra-pure DNA from PCR, endonuclease digestions, cell-free lysates, etc.*
- *Eluted DNA is well suited for use in PCR, DNA sequencing, DNA ligation, endonuclease digestion, RNA transcription, radiolabeling, etc.*

Description

The ZR-96 DNA Clean-up Kit™ provides for rapid, large-scale (96-well) purification and concentration of high-quality DNA from PCR samples, endonuclease digestions, or crude plasmid preparations. Simply add the specially formulated DNA Binding Buffer to your samples and transfer to the wells of the supplied Silicon-A™ Plate. No need for organic denaturants or chloroform, instead our Zymo-Spin™ Plate technology yields high-quality, purified DNA in just minutes.

Product	Cat. No.	Size	Specifications	Uses
DNA Clean & Concentrator® -100	D4029	25 preps.	Format: Spin-Column Elution Volume: ≥ 150 µl Processing Time: < 20 minutes Binding Capacity: 100 µg DNA Size Limits: 50 bp - 23 kb	PCR clean-up; enzyme removal; nucleotide/dye removal; cDNA/ssDNA purification; probe purification ; lysate DNA clean-up; M13 phage
	D4030	50 preps.		
DNA Clean & Concentrator® -500	D4031	10 preps.	Format: Spin-Column Elution Volume: ≥ 2 ml Processing Time: 20 minutes Binding Capacity: 500 µg DNA Size Limits: 50 bp - 23 kb	
	D4032	20 preps.		
ZR-96 DNA Clean-up Kit™	D4017	2 x 96 preps.	Format: 96-Well, Shallow Well Elution Volume: ≥ 30 µl Processing Time: 20 minutes Binding Capacity: 5 µg DNA Size Limits: 50 bp - 23 kb	
	D4018	4 x 96 preps.		

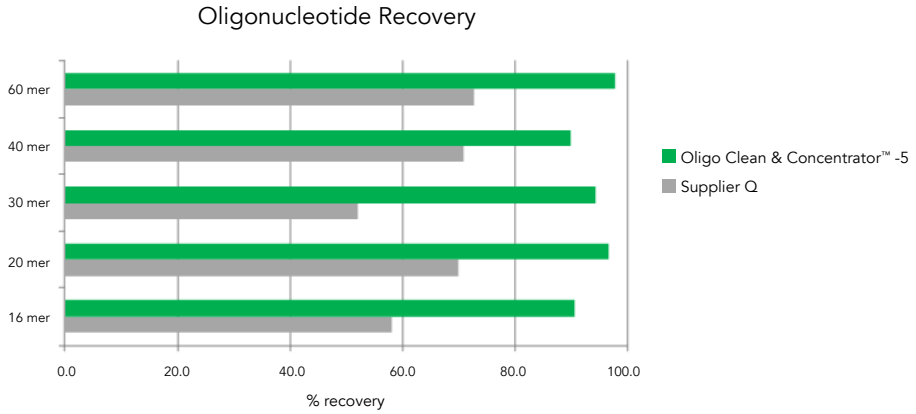
Oligo Clean & Concentrator™ Kits

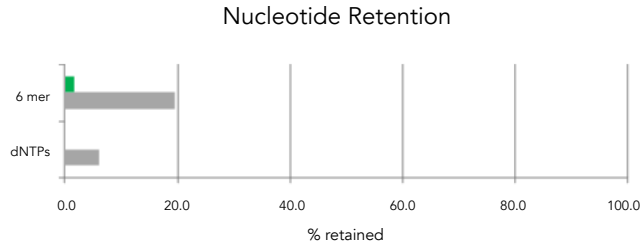
Highlights

- *Quick (2 minute) recovery of ultra-pure DNA and RNA oligonucleotides.*
- *Complete removal of dyes, salts, enzymes, nucleotides, and short oligos.*
- *Eluted DNA/RNA is well suited for use in hybridization, sequencing, PCR, ligation, etc.*

Description

The Oligo Clean & Concentrator™ provides a streamlined method for efficient recovery and clean-up of DNA fragments, oligonucletides ≥ 16 nt from labeling (radioactive, biotin, DIG, etc.) and other enzymatic reactions. Unincorporated nucleotides, short oligos, dyes, enzymes, and salts are effectively removed by the clean-up procedure. No need for organic denaturants or chloroform, our Zymo-Spin™ Columns employs a single-buffer system that allows for efficient DNA/RNA adsorption. DNA/RNA is washed and concentrated into a small volume of water (≥ 6 µl). Purified DNA/RNA, available in just two minutes, is ideal for hybridization, gel shift assays, enzymatic reactions, ligation, sequencing, microarray analysis, etc.





Product	Cat. No.	Size	Specifications	Uses
Oligo Clean & Concentrator™	D4060	50 preps.	Format: Spin-Column Elution Volume: ≥ 6 µl Processing Time: 2 minutes Binding Capacity: 10 µg ssDNA/RNA or 5 µg dsDNA Size Limit: ≥ 16 nt	Oglionucleotide clean-up; cDNA/ssDNA purification; Probe purification; Enzyme removal; Nucleotide/Dye removal
	D4061	200 preps.		
ZR-96 Oligo Clean & Concentrator™	D4062	2 x 96 preps.	Format: 96-Well Elution Volume: ≥ 10 µl Processing Time: 20 minutes Binding Capacity: 10 µg ssDNA/RNA or 5 µg dsDNA Size Limit: ≥ 16 nt	
	D4063	4 x 96 preps.		

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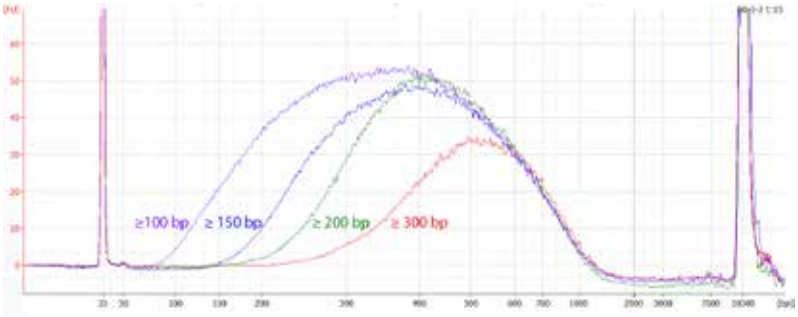
Select-a-Size DNA Clean & Concentrator® Kit

Highlights

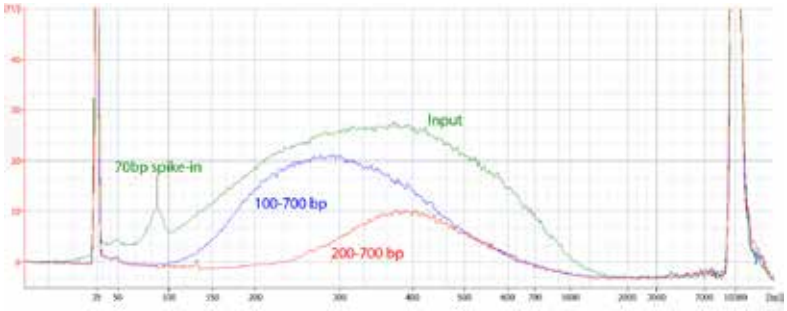
- *Quick (7 minute) protocol to select for ≥300 bp, ≥200 bp, ≥150 bp, ≥100 bp, ≥50 bp DNA fragments or perform a double size selection.*
- *Clean and concentrate DNA from enzymatic reactions in as little as 10 µl of DNA/RNA Free water.*
- *Eluted DNA is well suited for use in Next-Generation sequencing, PCR, DNA ligation, endonuclease digestion, RT-PCR, ChIP-seq, etc.*

Description

The Select-a-Size DNA Clean & Concentrator® Kit provides the quickest and easiest method for purifying a desired range of DNA fragment sizes from PCR, endonuclease digestions, ligations, etc. Simply adjust the binding conditions for the desired cutoff then bind, wash, and elute. Selectively recover 50 to ≥300 bp DNA fragments or perform a double size selection. Our Zymo-Spin™ Column technology yields high-quality DNA, in as little as seven minutes, that is ideal for Next-Generation sequencing, PCR, and other downstream applications.



***Select-a-Size* DNA Clean & Concentrator® allows for selection at ≥300 bp, ≥200 bp, ≥150 bp, ≥100 bp and ≥50 bp.** DNA was size selected according to the Select-a-Size DNA Clean and Concentrator® protocol and the results were analyzed by Bioanalyzer. 700 ng of sonicated salmon sperm DNA was used as a standard input to evaluate size selection efficiency and cutoff. Eluted DNA was diluted 1:20 prior to being loaded on the High Sensitivity DNA ChIP for analysis.



***Select-a-Size* DNA Clean & Concentrator® can be used for double size selection of samples in ranges from 50-700, 100-700, 150-700, and 200-700.** The desired DNA range was selected according to the Select-a-Size DNA Clean and Concentrator® protocol and the results were analyzed by Bioanalyzer. 700 ng of sonicated salmon sperm DNA, and a 70 bp amplicon was used as a standard input to evaluate size selection efficiency and cutoff. Eluted DNA was diluted 1:20 before loading onto the Bioanalyzer High Sensitivity DNA ChIP for analysis.

Product	Cat. No.	Size	Specifications	Uses
Select-a-Size DNA Clean & Concentrator®	D4080	25 preps.	Format: Spin-Column Elution Volume: ≥ 10 µl Processing Time: 7 minutes Binding Capacity: 3 µg DNA Size Limits: 50 bp - 23 kb Cutoffs: ≥ 300, 200, 150, 100, 50 Double Size Selection	Next Generation sequencing; library prep; PCR clean-up; ligation

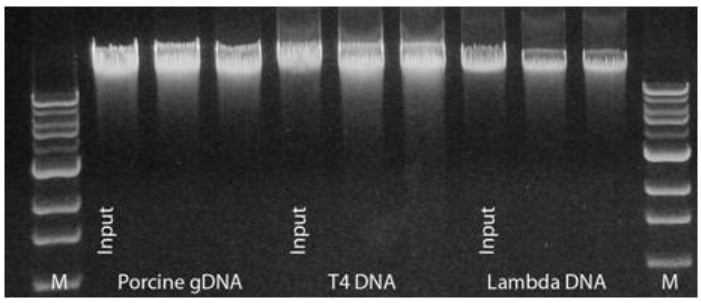
Genomic DNA Clean & Concentrator® Kits

Highlights

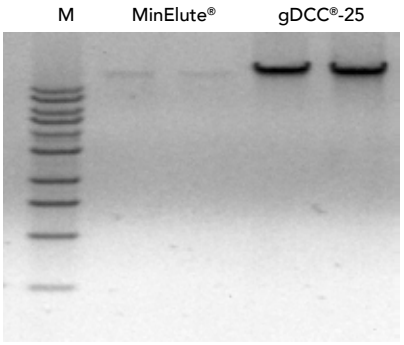
- *Quick (5 minute) spin-column recovery of large-sized DNA (e.g., genomic, mitochondrial, plasmid (BAC/PAC), viral, phage, (wga) DNA, etc.) from any enzymatic reaction or impure preparation (e.g., Proteinase K digestion). No messy precipitations!*
- *Unique spin-column for low volume (≥10 µl) elution of ultra-pure, high-yield DNA.*
- *Eluted DNA is ideal for PCR, restriction endonuclease digestion, Sanger and Next-Generation sequencing, etc.*

Description

The Genomic DNA Clean & Concentrator® is for quick recovery of ultra-pure, large-sized DNA (e.g., genomic, mitochondrial, plasmid (BAC/PAC), viral, phage, (wga) DNA, etc.) from any enzymatic reaction or impure preparation (e.g., Proteinase K digestion). No need for organic denaturants, chloroform, or messy precipitations, simply add the specially formulated ChIP DNA Binding Buffer to a sample and then transfer the mixture to the supplied Zymo-Spin™ Column. Eluted DNA is ideal for sequencing, PCR, endonuclease digestion, and other enzymatic procedures. The product is also compatible with smaller DNAs (50 bp to 10 kb) from PCR, digestions, crude plasmid preparations, cDNA synthesis, etc.



High molecular weight DNA is efficiently purified using the Genomic DNA Clean &Concentrator®-10. Porcine gDNA (~35-50 kb), T4 phage DNA (170 kb), and lambda (λ) phage DNA (48.5 kb) were purified (in duplicate) from input material using the Genomic DCC®. Eluted DNAs were analyzed in a 0.8% (w/v) TAE/agarose/EtBr gel. The size marker "M" is a 1 kb ladder (Zymo Research).



High molecular weight DNA is efficiently purified using the Genomic DNA Clean & Concentrator®-25. Lambda (λ) phage DNA (48.5 kb) was purified (in duplicate) from input material using the Minelute® (Qiagen) and the Genomic DCC®-25 (gDCC®-25). The gDCC®-25 resulted in yields > 40% compared to the MinElute®. Eluted DNAs were analyzed in a 0.8% (w/v) TAE/agarose/EtBr gel. The size marker "M" is a 1 kb ladder (Zymo Research).

Product	Cat. No.	Size	Specifications	Uses
Genomic DNA Clean & Concentrator®-10	D4010	25 preps.	Format: Spin Column Elution Volume: ≥ 10 µl Processing Time: 5 minutes Binding Capacity: 10 µg DNA Size Limit: 50 bp to ≥ 200 kb	High-molecular weight DNA clean-up; PCR clean-up; enzyme removal; nucleotide/dye removal; lysate DNA clean-up
	D4011	100 preps.		
Genomic DNA Clean & Concentrator®-25	D4064	25 preps.	Format: Spin Column Elution Volume: ≥ 35 µl Processing Time: 5 minutes Binding Capacity: 25 µg DNA Size Limit: 23 bp up to 200 kb	
	D4065	100 preps.		

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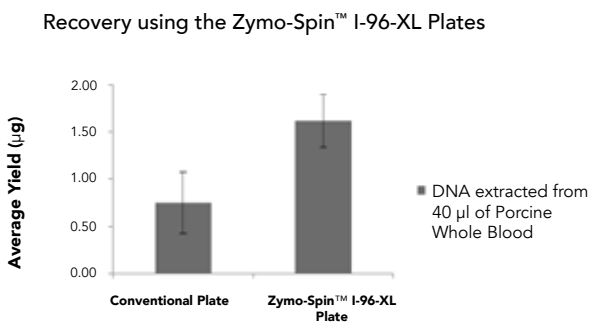
ZR-96 Genomic DNA Clean & Concentrator®-5

Highlights

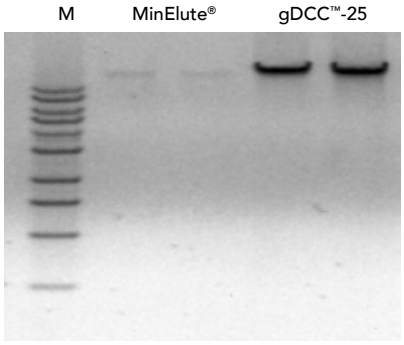
- *96-well plate recovery of large-sized DNA (e.g., genomic, mitochondrial, plasmid (BAC/PAC), viral, phage, (wga) DNA, etc.) from any enzymatic reaction or impure preparation (e.g., Proteinase K digestion). No messy precipitations!*
- *Unique plate for low volume (≥15 µl) elution of ultra-pure, high-yield DNA.*
- *Eluted DNA is ideal for PCR, restriction endonuclease digestion, Sanger and Next-Generation Sequencing, etc.*

Description

The ZR-96 Genomic DNA Clean & Concentrator®-5 (DCC®) is for high-throughput recovery of ultra-pure, large-sized DNA (e.g., genomic, mitochondrial, plasmid (BAC/PAC), viral, phage, (wga) DNA, etc.) from any enzymatic reaction or impure preparation (e.g., Proteinase K digestion). There is no need for organic denaturants, chloroform, or messy precipitations: simply add the specially formulated ChIP DNA Binding Buffer to a sample and then transfer the mixture to the supplied Zymo-Spin™ I-96-XL Plate. Eluted DNA is suitable for sequencing, PCR, endonuclease digestion, and other enzymatic procedures. The product is also compatible with smaller DNAs (50 bp to 10 kb) from PCR, digestions, crude plasmid preparations, cDNA synthesis, etc.



Zymo-Spin™ I-96-XL Plates result in superior yields to other conventional market columns. Genomic DNA extracted using the Zymo-Spin™ I-96-XL Plate results in higher yields from porcine whole blood.



High molecular weight DNA is efficiently purified using the ZR-96 Genomic DCC®-5. Lambda (λ) phage DNA (48.5 kb) was purified (in duplicate) from input material using the Minelute® and the ZR-96 Genomic DCC™-5 (ZR-96). The ZR-96 Genomic DCC®-5 resulted in yields > 340% compared to the MinElute®. Eluted DNAs were analyzed in a 0.8% (w/v) TAE/agarose/EtBr gel (shown above). The size marker "M" is a 1 kb ladder (Zymo Research).

Product	Cat. No.	Size	Specifications	Uses
ZR-96 Genomic DNA Clean & Concentrator®-5	D4066	2 x 96 preps.	Format: 96-Well Elution Volume: ≥ 15 µl Processing Time: 20 minutes Binding Capacity: 5 µg DNA Size Limits: 50 bp - 23 kb	High-molecular weight DNA clean-up; PCR clean-up; enzyme removal; nucleotide/dye removal; lysate DNA clean-up
	D4067	4 x 96 preps.		

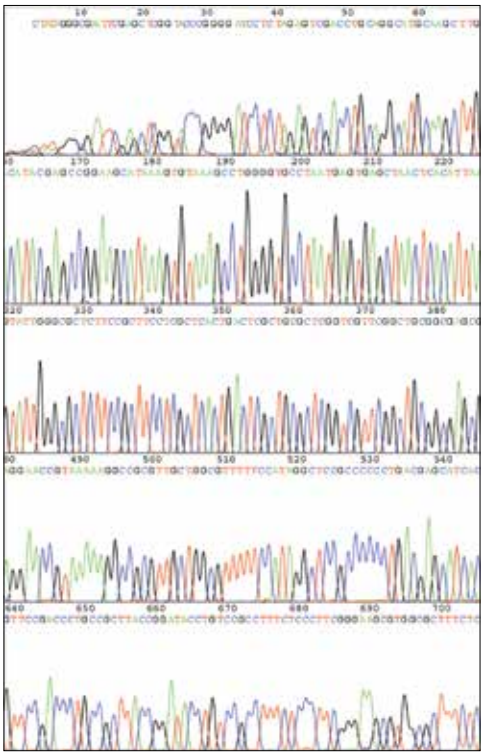
ZR DNA Sequencing Clean-Up Kits™

Highlights

- *Complete elimination of "dye blobs" for high-quality Phred scores and long read lengths.*
- *Flexible 6 - 20 µl elution volumes allow for direct loading of samples with no precipitation or drying steps.*
- *Reusable!*

Description

The ZR DNA & ZR-96 DNA Sequencing Clean-Up Kits™ provide simple and rapid (2 & 9 minute) methods for removal of post-cycle sequencing reaction contaminants (i.e., unincorporated fluorescent dyes, residual salts, dNTPs, primers, and enzymes) from DNA extension products. These contaminants can often interfere with the quality and signal strength of sequencing data, including dye peaks or "dye blobs" which may obscure portions of the sequencing chromatogram and interfere with base-calling accuracy of sequencing analysis software. DNA is eluted with a small volume of water or loading dye containing formamide.



Sequencing chromatogram of pGEM® DNA generated using an ABI 3730xl DNA analyzer. DNA was labeled with ABI BigDye® v3.1 Terminators and cleaned using the ZR DNA Sequencing Clean-up Kit™.

Product	Cat. No.	Size	Specifications	Uses
ZR DNA Sequencing Clean-Up Kits™	D4050	50 preps.	Format: Spin-Column Elution Volume: ≥ 6 µl Processing Time: 2 minutes Binding Capacity: 5 µg	Sequencing DNA clean-up; enzyme removal; dye terminator removal; nucleotide/dye removal
	D4051	200 preps.		
ZR-96 DNA Sequencing Clean-Up Kits™	D4052	2 x 96 preps.	Format: 96-Well Elution Volume: ≥ 15 µl Processing Time: 9 minutes Binding Capacity: 5 µg	
	D4053	4 x 96 preps.		

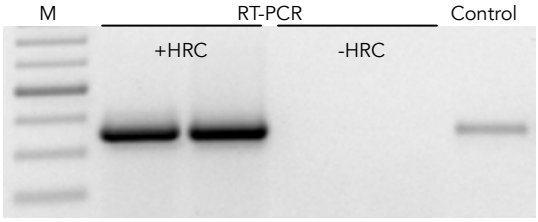
OneStep™ PCR Inhibitor Removal Kits

Highlights

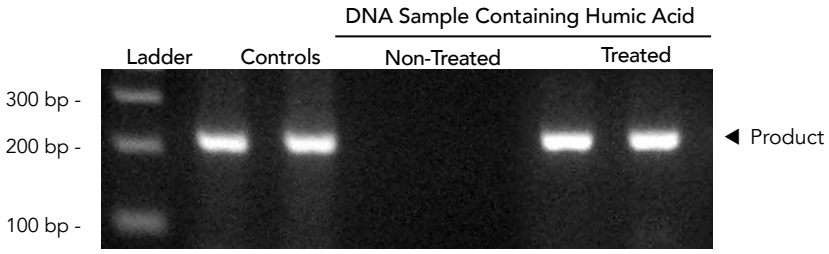
- *Removes PCR inhibitors such as polyphenolics, humic/fulvic acids, tannins, melanin, etc. from nucleic acid solutions to yield high-quality DNA or RNA.*
- *Fast, one-step procedure for cleaning impure samples prior to PCR, sequencing, reverse transcription (RT), etc.*

Description

The *OneStep*™ and *OneStep*™-96 PCR Inhibitor Removal Kits contain all the components needed for efficient removal of contaminants that can inhibit downstream enzymatic reactions (e.g. PCR and RT) from DNA and RNA preparations. The column/plate matrices have been specifically designed for the efficient removal of polyphenolic compounds, humic/fulvic acids, tannins, melanin, etc. from the most impure DNA and RNA preparations. Sample clean-up is as simple as applying, spinning, and recovering a sample from the column or plate.



PCR amplification of an eukaryotic transcript (post-RT): Total RNA isolated from sludge with or without inclusion of the Zymo-Spin™ IV-HRC Spin Filter. M is a 1 kb DNA Marker (Zymo Research).



DNA is efficiently amplified by PCR following humic acid removal with the *OneStep*™ PCR Inhibitor Removal Kit. The figure shows amplification of a 200 bp product from DNA containing humic acid that was treated with the kit. The ladder is a 100 bp DNA marker (Zymo Research).

Product	Cat. No.	Size	Specifications	Uses
OneStep™ PCR Inhibitor Removal Kit	D6030	50 preps.	Format: Spin Column Elution Volume: 50 - 200 µl Processing Time: 4 minutes DNA (RNA) Recovery: 80 - 100%	Polyphenolic PCR inhibitor removal from DNA & RNA (e.g. humic/fulvic acids, tannins, melanin)
OneStep™-96 PCR Inhibitor Removal Kit	D6035	2 x 96 preps.	Format: 96-Well Elution Volume: 50 - 100 µl Processing Time: 13 minutes Binding Capacity: variable DNA (RNA) Recovery: 50 - 90%	

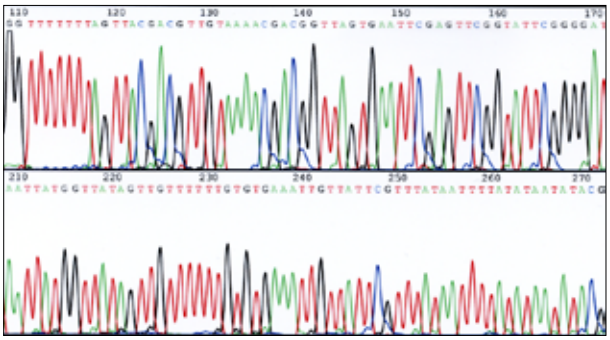
Zymoclean™ Gel DNA Recovery Kits

Highlights

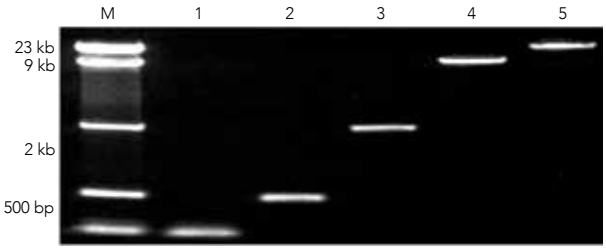
- *Quick (15 minute) recovery of ultra-pure DNA from agarose gels.*
- *Column design permits DNA elution at high concentrations into minimal volumes ≥ 6 µl.*
- *Eluted DNA is well suited for use in DNA ligation, sequencing, labeling, PCR, etc.*

Description

The Zymoclean™ Gel DNA Recovery and ZR-96 Zymoclean™ Gel DNA Recovery Kits provide for the rapid purification of high-quality DNA from TAE/TBE-buffered agarose gels. The products feature Zymo-Spin™ technology to yield high-quality, purified DNA in just minutes. DNA purified using the Zymoclean™ Gel DNA Recovery Kits is perfectly suited for use in DNA ligation reactions, sequencing, DNA labeling reactions, PCR, etc.



DNA sequencing chromatogram of a PCR product recovered using the Zymoclean™ Gel DNA Recovery Kit. DNA was recovered from a 2% (w/v) agarose gel and used directly for sequencing.



DNA fragments recovered from an agarose gel using the Zymoclean™ Gel DNA Recovery Kit. Lanes: M: DNA Ladder; 1-5: individual ladder DNA fragments.

Product	Cat. No.	Size	Specifications	Uses
Zymoclean™ Gel DNA Recovery Kit (uncapped columns)	D4001	50 preps.	Format: Spin-Column Elution Volume: ≥ 6 µl Processing Time: 15 minutes Binding Capacity: 5 µg DNA Size Limits: 50 bp - 23 kb	Recover DNA from TAE/TBE agarose gel slices
	D4001T	10 preps.		
	D4002	200 preps.		
Zymoclean™ Gel DNA Recovery Kit (capped columns)	D4007	50 preps.		
	D4008	200 preps.		
ZR-96 Zymoclean™ Gel DNA Recovery Kit	D4021	2 x 96 preps.	Format: 96-Well Elution Volume: ≥ 15 µl Binding Capacity: 5 µg DNA Size Limits: 50 bp - 23 kb	
	D4022	4 x 96 preps.		

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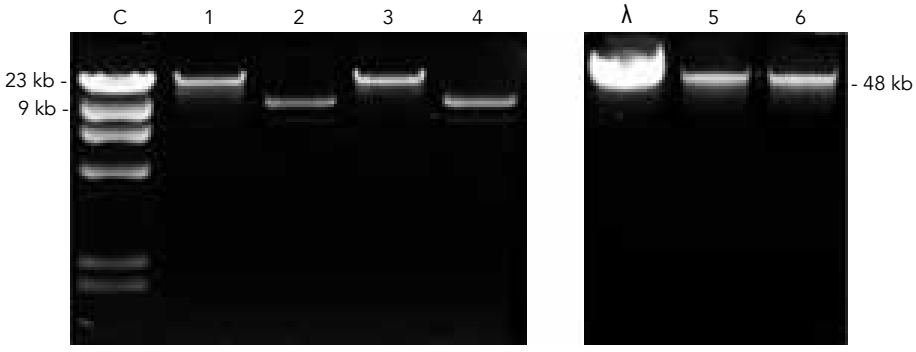
Zymoclean™ Large Fragment DNA Recovery Kit

Highlights

- *Quick (15 minute) recovery of large-sized DNA (e.g., genomic, plasmid [BAC/PAC], viral, phage, etc.) from agarose gels.*
- *Unique column design for low volume (≥ 10 µl) elution of ultra-pure, high-yield DNA.*
- *Eluted DNA is well suited for use in endonuclease digestion, sequencing, labeling, PCR, etc.*

Description

The Zymoclean™ Large Fragment DNA Recovery Kit provides a streamlined method for the rapid (15 minute) purification and concentration of high-quality large-sized DNA from agarose gels. Simply add the specially formulated Agarose Dissolving Buffer (ADB) to the gel slice containing a DNA sample, dissolve, and then transfer to the supplied Zymo-Spin™ IC-XL Column. No need for organic denaturants or chloroform, our Zymo-Spin™ Column technology yields high-quality, purified DNA in just minutes. DNA purified from this kit is ideal for PCR, sequencing, endonuclease digestion, ligation, etc.



Recovery of large DNA fragments. The Zymoclean™ Large Fragment DNA Recovery Kit was used to recover λ DNA digested with HindIII and separated by agarose gel electrophoresis. Lane C: λ-HindIII digest; lanes 1 & 3: recovered 23 kb λ-HindIII fragments; lanes 2 & 4: recovered 9 kb λ-HindIII fragments. Lane λ: intact λ phage DNA; lanes 5, 6: intact λ ~48 kb bands.

Product	Cat. No.	Size	Specifications	Uses
Zymoclean™ Large Fragment DNA Recovery Kit	D4045	25 preps.	Format: Spin-Column Elution Volume: ≥ 10 µl Processing Time: 15 minutes Binding Capacity: 10 µg DNA Size Limits: ≥ 50 bp ~ 200 kb	Recover high molecular weight DNA from TAE/TBE agarose gel slices
	D4046	100 preps.		

Technology Overview: Parallel Purification & Co-Purification

Purify DNA & RNA from the Same Sample

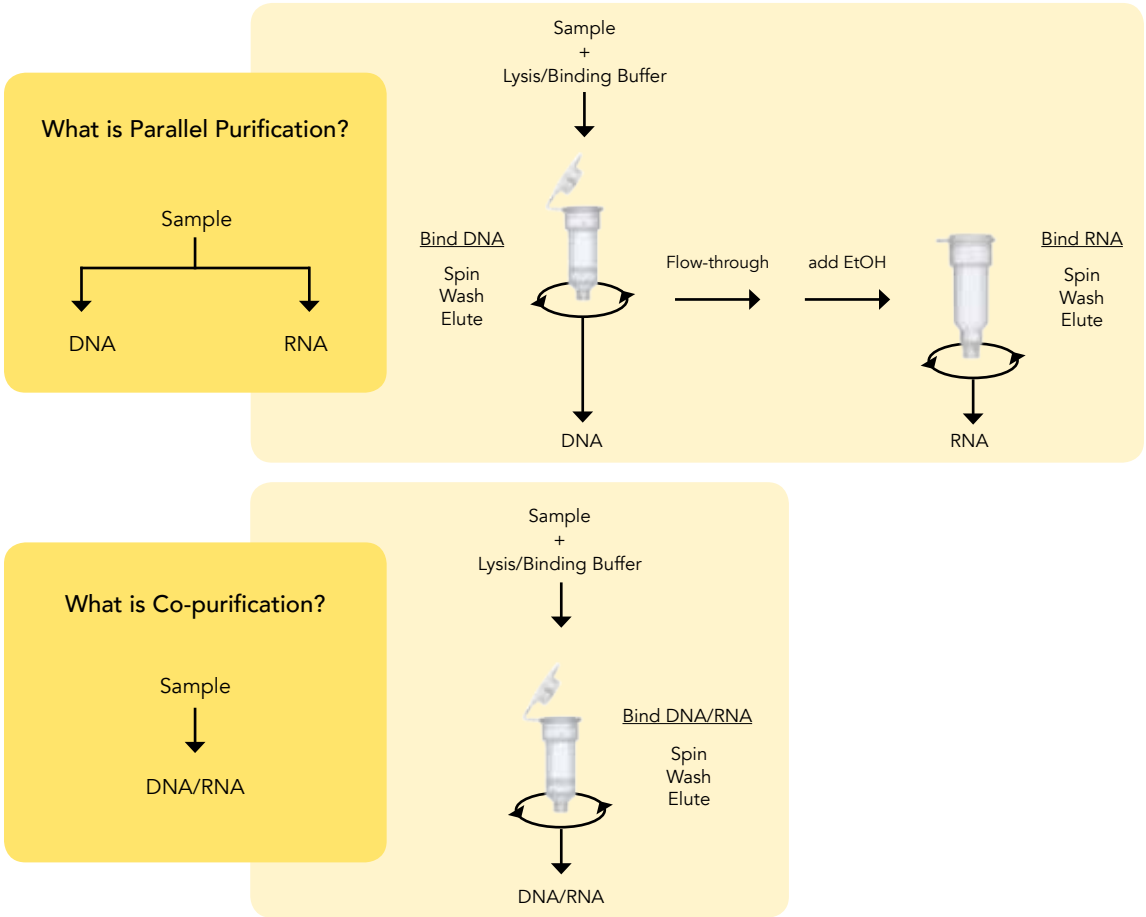
To meet the needs of scientists who wish to extract DNA and RNA from the same source simultaneously, Zymo Research developed a line of DNA/RNA co-purification kits. Cells or tissues can be processed with the *Quick*-DNA/RNA™ Viral Miniprep Kit to purify DNA and RNA from the same sample into separate products. The *Quick*-DNA/RNA™ Viral Kits are for the purification of viral and host DNA and RNA together using blood or cell culture as input. Our Oligo Clean & Concentrator™ facilitates the rapid recovery of both small DNA and RNA. Lastly, the ssDNA/RNA Clean & Concentrator™ is an adaptation of our DCC® product line for purifying ssDNA/RNA samples.

Parallel Purification and Co-purification of DNA & RNA

Zymo Research features a series of products for simultaneous purification of DNA and RNA from variety of samples. Both parallel purification or co-purification products provide high-quality DNA and RNA while the procedures are fast and simple to perform. The overview of parallel purification and co-purification procedures is illustrated below.

The *Quick*-DNA/RNA™ Miniprep Kit is designed for parallel purification of DNA and RNA from the same sample. Without sacrificing DNA yield, this kit also allows for recovery of a broad range of RNA including small RNA molecules (≥ 17 nt).

Viral nucleic acids can be readily extracted and co-purified from cells or body fluids with a single column format using the *Quick*-DNA/RNA™ Viral Kit. For high-throughput (96-well) sample processing, the *Quick*-DNA/RNA™ Viral 96 Kit is available. The ssDNA/RNA Clean & Concentrator™ streamlines the separation of single stranded DNA and RNA probes and transcripts from double stranded nucleic acid species and provides a convenient method for the removal of enzymes, dNTPs, etc. The spin column facilitates concentration of single stranded nucleotide moieties ≥ 17 nt into as little as 6 µl.



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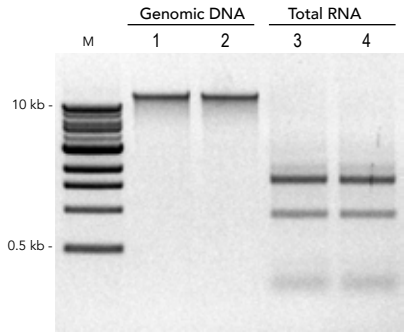
Quick-DNA/RNA™ Kits

Highlights

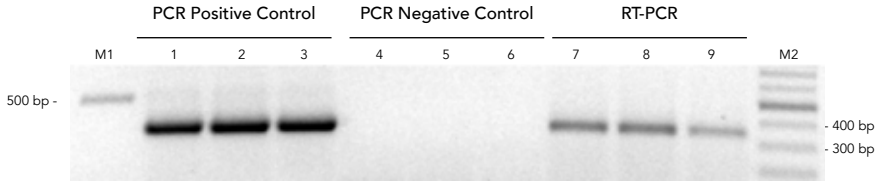
- *Quick isolation and separation of genomic DNA and total RNA (up to ~25 µg DNA; 50 µg RNA) from a wide range of sources using Zymo-Spin™ column technology.*
- *DNA/RNA products are suitable for use in PCR, RT-PCR, and other procedures.*
- *Omits the use of organic denaturants and proteases.*

Description

The *Quick*-DNA/RNA™ Miniprep Kits provide a quick method for parallel purification of high-quality genomic DNA and total RNA from small amounts of cells and tissue. The kits isolate both genomic DNA and large and small RNA species without the use of phenol or reducing agents. Small RNAs (e.g., tRNAs, microRNAs) can be recovered following a simple adjustment of the RNA isolation protocol – no extra steps are required! Both DNA and RNA from 5 x 10^6 cells can be isolated in less than 15 minutes.



DNA and RNA purified using the *Quick*-DNA/RNA™ Miniprep Kit. Genomic DNA (lane 1, 2) and total RNA (lane 3, 4) isolated from human epithelial cells (HCT 116) with the *Quick*-DNA/RNA™ Miniprep Kit. M is a 1 kb DNA Marker (Zymo Research).



PCR amplification of β-actin transcript (353 bp fragment shown) following DNA and RNA isolation from human epithelial cells (HCT 116) with the *Quick*-DNA/RNA™ Miniprep Kit: PCR positive control (DNA template; lane 1, 2, 3), PCR negative control (RNA template; lane 4, 5, 6), RT-PCR (lane 7, 8, 9). M1 and M2 are 1 kb and 100 bp DNA Markers, respectively (Zymo Research).

Product	Cat. No.	Size	Specifications	Uses
Quick-DNA/RNA™ Miniprep Kit	D7001	50 preps.	Format: Spin-Column DNA/RNA Binding Capacity: 25 µg DNA Elution Volume: ≥ 50 µl RNA Elution Volume: ≥ 25 µl Processing Time: 15 minutes	Parallel DNA/RNA purification from fresh/frozen soft tissue; cultured cells; buccal cells/swabs; buffy coat
Quick-DNA/RNA™ Miniprep Plus Kit	D7003	50 preps.	Format: Spin-Column DNA/RNA Binding Capacity: 100 µg DNA Elution Volume: ≥ 50 µl RNA Elution Volume: ≥ 50 µl Processing Time: 15 minutes	

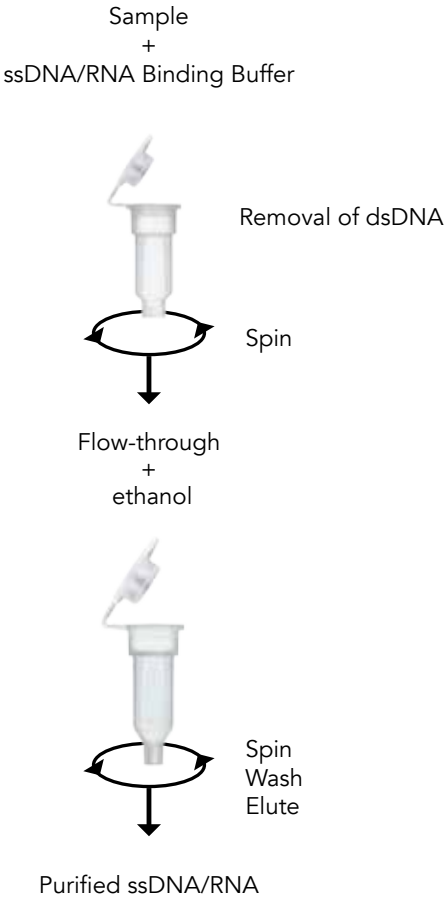
ssDNA/RNA Clean & Concentrator™

Highlights

- *Quick (10 minute) method for separating, cleaning, and concentrating short (< 200 nt) ssDNA or RNA.*
- *Ideal for non-enzymatic elimination of genomic DNA from transcripts, probes, primers, etc.*
- *Zymo-Spin™ Column technology allows for elution into minimal volumes (≥ 6 µl).*

Description

The ssDNA/RNA Clean & Concentrator™ provides a simple and reliable method for the rapid separation, clean-up, and concentration of up to ~5 µg (per prep.) of single stranded DNA and/or RNA from double stranded species (e.g. genomic DNA). This simple 10 minutes procedure is based on the use of a unique single-buffer system and Zymo-Spin™ Column technology. Single stranded DNA or RNA ≥ 17 nucleotides (e.g., transcripts, probes, primers) can be safely treated and co-purified using this kit. The highly concentrated, purified DNA/RNA is great for downstream applications including PCR, RT-PCR, hybridization, etc.



Product	Cat. No.	Size	Specifications	Uses
ssDNA/RNA Clean & Concentrator™	D7010	20 preps.	Format: Spin-Columns Elution Volume: ≥ 6 µl Processing Time: 10 minutes Binding Capacity: 5 µg Size Limits: 17 - 200 nt	Isolate ss nucleic acids from a mixture of ss and ds species
	D7011	50 preps.		

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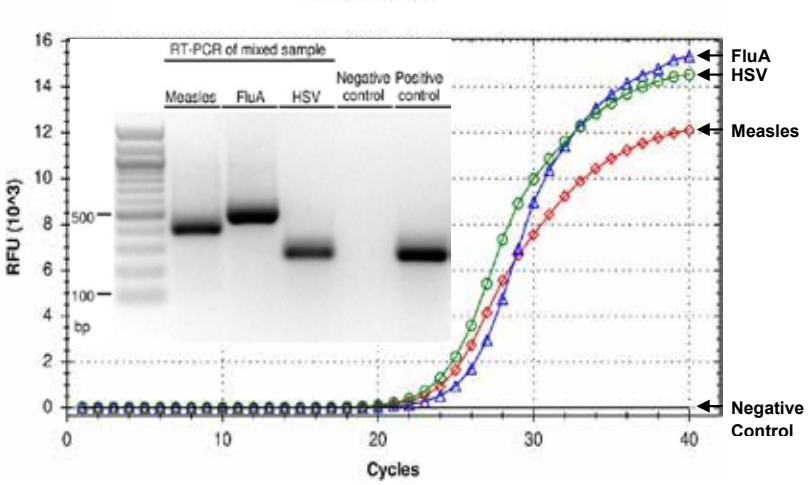
Quick-DNA/RNA™ Viral Kits

Highlights

- *Quick co-purification of viral DNA/RNA from a wide range of sources.*
- *Zymo-Spin™ Column and Plate technologies allow ultra-clean DNA and RNA to be eluted into minimal volumes.*
- *Omits the use of organic denaturants and proteases.*

Description

The *Quick*-DNA/RNA™ Viral Kits provide for rapid, single column or high-throughput (96-well) isolation of high-quality viral nucleic acids from a wide range of biological sources. The kit can be used to successfully isolate viral DNA and RNA from cell-free body fluids as well as cellular suspensions at concentrations ≤ 1 x 10^5 cells/ml. A single buffer system is employed to facilitate viral particle lysis, which allows for the subsequent DNA/RNA binding onto the matrix of the Zymo-Spin™ IIC-XL Column. The nucleic acids are washed then eluted with DNase/RNase free water. The eluted DNA/RNA are ideal for use in various subsequent procedures including RT/PCR.



Detection of DNA/RNA Viruses From A Mixed Population. Viral nucleic acids were isolated from liquid samples using the *Quick*-DNA/RNA™ Kit. Data are RT-qPCR Ct values for measles, influenza type A (FluA), and herpes-simplex (HSV) viruses were 23.05 (diamonds), 24.56 (triangles), 22.92 (circles), respectively. Negative control – RT-PCR (no template w/ HSV specific primers). Positive control – PCR (HSV template w/ HSV primers).

Product	Cat. No.	Size	Specifications	Uses
Quick-DNA/RNA™ Viral Kit	D7020	25 preps.	Format: Spin-Columns Elution Volume: ≥ 35 µl Binding Capacity: 25 µg Processing Time: 5 minutes	Viral DNA/RNA co-purification from: Cultured cells; plasma/serum; virus
	D7021	100 preps.		
Quick-DNA/RNA™ Viral 96 Kit	D7022	2x96 preps.	Format: 96-Well Elution Volume: ≥ 10 µl Binding Capacity: 10 µg Processing Time: 15 minutes	
	D7023	4x96 preps.		

DNA Analysis

Tools for Effective DNA Analysis

Working with human, fungal, or bacterial DNA? Zymo Research has engineered our Femto™ Quantification Kits to ensure your DNA quantification is accurate. These products allow for the quantification of 20 femtograms of DNA in as little as 1 µl of sample. The Femto™ Quantification Kits have a high specificity and sensitivity to ensure accurate quantification, even with a non-target DNA background. Also, our DNA ladders ensure your DNA samples are of the highest quality for processing, making DNA size approximation easy for both PCR products as well as plasmid DNAs.

Femto™ Quantification Kits

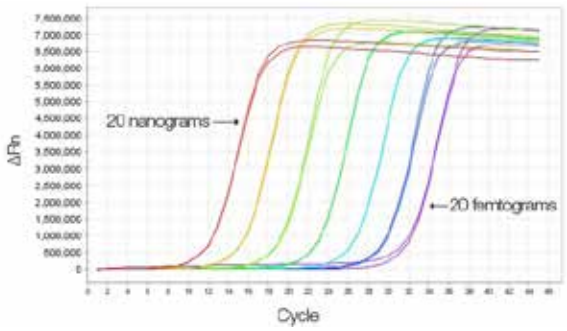
Highlights

- *Quantify as little 20 femtograms of DNA in as little as 1 µl of sample.*
- *High specificity and sensitivity for DNA in a background of non-target DNA.*
- *Fast and simple: add samples to the PreMix... and quantify.*

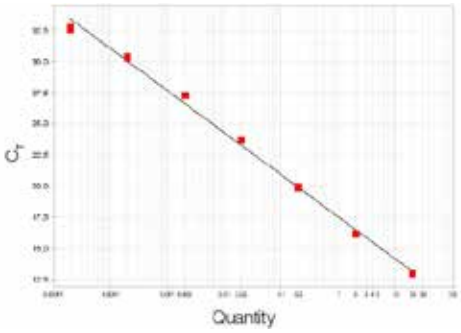
Description

The Femto™ Human DNA Quantification Kit can detect and quantify human DNA with high specificity and sensitivity. Human DNA can be reliably quantified in a background of non-human DNA such as bacterial, fungal, animal, plant DNA, etc. This is essential for downstream applications that require accurate DNA input amounts including STR analysis, quantifying bacteria DNA template for Next-Gen. sequencing library preparation, and metagenomic analysis. As little as 20 fg from 1 µl of purified biological liquids or other samples can be dependably quantified.

Amplification Plot



Standard Curve



Reliable standards for the qualification of bacterial DNA: Bacterial DNA Standards (measured in duplicates) comprise a 10-fold dilution series ranging from 20 ng to 20 fg.

Product	Cat. No.	Size	Specifications	Uses
Femto™ Human DNA Quantification Kit	E2005	100 rxns.	Detection Dye: SYTO 9® DNA Inpt: 20 fg - 20 ng Standards Included	Human DNA detection and quantification
Femto™ Bacterial DNA Quantification Kit	E2006	100 rxns.		Bacterial DNA detection and quantification
Femto™ Fungal DNA Quantification Kit	E2007	100 rxns.		Fungal DNA detection and quantification

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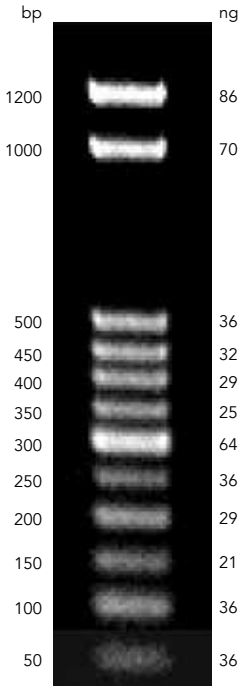
ZR DNA Markers™

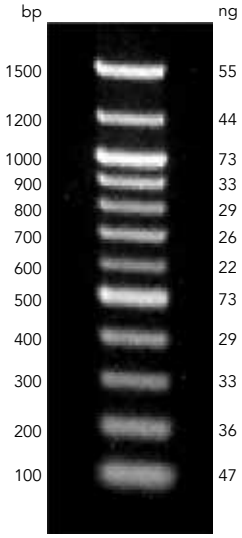
Description

The ZR DNA Markers™ are defined DNA size fragments that encompass a range of sizes from 50 bp up to 10 kb. This makes DNA size approximation easy for both PCR products as well as plasmid DNAs. The ZR 50 bp DNA Marker™, ranging from 50 bp to 1200 bp, is well within the common range of PCR generated DNA fragments. For larger DNAs, the ZR 100 bp DNA Marker™ and ZR 1 kb DNA Marker™ are appropriate. Inclusion of an intensified band is provided in each marker for easy identification. Each marker comes with product information detailing the product and its application.



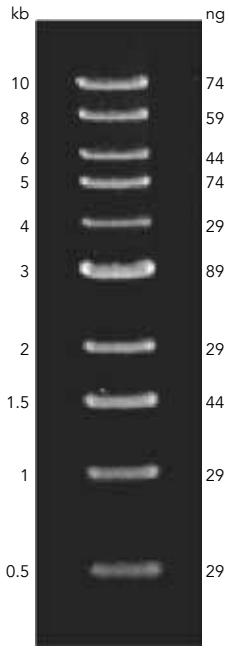
ZR 50 bp DNA Marker™

500 ng of the ZR 50 bp DNA Marker™ was separated in a 1.8% w/v agarose/ EtBr/TAE gel.



ZR 100 bp DNA Marker™

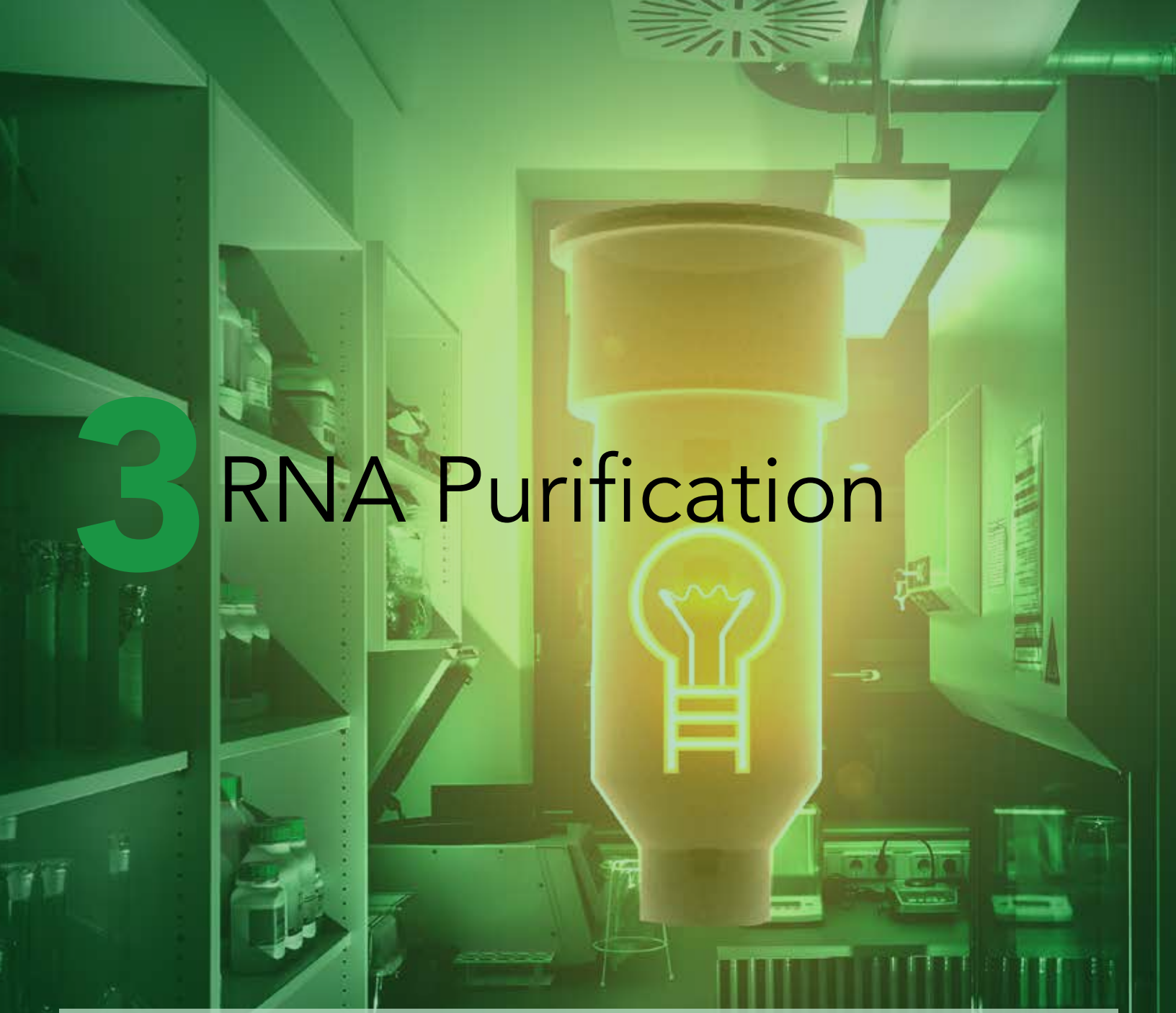
500 ng of the ZR 100 bp DNA Marker™ was separated in a 1.5% w/v agarose/ EtBr/TAE gel.



ZR 1 kb DNA Marker™

500 ng of the ZR 1 kb DNA Marker™ was separated in a 0.8% w/v agarose/EtBr/ TAE gel.

Product	Cat. No.	Size	Specifications	Uses
ZR 50 bp DNA Marker™	M5001-50	50 µg / 100 µl	Ranges Available: 50 - 1200 bp	DNA size standard for gel electrophoresis
	M5001-200	200 µg/400 µl		
ZR 50 bp DNA Marker™ (ready-to-load)	M5004-50	50 µg / 600 µl		
ZR 100 bp DNA Marker™	M5002-50	50 µg / 100 µl	Ranges Available: 100 - 1500 bp	
	M5002-200	200 µg/400 µl		
ZR 100 bp DNA Marker™ (ready-to-load)	M5005-50	50 µg / 600 µl		
ZR 1 kb DNA Marker™	M5003-50	50 µg / 100 µl	Ranges Available: 0.5 - 10 kb	
	M5003-200	200 µg/400 µl		
ZR 1 kb DNA Marker™ (ready-to-load)	M5006-50	50 µg / 600 µl		



3 RNA Purification

RNA is truly an amazing and important biological molecule, playing absolutely critical roles in regulating many types of biological pathways and processes in all species of life. RNA is widely thought to have been both the first catalytic molecule and the first form of self-replicating genetic material during a period of history referred to as "The RNA World". Despite its obvious importance to biology, the numerous functions and activities carried out by RNA molecules have been underappreciated until recently, largely due to previous limitations in the technologies and tools available to use in RNA research. Recent work is uncovering new classes of RNAs and new activities mediated by RNA molecules. It has also become clear that the majority of genomes for most organisms, once thought to be "junk DNA", are actively transcribed to produce functional RNA species. Now, more than ever, it is evident that we are living in the New RNA World.

Zymo Research understands the central role that RNA plays in biological processes and now offers a complete portfolio of products to help researchers perform their RNA experiments efficiently and effectively. This section features information on our RNA products, ranging from the quickest and highest quality RNA purification procedures available to products for cleaning, concentrating, and isolating RNA from a wide variety of sources. The success of all RNA-based experiments depends on first isolating ultra-pure, high-quality RNA. Our industry-leading products ensure that your RNA samples are ready for all standard and Next-Generation applications to investigate this New RNA World!

RNA Purification Made Simple®

Quick Product Guide

RNA Isolation

Samples in TRIzol®, TRI Reagent®, etc. without phase separation in 7 min.

Direct-zol™ RNA Miniprep Plus Kit

100 µg total RNA (≥17 nt).

*DNase I included

Page 107

Format:
Spin-Column
96-Well Plate
Magnetic Bead

Cells

***Quick*-RNA™ Miniprep Kit**

100 µg total RNA (≥17 nt).

*DNase I included

Page 110

Format:
Spin-Column
96-Well Plate

Biological Fluids & Tissues

***Quick*-RNA™ Miniprep Plus Kit**

100 µg total RNA (≥17 nt) from cells, all tissue types, & blood.

*DNase I, Proteinase K, DNA/RNA Shield™ included

Page 111

Format:
Spin-Column

***Quick*-RNA™ Viral Kits**

Serum, plasma, culture supernatant, urine, saliva.

Page 112

Format:
Spin-Column
96-Well Plate

***Quick*-RNA™ Whole Blood Kit**

Mammalian whole blood, plasma, serum, pelleted blood cells, nucleated blood.

Page 113

Format:
Spin-Column

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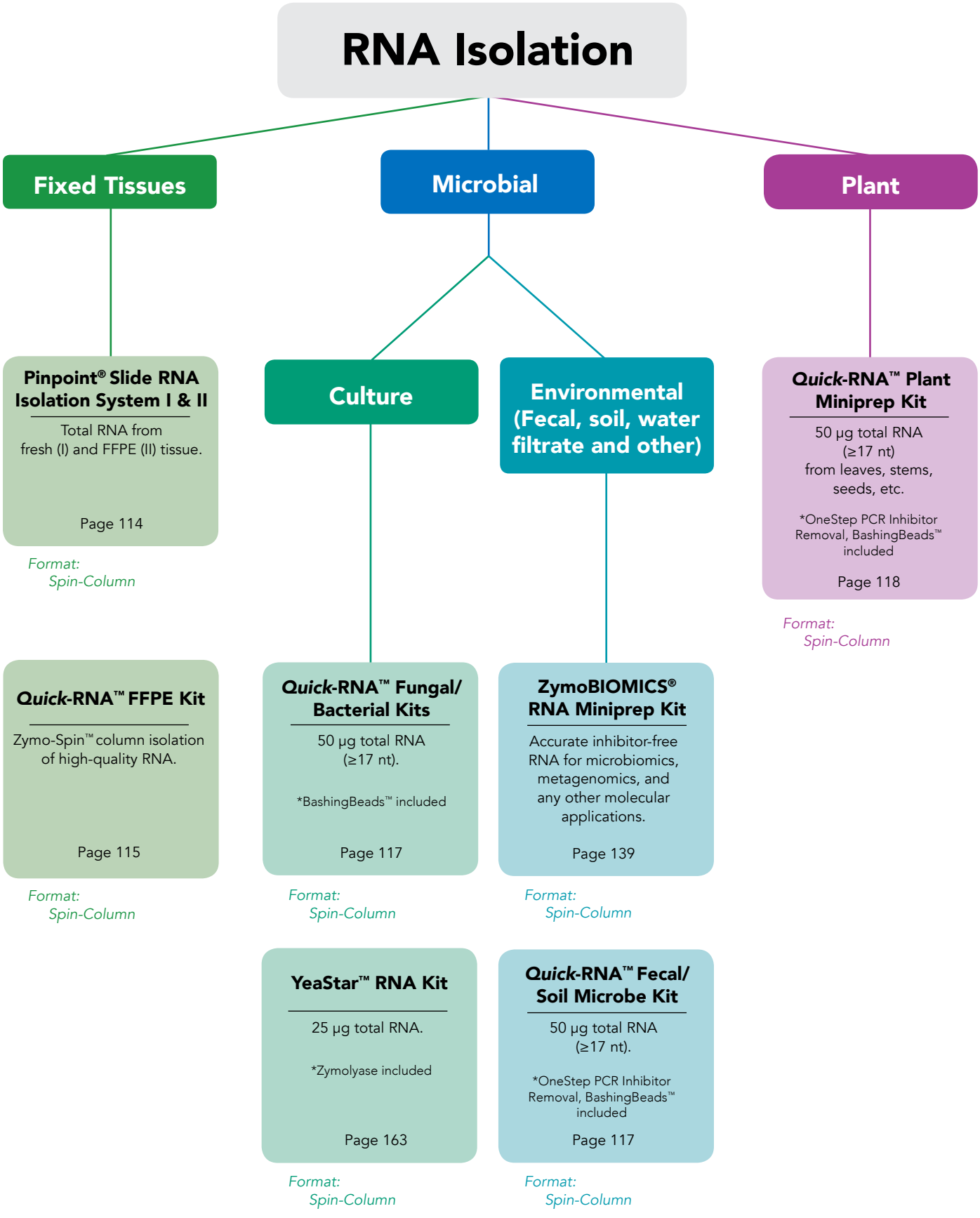
RNA Isolation



Quick Product Guide

RNA Clean-Up

Enzymatic Reactions, Impure and Diluted Samples

RNA Clean & Concentrator™ Kits

RNA and (ss)DNA (≥17 nt).

*Optionally supplied with DNase I

Page 119

Format:
Spin-Column
96-Well Plate

Oligo Clean & Concentrator™ Kits

DNA & RNA (10 to 200 nt) oligos and probes.

Page 86

Format:
Spin-Column
96-Well Plate

Inhibitor Removal

OneStep™ PCR Inhibitor Removal Kits

Removal of polyphenolics, humic/fulvic acids, tannins, melanins, etc. from DNA & RNA.

Page 91

Format:
Spin-Column
96-Well Plate

Gel Excisions

Zymoclean™ Gel RNA Recovery Kit

RNA (>200 nt) from agarose gels.

Page 120

Format:
Spin-Column

ZR small-RNA™ PAGE Recovery Kit

RNA (and DNA) (>17 nt) from PAGE gels.

Page 121

Format:
Spin-Column

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High-quality RNA from Diverse Sample Sources

Zymo Research offers an assortment of products that allow for the simple, rapid, and efficient isolation of total RNA from a variety of biological sources including fresh, frozen, or paraffin-embedded tissues, cultured cells, buccal cells, whole blood, plasma, serum, urine, yeast, or RNA viruses. All of our RNA isolation kits feature Zymo-Spin™ Column technology, which yields highly concentrated RNA perfect for applications such as microarrays, denaturing-gel electrophoresis, Northern blotting, and RT-PCR (or just all sensitive downstream applications). Each kit has been optimized for a particular application with specialized, nuclease-free components to ensure: 1) Maximum levels of membrane solubilization and cellular disruption, 2) Total inhibition of nuclease activity, 3) Complete deproteinization of the sample, 4) Efficient isolation and concentration of the RNA, 5) Stabilization and safe storage of the RNA.

Technology Overview: Direct-zol™ RNA

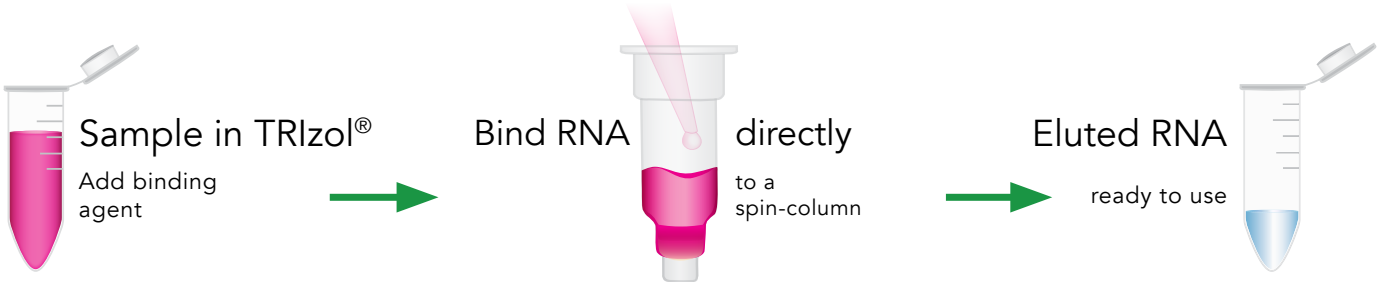
Never Phase Separate Again - from TRIzol® to RNA in only 7 Minutes

Extract high-quality total RNA from any sample stored in TRIzol®, TRI Reagent®, and all other acid-guanidinium-phenol based reagents, directly on-column. The Direct-zol™ RNA Miniprep enables lightning-fast and consistent broad size-range purification (including miRNAs) of high quality (DNA-free) total RNA. The innovative procedure bypasses phase separation and precipitation steps with a spin column format, saving time and eliminating phenol carryover without compromising RNA quality.

Direct-zol's™ novel technology couples the effectiveness of TRI Reagent® for infectious agent inactivation and sample preservation with a convenient no hassle, no mess procedure for DNA-free RNA. This groundbreaking procedure is perfect for both routine lab use and high-throughput and automated applications.

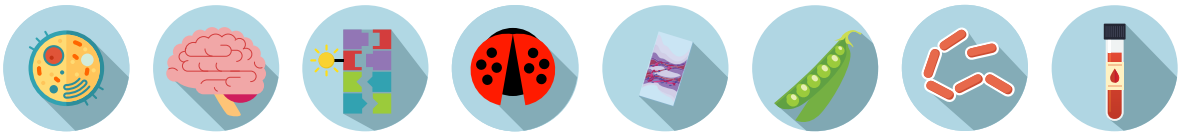
To discover non-organic sample preservation and pathogen inactivation with the same power and effectiveness as TRI Reagent® turn to page 124.

Innovation. Pure & Simple.™

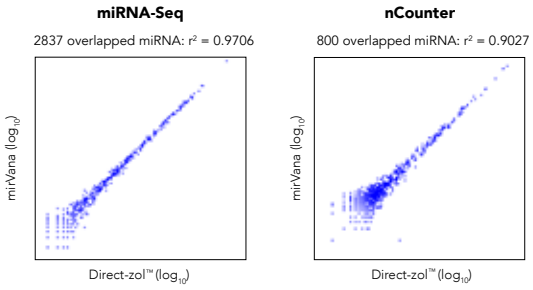


Accommodates any sample in TRIzol®, TRI Reagent®, etc.

including cells, tissues, *in vitro* reactions, tough-to-lyse samples, FFPE, plants, microorganisms, and bodily fluids

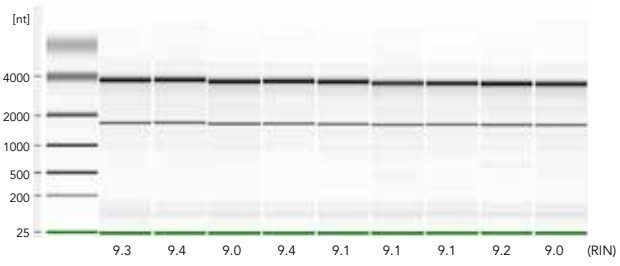


Efficient Small RNA Recovery



The data show RNA purified from TRIzol® samples using the Direct-zol™ RNA Miniprep compared to an unbiased method (mirVana™, Ambion). Micro-RNA analysis was performed using miRNA-Seq (MiSeq®, Illumina) and a direct hybridization assay (nCounter®, Nanostring).

High-Quality RNA



High RNA integrity number (RIN > 9; Bioanalyzer® (Aligent Technologies Inc.)) indicates high-quality RNA was purified from human epithelial cells using the Direct-zol™ RNA Kit.

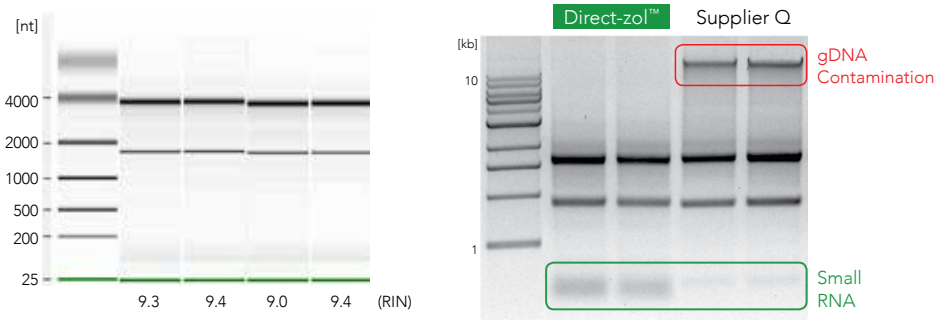
Direct-zol™ RNA Kits

Highlights

- *Quick, purification of high-quality (DNA-free) total RNA directly from samples stored in TRIzol®, TRI Reagent® and all other acid-guanidinium-phenol based reagents.*
- *Eliminates phase separation and precipitation procedures.*
- *Efficient, broad range purification of small and large RNAs from cells, tissues, biological liquids, in vitro transcripts, etc.*
- *Ideal for viral inactivation/sample storage.*

Description

The Direct-zol™ RNA kits facilitate efficient and consistent purification of high-quality (DNA-free) total RNA (including miRNAs) directly from samples stored in TRIzol®, TRI Reagent®, and all other acid-guanidinium-phenol based reagents, directly on column. The innovative Direct-zol™ procedure bypasses phase separation and precipitation steps with a spin-column format, saving time and also eliminating phenol carryover without compromising RNA quality. Direct-zol™ technology couples the effectiveness of TRI Reagent®, for infectious agent inactivation, and sample preservation for a convenient hassle-free, mess-free procedure for DNA-free RNA.



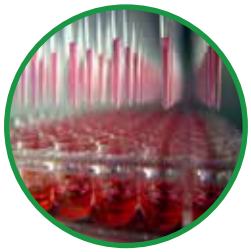
High RNA integrity number (RIN > 9; Bioanalyzer® (Aligent Technologies Inc.)) indicates high-quality RNA was purified from human epithelial cells using the Direct-zol™ 96 Magbead RNA on a Freedom EVO® (Tecan liquid handler) (left), and the Direct-zol™ RNA Miniprep (right).

Product	Cat. No.	Size	Specifications	Uses
Direct-zol™ RNA Microprep Kit	R2060, R2061*	50 preps.	Format: Spin-Column Elution Volume: ≥ 6 µl Binding Capacity: 10 µg RNA Size Limits: ≥ 17 nt Processing Time: 10 minutes	RNA isolation from samples stored in TRIzol®(Molecular Research Center, Inc.), RNAzol®, QIAzol®, TriPure®, TriSure® (Bioline) and all other acid-guanidinium-phenol reagents including cells from culture; Solid tissue; Plasma; Serum; Whole blood; *in vitro* processed RNA
	R2062, R2063*	200 preps.		
Direct-zol™ RNA Miniprep Kit	R2050, R2051*	50 preps.	Format: Spin-Column Elution Volume: ≥ 25 µl Binding Capacity: 50 µg RNA Size Limits: ≥ 17 nt Processing Time: 10 minutes	
	R2052, R2053*	200 preps.		
Direct-zol™ RNA Miniprep Plus Kit	R2070T	10 preps.	Format: Spin-Column Elution Volume: ≥ 50 µl Binding Capacity: 100 µg RNA Size Limits: ≥ 17 nt Processing Time: 10 minutes	
	R2070, R2071*	50 preps.		
	R2072, R2073*	200 preps.		
Direct-zol™ 96 RNA Kit	R2054, R2055*	2 x 96 preps.	Format: 96-Well Elution Volume: ≥ 10 µl Binding Capacity: 10 µg RNA Size Limits: ≥ 17 nt Processing Time: 30 minutes	
	R2056, R2057*	4 x 96 preps.		

*Supplied with TRI Reagent®

Direct-zol™ 96 Magbead RNA Kit

Highlights

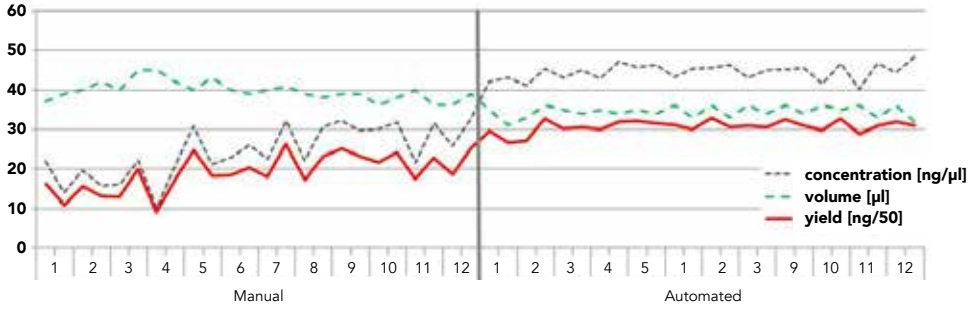


- *High-throughput, magnetic bead based purification of high-quality (DNA-free) total RNA directly from samples stored in TRIzol®, TRI Reagent® and all other acid-guanidinium-phenol based reagents.*
- *Eliminates phase separation and precipitation procedures.*
- *Efficient, broad range purification of small and large RNAs from cells, tissues, biological liquids, in vitro transcripts, etc.*
- *Automation ready!*

Description

The Direct-zol™ 96 Magbead RNA Kit is a high-throughput adaptation of Direct-zol™ technology for high-quality RNA isolation directly from samples in TRI Reagent® and similar. The magnetic bead format allows the procedure to be easily automated. The extraction method inactivates viruses and other infectious agents. Total RNA including small and non-coding RNAs (17-200 nt) is effectively isolated from a variety of sample sources (cells, tissues, serum, plasma, blood, biological liquids, etc.) using this product.

RNA Directly from TRI Reagent® – Now Automated!



Comparison between manual and automated (Freedom EVO®, Tecan) sample processing with the Direct-zol™ 96 Magbead RNA Kit across a 96-Well plate. RNA was purified from human epithelial cells (5 x 10^5/well).

Product	Cat. No.	Size	Specifications	Uses
Direct-zol™ 96 Magbead RNA Kit	R2100, R2101*	2 x 96 preps.	Format: Magnetic Beads Elution Volume: 50 µl Binding Capacity: 10 µg/prep. Size Limits: 17 - 200 nt Processing Time: 45 minutes	HTP & automated RNA isolation from samples stored in TRIzol®(Molecular Research Center, Inc.), RNAzol®, QIAzol®, TriPure®, TriSure® (Bioline) and all other acid-guanidinium-phenol reagents including cells from culture; Solid tissue; Plasma; Serum; Whole blood; *in vitro* processed RNA
	R2102, R2103*	4 x 96 preps.		
	R2104, R2105*	8 x 96 preps.		

*Supplied with TRI Reagent®

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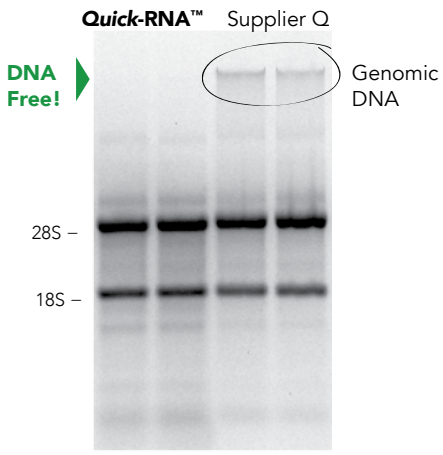
Technology Overview: *Quick*-RNA™

High Quality DNA-free RNA from Diverse Sample Sources

Speed, precision, and phenol-free purification of total RNA (including miRNAs) from diverse sample sources. The *Quick*-RNA™ kits have been optimized for rapid, specific isolation of total (>17 nt), large (>200 nt), or small (17-200 nt) RNA species. The included Zymo-Spin™ Column and Plate technologies enable unprecedented sample concentration with elution volumes as little as 6 µl. The *Quick*-RNA™ kits remove the vast majority of genomic DNA (Spin-Away™ Filter) and feature convenient in-column DNase I treatment.

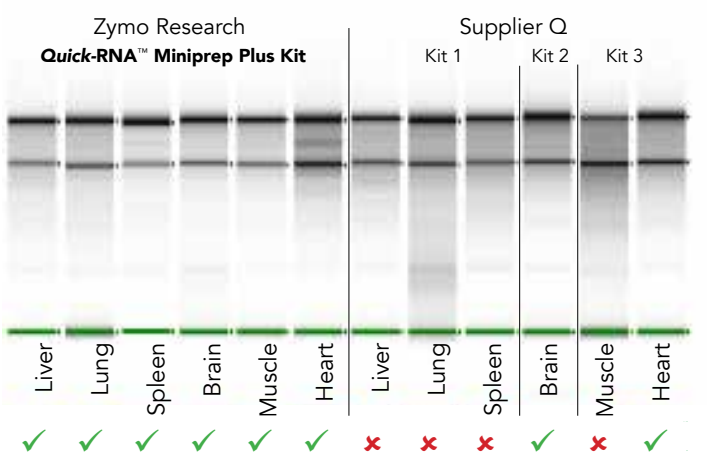
All *Quick*-RNA™ kits include **DNase I** for DNA-free RNA – Right Away!

Quality



The *Quick*-RNA™ kits yield high quality total RNA. High levels of genomic DNA contamination are present in the preps from Suppliers Q but not with the *Quick*-RNA™ kits. Total RNA was isolated from human epithelial cells (sans DNase treatment).

Versatility



High-quality total RNA is isolated from various tissue types using the Quick-RNA™ Miniprep Plus Kit. In comparison, RNA isolated from the same tissue types using three kits recommended by Supplier Q (Agilent 2200 TapeStation®; Red = low quality).

Value

	***Quick*-RNA™**	Supplier Q
Small RNA (≥17 nt) recovery	Yes	No
DNase I included	Yes	No
gDNA removal column included	Yes	No
Proteinase K	Yes*	No
DNA/RNA Shield™ (for sample storage)	Yes*	No

**Quick*-RNA™ Miniprep Plus Kit*

Quick-RNA™ Kits

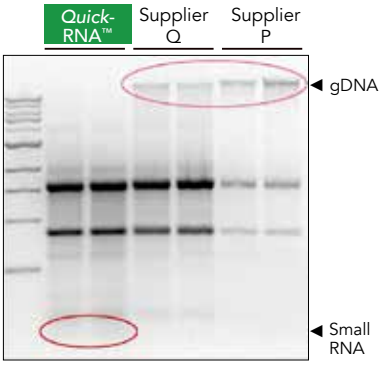
Highlights

- *High-quality total RNA (including small RNAs) from a wide range of samples – single to 10^6 cells.*
- *Isolate small and large RNAs into separate fractions (optional).*
- *DNA-free RNA for use in any downstream application. DNase I included.*
- *No organic denaturants!*

Description

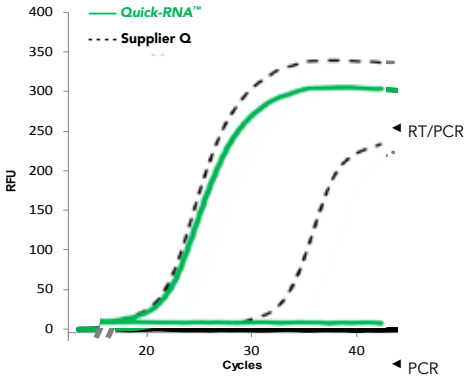
The *Quick*-RNA™ kits are innovative products designed for the easy, reliable, and rapid isolation of DNA-free total RNA from a wide range of cell and tissue samples. *Quick-RNA™* and Zymo-Spin™ Column technologies enable a high yields of quality total RNA (including small RNAs 17-200 nt) in minutes. Simply add the provided RNA Lysis Buffer to extract total RNA from the cells of interest, then purify the RNA using the provided Zymo-Spin™ columns or plate. The result is highly-concentrated, DNA-free RNA that is suitable for subsequent RNA-based methods including RT-PCR, hybridization, sequencing etc. In addition, the kit can be used for enrichment of small and large RNAs in two separate fractions.

High-Quality RNA



Broad range RNA without genomic DNA contamination. The *Quick*-RNA™ Miniprep Kit compared to kits from Suppliers Q and P. 1% (w/v) agarose gel, M is a 1 kb DNA marker.

Ultra-Pure



RNA isolated with the *Quick*-RNA™ Miniprep Kit is DNA-free (PCR control - black; RT/PCR - green).Samples isolated with Supplier Q's kit provided for comparison (PCR control - dotted; RT/PCR - dashed). Each amplification curve represents an average of three independent isolation experiments. Total RNA isolated from 10^6 human epithelial cells (with in-column DNase treatment).

Product	Cat. No.	Size	Specifications	Uses
Quick-RNA™ Microprep Kit	R1050	50 preps.	Format: Spin-Column Elution Volume: ≥ 6 µl Binding Capacity: 10 µg Sample Size: ≤ 10^6 cells Processing Time: 10 minutes	RNA isolation from: Cultured cells; Fresh/frozen/soft tissue; Buccal cells/ swabs; Buffy coat; Bioligical fluids
	R1051	200 preps.		
Quick-RNA™ Miniprep Kit	R1054T	10 preps.	Format: Spin-Column Elution Volume: ≥ 30 µl Binding Capacity: 100 µg Sample Size: ≤ 10^7 cells Processing Time: 10 minutes	
	R1054	50 preps.		
	R1055	200 preps.		
Quick-RNA™ Midiprep Kit	R1056	25 preps.	Format: Spin-Column Elution Volume: ≥ 200 µl Binding Capacity: 1 mg Sample Size: 10^3 - 10^8 cells Processing Time: 15 minutes	
Quick-RNA™ 96 Kit	R1052	2 x 96 preps.	Format: 96-Well Elution Volume: ≥ 25 µl Binding Capacity: 10 µg Sample Size: ≤ 10^6 cells Processing Time: 30 minutes	
	R1053	4 x 96 preps.		

Quick-RNA™ Miniprep Plus Kit

Highlights

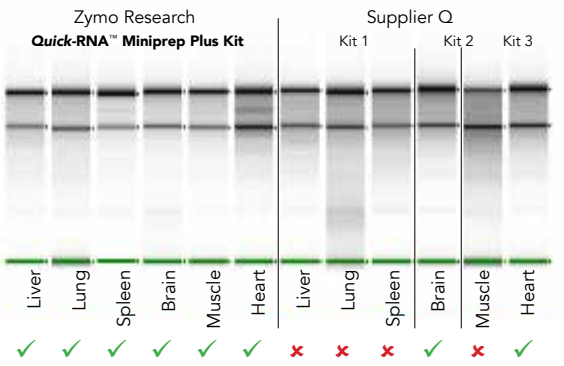
- *High-quality total RNA (including small/micro RNAs) from all tissues, cells, whole blood, and biological fluids.*
- *Worry-free sample storage at ambient temperatures with provided DNA/RNA Shield™.*
- *DNA-free RNA is ready for use in any downstream application.*
- *No organic denaturants!*

Description

The *Quick*-RNA™ Miniprep Plus Kit is an innovative and versatile product designed for the easy, reliable, and rapid isolation of DNA-free RNA from all tissue types (up to 50 mg), cells (up to 10^7 animal), whole blood, and biological fluids. The provided DNA/RNA Shield™ stabilizes samples, allowing them to be stored without the need for immediate freezing or processing for up to one month. Furthermore, DNA/RNA Shield™ inactivates RNases as well as microbial pathogens (viruses, bacteria, etc.). The procedure combines a unique buffer system with Zymo-Spin™ Column technology to yield high quality total RNA (including small RNAs 17-200 nt).

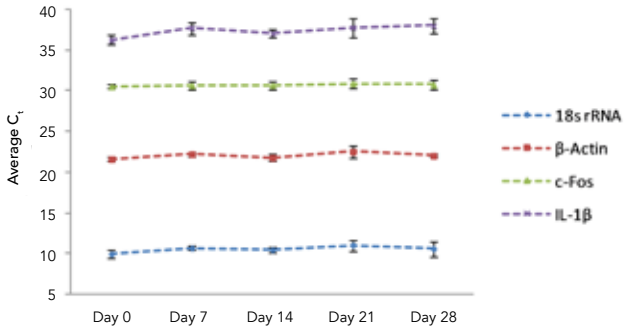
Simply add DNA/RNA Shield™ and Proteinase K to extract total RNA from any tissue, then purify the RNA using the Zymo-Spin™ Column or Plate workflow. The result is highly-concentrated, DNA-free RNA that is suitable for RT-PCR, hybridization, sequencing, etc. In addition, the kit can be used for the enrichment of small and large RNAs in two separate fractions.

Versatility



High-quality total RNA is isolated from various tissue types using the Quick-RNA™ Miniprep Plus Kit. In comparison, RNA isolated from the same tissue types using three kits recommended by Supplier Q (Agilent 2200 TapeStation®; Red = low quality).

RNA Preservation at Ambient Temperature



RNA from tissue stored in DNA/RNA Shield™ (included with the *Quick*-RNA™ Miniprep Plus Kit) is preserved at ambient temperature. RNA from muscle tissue (mouse) was purified using the *Quick*-RNA™ Miniprep Plus Kit and analyzed by RT-PCR.

Product	Cat. No.	Size	Specifications	Uses
Quick-RNA™ Miniprep Plus Kit	R1057	50 preps.	Format: Spin-Column Elution Volume: ≥ 50 µl Binding Capacity: 100 µg Sample Size: ≤ 50 mg	RNA isolation from all tissue types (fibrous, lipid, tough-to-lyse); Whole blood; Cells (buccal/buffy coat; Swabs; Biological fluids
	R1058	200 preps.		

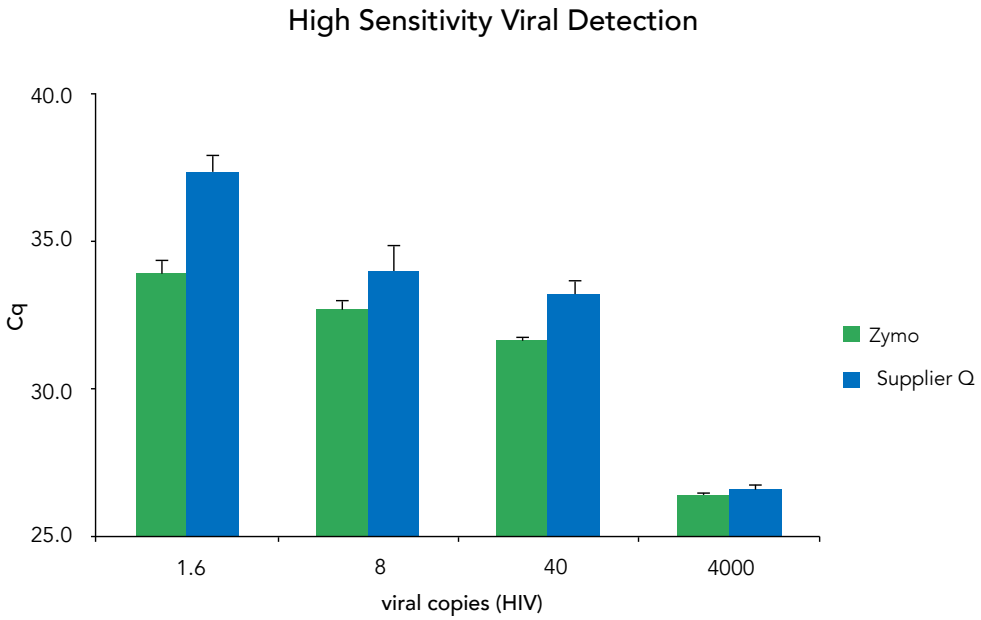
Quick-RNA™ Viral Kits

Highlights

- *Quick recovery of viral RNA from a wide range of sources using Zymo-Spin™ Column and Plate technologies.*
- *Column and plate designs allow RNA to be eluted at high concentrations into minimal volumes of RNase-free water.*
- *Eliminates the use of organic denaturants and proteases.*

Description

The *Quick*-RNA™ Viral and *Quick*-RNA™ Viral 96 Kit enable rapid isolation of high-quality viral RNA from a wide range of biological sources. Powerful enough to isolate viral RNA from cell-free body fluids as well as cellular suspensions at concentrations ≤1x10^5 cells/ml, this kit has been rigorously tested and used to isolate viral RNA from samples containing enteroviruses, rhinoviruses, coronaviruses, HIV, HCV, influenza A virus, flaviviruses, measles virus, parainfluenza virus and parvovirus (a ssDNA virus). The eluted RNA is ideal for use in various subsequent procedures including RT-PCR.



The *Quick*-RNA™ Viral Kit from Zymo Research ensures high sensitivity viral detection compared to that of Supplier Q. Viral RNA was isolated from plasma samples using the *Quick*-RNA™ Viral Kit. Data are the mean (+/- SD) of triplicate RTqPCR measurements.

Product	Cat. No.	Size	Specifications	Uses
Quick-RNA™ Viral Kit	R1034	50 preps.	Format: Spin-Column Elution Volume: ≥ 6 µl Binding Capacity: 10 µg Processing Time: 5 minutes	Viral RNA recovery from cultured cells; Plasma; Serum; Culture supernatant; Urine; Virus
	R1035	200 Preps.		
Quick-RNA™ Viral 96 Kit	R1040	2 x 96 preps.	Format: 96-Well Elution Volume: ≥ 10 µl Binding Capacity: 10 µg Processing Time: 15 minutes	
	R1041	4 x 96 preps.		

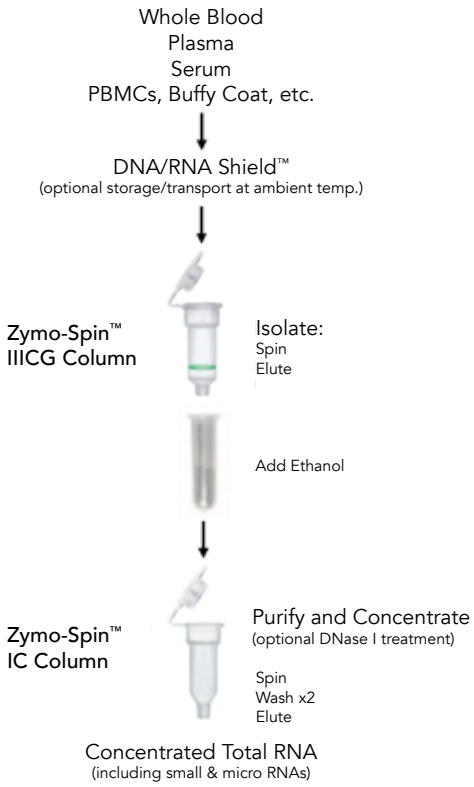
Quick-RNA™ Whole Blood Kit

Highlights

- *Purify high-quality total RNA (including small/micro RNAs) from whole and partitioned blood samples.*
- *Compatible with commonly used anticoagulants (i.e., EDTA, citrate, heparin).*
- *DNA-free RNA is ready for use in any downstream application. DNase I included.*
- *Worry-free sample storage at ambient temperatures with provided DNA/RNA Shield™.*

Description

The *Quick*-RNA™ Whole Blood Kit utilizes DNA/RNA Shield™, a unique preservation and lysis technology, to enable rapid isolation of total RNA from whole, partitioned blood, or a cell pellet (after red blood cell lysis). The procedure uses Zymo-Spin™ Column technology, enabling concentrated, ultra-pure RNA. The RNA is eluted into ≥ 6 µl of RNase-free water and is ready for any downstream application including RT-PCR, sequencing, etc.



Quick-DNA/RNA™ Blood Tube Kit

- *For use with DNA/RNA Shield™ - Blood Collection Tube (worry-free sample storage at ambient temperatures).*
- *Purify DNA, total RNA (including small/micro RNAs), or DNA & RNA from the same whole blood sample. No pelleting and no reagent removal.*
- *High quality DNA and DNA-free RNA is ready for use in any downstream application. DNase I included.*

Description

The DNA/RNA Shield™ Blood Kit utilizes DNA/RNA Shield™, a novel preservation/lysis reagent, and Proteinase K to enable rapid isolation of DNA and RNA from up to 3 ml whole blood. The procedure uses Zymo-Spin™ Column technology, along with the aid of reservoirs and a vacuum, to enable ultra-pure nucleic acid. High-quality DNA, total RNA, or DNA & RNA is eluted into ≥50 µl of DNase/RNase-free water and is ready for any downstream application including RT-PCR, sequencing, etc.

See page 126 for information on the DNA/RNA Shield™ - Blood Collection Tube.

Product	Cat. No.	Size	Specifications	Uses
Quick-RNA™ Whole Blood Kit	R1201	50 preps.	Format: Spin Column Elution Volume: ≥ 50 µl Binding Capacity: 100 µg Sample Size: ≤ 50 mg	RNA isolation from mammalian whole blood (fresh or stored in DNA/RNA Shield™ 2X concentrate); Plasma; Serum; Pelleted blood cells (PBMCs, WBCs, buffy coat, pelleted samples from PAXgene® Blood RNA Tube(Qiagen), etc.); Nucleated blood
Quick-DNA/RNA™ Blood Tube Kit	R1151	50 preps.	Format: Spin Column Elution Volume: ≥ 50 µl Binding Capacity: 100 µg	RNA isolation for use with the DNA/RNA Shield™- Blood Collection Tube (p. 126)

ZR Urine RNA Isolation Kit™

Highlights

- *Quick, simple, and reliable recovery of RNA from cells and biological sediment in urine.*
- *Ideal for recovering total RNA from large volume liquid samples that contain a low concentration of cells.*
- *Column design allows RNA to be eluted at high concentration into minimal volume.*

Description

Isolate total RNA from cells and biological sediment in urine reliably and rapidly with the ZR Urine RNA Isolation Kit™. Urine RNA isolation has never been easier! This innovative product enables isolation of cells from urine using a syringe fitted with a uniquely-designed syringe filter. Following separation, cells are lysed and the collected lysate may be processed immediately or at a later time following transportation and/or storage. The RNA isolation procedure is simple and can be performed in under 10 minutes with the technologies featured in the kit. Total RNA isolated with the ZR Urine RNA Isolation Kit™ is ideal for RT-PCR, etc.

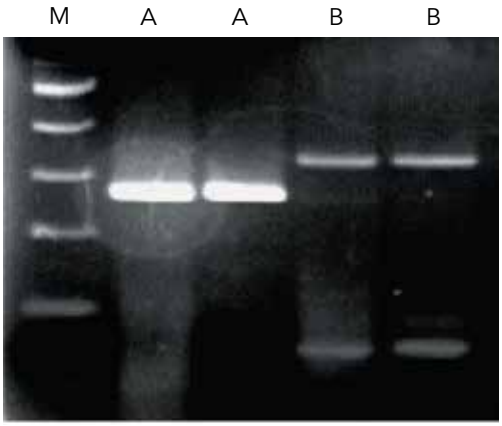
Pinpoint® Slide RNA Isolation Systems

Highlights

- *Allows for the isolation of total RNA from fresh and/or FFPE tissue sections.*
- *Simple procedure combines Pinpoint® tissue sampling technology with a one-step RNA extraction/purification method.*
- *Omits the use of organic denaturants.*

Description

The Pinpoint® Slide RNA Isolation Systems I and II are innovative products for the isolation of RNA from any targeted area of fresh (Systems I and II) or paraffin-embedded (System II) tissue sectioned onto a glass slide. The systems combine powerful Pinpoint® tissue sampling methodology, a unique single-step RNA extraction/binding buffer, and Zymo-Spin™ Column purification technology to yield high-quality RNA. Unlike current UV-based methods, these products make isolation of tissue RNA simple and quick. No expensive specialized equipment is needed. Eluted RNA is well suited for subsequent RNA analyses including RT-PCR.



RT-PCR of RNA recovered from human tissue using the Pinpoint® RNA Isolation System. Amplicons (in duplicate) are from A) a human β-actin transcript; B) an arbitrary human transcript from Chromosome 3. M is 100 bp DNA Marker (Zymo Research).

Product	Cat. No.	Size	Specifications	Uses
ZR Urine RNA Isolation Kit™	R1038	20 preps.	Format: Spin Column Elution Volume: ≥ 10 µl Binding Capacity: 10 µg RNA Size Limits: 17 nt Processing Time: 10 minutes	RNA isolation from urine; Cells; Biological sediment; Microvesicles; Exosomes
	R1039	50 preps.		
Pinpoint® Slide RNA Isolation System I Kit	R1003	50 preps.	Format: Spin Column Elution Volume: ≥ 10 µl Binding Capacity: 10 µg RNA Size Limits: 17 nt	RNA isolation from: Tissue sections (Systems I & II) FFPE tissue sections (System II)
Pinpoint® Slide RNA Isolation System II Kit	R1007	50 preps.		

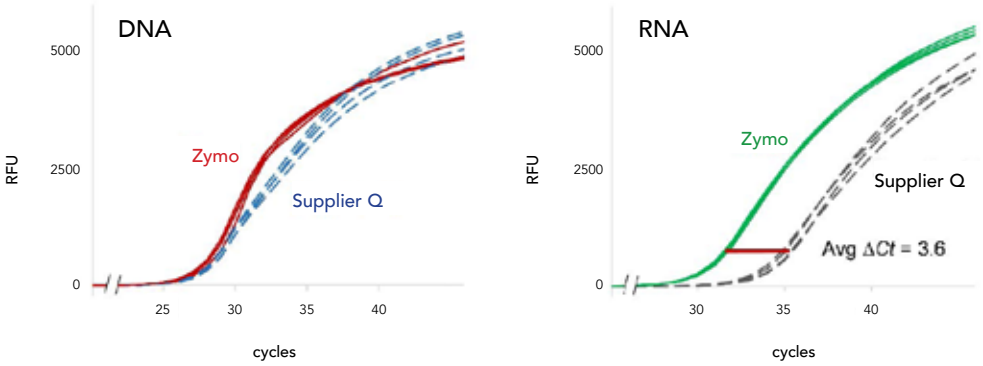
Quick-RNA™ FFPE Kit

Highlights

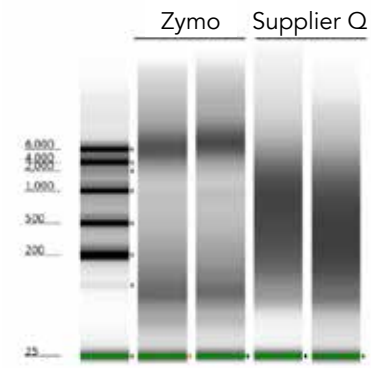
- *High performance sample prep technology for high-quality total RNA (including small/micro RNAs) from FFPE tissue samples and sections.*
- *DNA-free RNA is ready for use in any downstream application. DNase I included.*

Description

The *Quick*-RNA™ FFPE Kit provides a simple and reliable method for RNA isolation from formalin-fixed, paraffin embedded (FFPE) tissue samples. The unique chemistries of this kit have been optimized for maximum recovery of both large and small RNA species. Simply deparaffinize tissues using the Deparaffinization Solution, digest using Proteinase K, heat to reverse chemical crosslinks, and then purify using Zymo-Spin™ Column technology. The result is high-quality total RNA (including small RNAs 17-200 nt), which is DNA-free and is ready for RT-PCR, hybridization, sequencing, etc.



DNA & RNA isolated using the *Quick*-DNA/RNA™ FFPE Kit are high-quality and consistently outperforms RNA isolated using Supplier Q procedures (Avg ΔCt = 3.6) as depicted by the RT-PCR amplification curves (n=4) (Zymo Research).



RNA isolated with the *Quick*-RNA™ FFPE Kit is higher quality (left); compared to Supplier Q procedures (right). Quality assessed by Agilent TapeStation 2200®.

Product	Cat. No.	Size	Specifications	Uses
Quick-RNA™ FFPE Kit	R1008	50 preps.	Format: Spin Column Elution Volume: ≥ 50 µl Binding Capacity: 50 µg RNA Size Limits: ≥17 nt	RNA isolation from: FFPE blocks; FFPE tissue sections
Quick-DNA/RNA™ FFPE Kit	R1009	50 preps.	Format: Spin Column Elution Volume: ≥ 50 µl DNA Binding Capacity: 50 µg RNA Binding Capacity: 50 µg DNA & RNA Size Limits: ≥17 nt	RNA isolation from: FFPE blocks; FFPE tissue sections DNA isolation from: FFPE blocks; FFPE tissue sections

Environmental RNA Purification with *Quick*-RNA™ Kits

Innovation. Pure & Simple.™

Are you isolating RNA from tough-to-lyse and environmental samples? We offer a variety kits which feature our superior mechanical lysis, BashingBead™, technology. With these kits, RNA can be isolated from samples otherwise resistant to conventional lysis procedures, including solid tissues, plants, seeds, food, arthropods, Gram-positive and Gram-negative bacteria, yeast, filamentous fungi, unicellular or filamentous algae, and protozoa. The result is high-yield, high-quality RNA that is suitable for downstream applications such as RT-PCR and more.

Technology Overview: BashingBeads™ Lysis & Environmental RNA Purification

Our BashingBead™ RNA purification kits feature novel technology designed for quick recovery of RT-ready total RNA from tough-to-lyse environmental samples. RNA can be isolated from a broad range of samples including plants, seeds, insects and microorganisms in soil, sludge, sediment, or fecal samples. Kits are available in Microprep and Miniprep spin-column formats.

Simply transfer samples into the provided ZR BashingBead™ Lysis Tubes and bead beat, as normal, in any bead mill, pulverizer, or vortex that can accommodate standard 2.0 ml tubes. The tubes contain a specially formulated lysis buffer. Following lysis, RNA is isolated using Zymo-Spin™ technology and special filtration technologies, which remove polyphenolic inhibitors that can inhibit reverse transcriptase (RT) for plant, fecal, and soil samples.

By the tube

Our state-of-the-art BashingBeads™ are created with the densest and highest-quality ceramic material. The beads are ideal for when a sample requires homogenization/lysis. Novel technology enables the beads to be chemically inert, minimalizing RNA shearing by physical and chemical methods.

Our state-of-the-art BashingBeads™ are constructed of the highest quality, most dense ceramic material available today. They are used when thorough sample homogenization/lysis is required by the researcher. RNA shearing by physical and chemical methods are minimized since the beads are fracture resistant and chemically inert. They are unique amongst the lysis matrices offered by other companies for RNA isolation from tough-to-lyse materials.

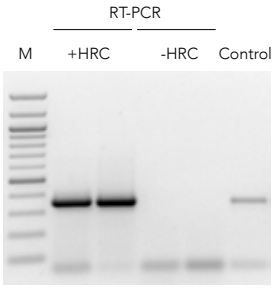
Quick-RNA™ Fecal/Soil Microbe Microprep Kit

Highlights

- *Simple and efficient method for inhibitor-free RNA from soil and fecal samples.*
- *Ultra-high density BashingBeads™ can be used with any bead mill, disrupter, or vortex.*

Description

Purify inhibitor-free RNA from soil and fecal samples rapidly and reliably with the *Quick*-RNA™ Fecal/Soil Microbe Microprep Kit. The kit is designed for isolation of total RNA including small RNAs (≥ 17 nt) from tough-to-lyse bacteria, fungi, protozoa, algae, etc. in various soil types, sludge, sediment, and/or fecal samples. Samples are efficiently homogenized by ZR BashingBead™ Lysis Tubes. Zymo-Spin™ Column technologies allow for quick removal of genomic DNA and polyphenolic RT/PCR inhibitors (e.g., humic acids, polyphenols, tannins). The purified RNA is highly-concentrated and ideal for subsequent RNA-based methods including RT-PCR, hybridization, etc.

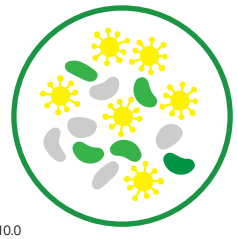


PCR amplification of a eukaryotic transcript post-RT: Total RNA isolated from sludge with or without inclusion of the Zymo-Spin™ IV-HRC spin filter during the *Quick*-RNA™ Fecal/Soil Microbe Microprep Kit protocol. M is a ZR 1 kb DNA Marker (Zymo Research).

Quick-RNA™ Fungal/Bacterial Kits

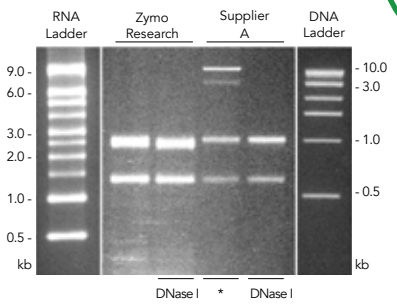
Highlights

- *Quick (15 minute) isolation of total RNA from tough-to-lyse bacteria, yeast, and fungi.*
- *Zymo-Spin™ Column technology allows RNA to be eluted into minimal volumes (≥ 6 µl).*



Description

The *Quick*-RNA™ Fungal/Bacterial Microprep and Miniprep Kit delivers rapid (15 minute) isolation of total RNA from pelleted tough-to-lyse bacteria (e.g., Gram-positive), yeast, and/or fungal cells. Both kits utilize ultra-high density BashingBeads™ for sample homogenization and a robust buffer system for total RNA purification (small RNAs included). Zymo-Spin™ Column technology allows eluted RNA volumes in as little as 6 µl, which is ideal for subsequent procedures including RT-PCR.



Total RNA was isolated from equal amounts of *E.coli* cells containing plasmid DNA (pGEM®) using the *Quick*-RNA™ Fungal/Bacterial Microprep Kit or kit from Supplier A. The samples were resolved in a 2% (w/v) agarose gel. RNA Millenium™ Markers (Ambion) and ZR 1 kb DNA Marker (Zymo Research) were used.

* = genomic (> 10 kb) and plasmid (> 3 kb) DNA contamination
DNase I = samples treated with DNase I.

Product	Cat. No.	Size	Specifications	Uses
Quick-RNA™ Fecal/Soil Microbe Microprep Kit	R2040	50 preps.	Format: Spin-Columns Elution Volume: ≥ 6 µl Binding Capacity: 10 µg Processing Time: 45 minutes	RNA isolation from: Soil; Sediment; Sludge; Feces
Quick-RNA™ Fungal/Bacterial Microprep Kit	R2010	50 preps.	Format: Spin-Columns Elution Volume: ≥ 6 µl Binding Capacity: 10 µg Processing Time: 45 minutes	RNA isolation from: Gram (+) and (-) bacteria; Yeast; Filamentous fungi; Unicellular algae; Filamentous algae; Protists; Soft tissue (limited); Food
Quick-RNA™ Fungal/Bacterial Miniprep Kit	R2014	50 preps.	Format: Spin-Columns Elution Volume: ≥ 6 µl Binding Capacity: 10 µg Processing Time: 45 minutes	

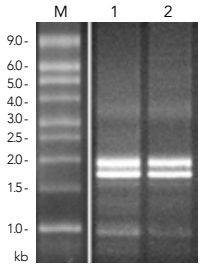
Quick-RNA™ Tissue & Insect Microprep Kit

Highlights

- *Quick (15 minute) isolation of RNA from insects and tough-to-lyse tissues.*
- *Omits the use of organic denaturants and proteases.*

Description

The *Quick*-RNA™ Tissue & Insect Microprep Kit delivers rapid (15 minute) isolation of total RNA from various tissue samples, insect and other arthropod specimens (e.g., mosquitoes, bees, lice, ticks, *Drosophila melanogaster*). Mammalian tissues can also be processed with this kit. The product utilizes ultra-high density BashingBeads™ for sample homogenization and a robust buffer system to deliver total RNA purification (small RNAs included). RNA eluted in DNase/RNase Free Water is perfect for subsequent procedures including RT-PCR.



Analysis of *Quick*-RNA™ Tissue & Insect Microprep Kit. Isolation of total RNA from n=2 Drosophila sp. individuals was performed in duplicate (lanes 1 and 2). Samples were processed (2 x 30 sec at 6 m/s) using a FastPrep®-24 Instrument (MP Biomedicals) and resolved alongside (lane M) RNA Millenium™ Markers (Ambion) in a 1% (w/v) non-denaturing agarose gel.

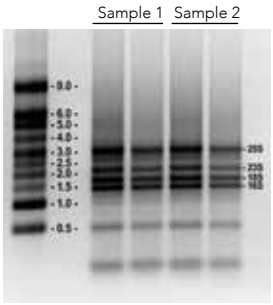
Quick-RNA™ Plant Miniprep Kit

Highlights

- *Quick, 10 minute isolation of inhibitor-free total RNA (~50 µg) from a wide variety of plant samples using ultra-high density BashingBeads™ and Zymo-Spin™ Column technologies.*
- *High-quality RNA eluted in ≥25 µl is ready for reverse transcription, microarray, sequencing, etc.*

Description

Isolation of total RNA from various plant samples (e.g., leaves, stems, buds, flowers, fruit, seeds, etc.) has never been easier with the *Quick*-RNA™ Plant Miniprep Kit. Taking only 15 minutes, the kit completely eliminates DNA and polyphenolic inhibitors from samples. The RNA is eluted into volumes as little as 25 µl and is suitable for use in various downstream procedures including RT-PCR.



Isolation of total RNA from 10 mg of a fresh leaf material (Nicotiana sp.) using the *Quick*-RNA™ Plant Miniprep Kit. Leaves were minced, then processed using a FastPrep®-24 instrument (MP Biomedicals). Samples 1 and 2 were loaded in 2x and 1x volume aliquots, respectively, and resolved in a 1% (w/v) nondenaturing agarose gel. RNA Millenium™ Markers (Ambion) were used as size standards.

Product	Cat. No.	Size	Specifications	Uses
Quick-RNA™ Tissue & Insect Microprep Kit	R2030	50 preps.	Format: Spin-Columns Elution Volume: ≥ 6 µl Binding Capacity: 10 µg Processing Time: 15 minutes	RNA isolation from: Soft tissue; Solid tissue; Tough-to-lyse tissues; Tough-to-lyse organisms; Insects/arthropods; Food
Quick-RNA™ Plant Miniprep Kit	R2024	50 preps.	Format: Spin-Columns Elution Volume: ≥ 25 µl Binding Capacity: 50 µg Processing Time: 15 minutes	RNA isolation from: Plant material; Seeds; Fruit

RNA Clean-Up

Inhibitor-free RNA from any Enzymatic Reaction

The RNA Clean & Concentrator™ (RCC™) kits facilitate the efficient removal of RNA polymerases, ligases, and RNA modifying enzymes as well as free NTPs and their analogs including fluorescent and radio-labeled derivatives. Our Zymoclean™ Gel RNA Recovery Kit and the ZR small-RNA™ PAGE Recovery Kit are designed for recovery of RNA from agarose and polyacrylamide gel matrices. All clean-up kits feature our state-of-the-art Zymo-Spin™ Column technology, which enables RNA to be eluted in minimal volumes (i.e., ≥ 6 µl) of water. This allows for highly concentrated RNA that is well suited for applications like microarrays, RNA transfection, denaturing-gel electrophoresis, Northern blotting, and RT-(q)PCR.

RNA Clean & Concentrator™ Kits

Highlights

- *Quick methods for cleaning and concentrating RNA.*
- *Zymo-Spin™ Column/Plate technology allows minimal elution volumes.*
- *Ideal for purification of RNA from aqueous phase following acid phenol extraction.*

Description

The RNA Clean & Concentrator™ kits provide simple and reliable methods for the rapid preparation of high-quality RNA. The kit owes its simplicity to a unique single-buffer system and Zymo-Spin™ technology. Simply add the binding buffer to your sample, adjust the conditions for binding by adding ethanol, then wash and elute the concentrated RNA. RNA ≥ 17 bases can be safely treated and recovered using these kits. The result is highly-concentrated, purified RNA that is perfect for subsequent RNA-based methods including RT-PCR, hybridization, etc.

Product	Cat. No.	Size	Specifications	Uses
RNA Clean & Concentrator™-5	R1015	50 preps.	Format: Spin-Columns Elution Volume: ≥ 6 µl Binding Capacity: 10 µg RNA Size Limits: ≥ 17 nt Processing Time: 5 minutes	RNA clean-up; DNA-free RNA; Enzyme removal; Nucleotide/dye removal; Small-RNA/probe purification
	R1016	200 preps.		
RNA Clean & Concentrator™-5 w/ DNase I	R1013	50 preps.		
	R1014	200 preps.		
ZR-96 RNA Clean & Concentrator™-5	R1080	2 x 96 preps.	Format: 96-Well Elution Volume: ≥ 10 µl Binding Capacity: 25 µg RNA Size Limits: ≥ 17 nt Processing Time: 20 minutes	
RNA Clean & Concentrator™-25	R1017	50 preps.	Format: Spin-Columns Elution Volume: ≥ 25 µl Binding Capacity: 50 µg RNA Size Limits: ≥ 17 nt Processing Time: 5 minutes	
	R1018	100 preps.		
RNA Clean & Concentrator™-100	R1019	25 preps.	Format: Spin-Columns Elution Volume: ≥ 100 µl Binding Capacity: 250 µg RNA Size Limits: ≥ 17 nt Processing Time: 10 minutes	

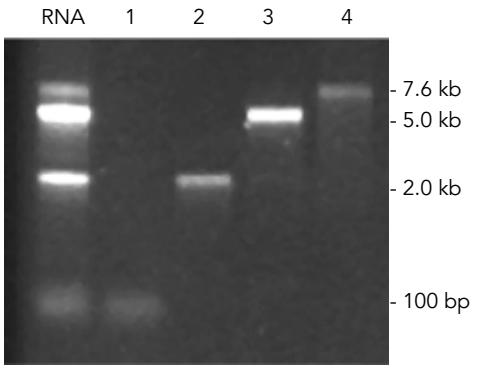
Zymoclean™ Gel RNA Recovery Kit

Highlights

- *Quick (30 minute) recovery of purified RNA fragments from agarose gels.*
- *Recovery ≥ 80% for RNA > 500 nt.*

Description

Recover purified RNA fragments from agarose gels in only 30 minutes with the Zymoclean™ Gel RNA Recovery Kit. The procedure combines a unique, single-step agarose dissolving/RNA binding buffer with Zymo-Spin™ Column technology to yield high-quality, purified RNA in just minutes. The purified RNA is eluted into small volumes of DNase/RNase Free Water for highly concentrated samples suitable for subsequent RNA-based manipulations. Compatible with MOPS, TAE, and TBE buffered agarose gels (formaldehyde up to 2.0%).

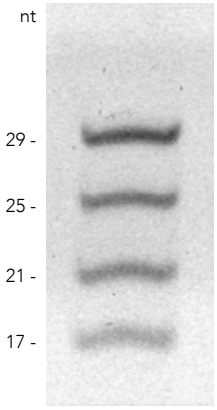


The recovery of RNA from an agarose gel. Different sized RNAs on the left were excised from the gel and recovered using the Zymoclean™ Gel RNA Recovery Kit (lanes 1-4).

ZR small-RNA™ Ladder

Description

The ZR small-RNA™ Ladder is a microRNA size marker for use in polyacrylamide gel separation methods and small RNA size approximation. The ladder consists of four single-stranded RNA oligonucleotides 17, 21, 25, and 29 bases in length. The marker is supplied in water and can be stained with dyes specific for single-stranded nucleic acid species e.g, GelStar™. Sequence available upon request.



ZR small-RNA™ Ladder. ZR small-RNA™ Ladder (350 ng) was resolved in a 25% (w/v) non-denaturing PAGE gel and visualized after staining with GelStar™ for 5 minutes.

Product	Cat. No.	Size	Specifications	Uses
Zymoclean™ Gel RNA Recovery Kit	R1011	50 preps.	Format: Spin-Columns Elution Volume: ≥ 6 µl Binding Capacity: 10 µg RNA Size Limits: ≥ 200 nt Processing Time: 30 minutes	RNA from agarose gel slices
ZR small-RNA™ Ladder	R1090	10 µg	Ladder for four microRNAs (17, 21, 25, 29 nt) Concentration: 20 ng/µl Amount: 10 µg Storage: -20° C	Isolated RNA; Small RNA fraction

ZR small-RNA™ PAGE Recovery Kit

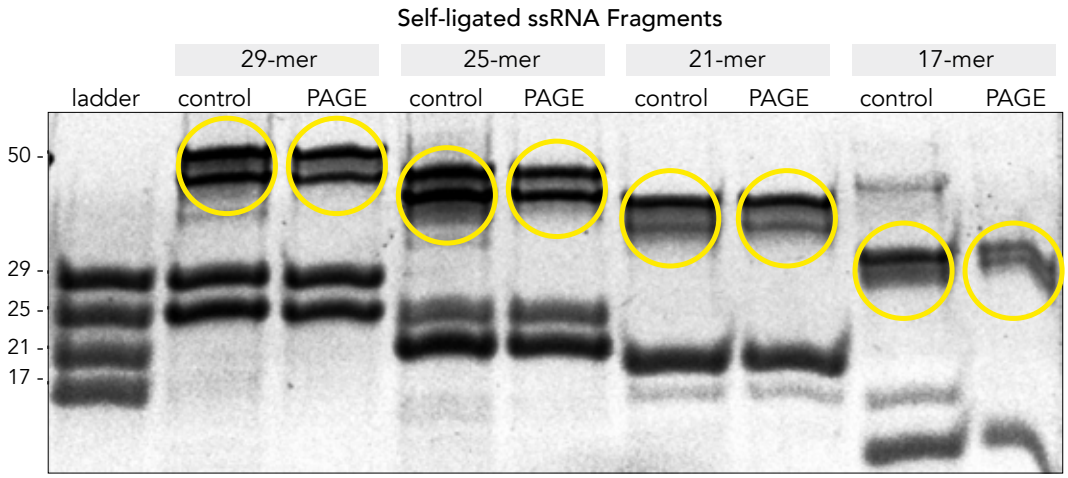
Highlights

- *For concentrated recovery of small RNA (& DNA) fragments from polyacrylamide gels.*
- *Compatible with up to 25% (w/v) polyacrylamide.*

Description

Extract high-quality small RNAs from polyacrylamide gels (native or denatured) easily and efficiently with the ZR small-RNA™ PAGE Recovery Kit. This kit is an improvement of the "crush and soak" method, which incorporates a unique buffer system together with Zymo-Spin™ Column technologies for improved recovery and convenience. Recovered RNA can be concentrated into volumes ≥ 6 µl, making it ideal for downstream enzymatic reactions and manipulations.

Can be used for extraction/isolation of DNA fragments with equal efficiency.



ladder = ZR small RNA ladder

control = ssRNA oligo ligation control

PAGE = recovered ssRNA oligo self-ligated

Recovery and ligation of single-stranded RNA oligonucleotides. In the image above, the RNA fragments were recovered from a 17.5% (w/v) native polyacrylamide gel using the ZR small-RNA™ PAGE Recovery Kit. All fragments shown were resolved in a native PAGE gel following ligation. T4 polynucleotide kinase and T4 RNA ligase I (New England Biolabs) were used for the phosphorylation and subsequent ligation of the ssRNA samples. Ligated RNAs are circled in yellow. RNA in the gel was visualized with GelStar® Stain (Lonza).

Product	Cat. No.	Size	Specifications	Uses
ZR small-RNA™ PAGE Recovery Kit	R1070	20 preps.	Format: Spin-Columns Elution Volume: ≥ 6 µl Binding Capacity: 10 µg Size Limits: 17 - 200 nt Processing Time: 45 minutes	RNA (&DNA) from polyacrylamide gel slices

4 Sample Collection and Preservation

Sample collection and preservation stand as the origin of all workflows which use nucleic acids. The methods and technologies used to collect and store samples can profoundly impact analyses and downstream applications of nucleic acids. Compositional changes and bias can occur because of nucleic acid degradation, cellular growth or decay, and the logistics of collection. Current collection and transportation methods require the use of costly cold-chain logistics to prevent or slow down these processes. Without proper storage conditions, the aforementioned can lead to misrepresentation of an analyte's abundance, systematic bias, reduced sensitivity, complete signal loss, poor reproducibility, and an inability to compare results between labs. RNA is especially vulnerable to degradation due to the ubiquity of RNases and the inherent instability of the RNA phosphoester bond. Even DNA is prone to rapid degradation and complete signal loss. For instance, when detecting *H. Pylori* in a stool sample, by real-time PCR, it is necessary to store the samples in a preservative or the DNA rapidly degrades.

There are a plethora of other factors within collection and storage that can affect downstream use of nucleic acids. Microbial growth and decay can significantly alter the composition of a sample if the organisms are not inactivated. Compositional changes associated with other collection methodologies, especially if phase separation (e.g. precipitation) is utilized, can also significantly bias downstream analyses.[1] Small nucleic acids (e.g. miRNA) are particularly vulnerable to such biases and/or complete signal loss because of their aberrant behavior when compared to larger nucleic acids. The ease of processing a sample post storage in a preservation solution is critical to cost, throughput, and methodologies that require phase separation and/or reagent removal impose significant and costly challenges for high throughput applications and automation. Another major consideration when choosing a sample stabilization reagent is the logistics and cost of transporting samples potentially containing pathogens.

Zymo Research has overcome these challenges with a range of DNA/RNA Shield™ sample collection devices, which can reliably provide a genetic snapshot at the time of collection by stabilizing nucleic acids at ambient temperature for up to 30 days, inactivates pathogens, and renders the sample noninfectious for safe transport. Samples collected in DNA/RNA Shield™ devices are prepared for hassle-free transport and are ready for any downstream purification. Also, unlike any preservative on the market, there is no need for removal of the DNA/RNA Shield™ reagent for purification of nucleic acid.

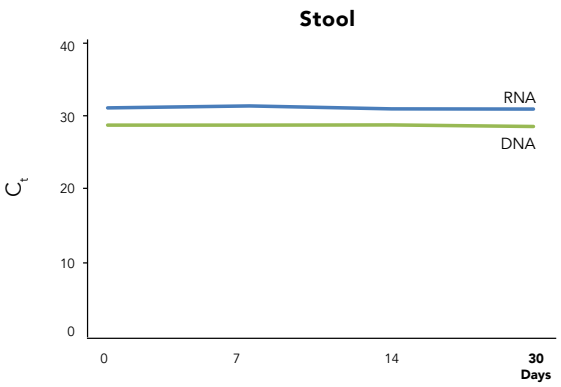
At Zymo Research, we have made it our goal to standardize sample collection in the clinical/research setting.

DNA/RNA Shield™ Collection Devices

1) Kim, Young-Kook, et al. "Short structured RNAs with low GC content are selectively lost during extraction from a small number of cells." Molecular cell 46.6 (2012): 893-895.

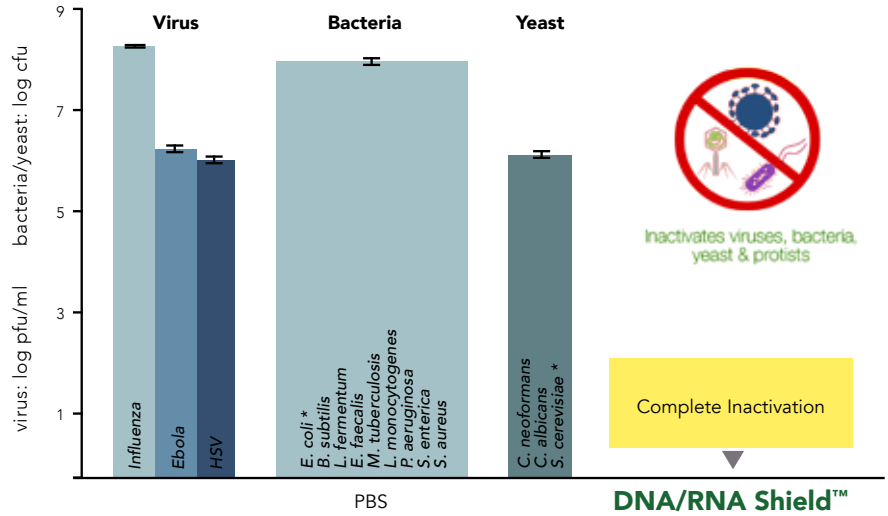
Technology Overview: DNA/RNA Shield™

Nucleic Acid Stabilization at Ambient Temperature for 30 Days



DNA and RNA in stool is effectively stabilized in DNA/RNA Shield™ at ambient temperature. Graphs show: spike-in DNA and RNA controls from stool purified at the indicated time points and analyzed by (RT)qPCR.

Microbial and Viral Inactivation

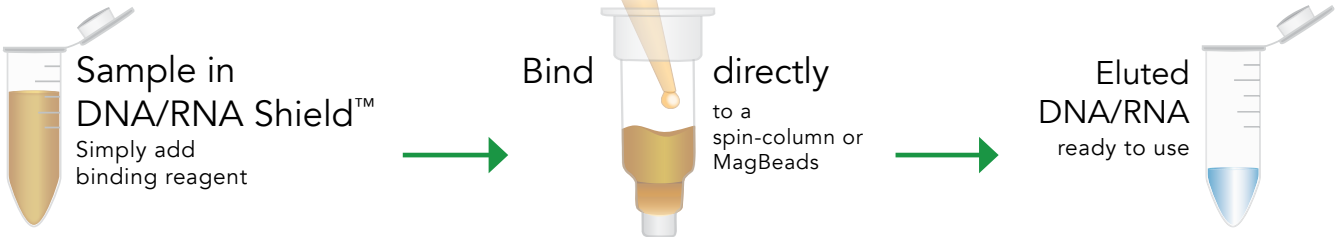


Viruses, bacteria and yeast are effectively inactivated by DNA/RNA Shield™. Samples containing the infectious agent (virus, bacteria, yeast) were treated for 5 minutes with DNA/RNA Shield™ or mock (PBS). Titer (PFU) was subsequently determined by plaque assay. Validated by: Influenza A - D. Poole and Prof. A. Mehle, Department of Medical Microbiology and Immunology, University of Wisconsin, Madison; Ebola (Kikwit) - L. Avena and Dr. A. Griffiths, Department of Virology and Immunology, Texas Biomedical Research Institute; HSV-1/2 - H. Oh, F. Diaz and Prof. D. Knipe, Virology Program, Harvard Medical School; *E. coli, L. fermentum, B. subtilis, S. cerevisiae* – Zymo Research).

*Disclaimer: This graph only displays results from *E. coli* inactivation. Each microbe was tested independently and were combined into one graph for brevity. Bacterial cultures were grown between 10^8 - 10^9 cells and yest cultures were grown between 10^7 - 10^8 cells.

Streamlined Purification

No Reagent Removal. Simple, direct purification using Zymo Research Purification Products*.



*Also compatible with most other commercial products.

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Accommodates Any Sample

including cells, tissues, fecal samples, tough-to-lyse samples, soil samples, plants, microorganisms, and bodily fluids

Sample Collection Devices

Blood Collection Tube

A sterile evacuated blood collection tube prefilled with DNA/RNA Shield™.

Page 126

Fecal Collection Tube

A 15 ml tube prefilled with DNA/RNA Shield™ equipped with scoop attached to screwcap for convenient sample collection.

Page 126

Swab Collection Tube

A sterilized screwcap tube prefilled with DNA/RNA Shield™ (1 or 2 ml) with flocked swab.

Page 125

Collection & Lysis Tubes

Collect and inactivate samples in lysis tubes prefilled with DNA/RNA Shield™.

*BashingBeads™ included with some formats

Page 127

DNA/RNA Shield™ - Swab and Collection Tube

Highlights

- *Nucleic acid preservation (at ambient temperature; cold-free)*
- *Pathogen inactivation (bacteria, fungus, parasites & viruses)*
- *Streamlined purification (no reagent removal, universally compatible, automatable)*

Description

A general swab collection system (12 x 80 mm screwcap tube) that allows for the collection of samples including mouth, nose, throat, etc. The swab is collected into a tube prefilled with DNA/RNA Shield™, which effectively inactivates viral, bacterial, and other pathogens. Samples stored in DNA/RNA Shield™ are ready for downstream purification and any nucleic acid-based analysis.

Applications

- *Mouth, nose, and throat sample collection*
- *Environmental sample collection*
- *Pathogen inactivation and detection*

Product	Cat. No.	Size	Specifications	Uses
DNA/RNA Shield™ - Swab & Collection Tube	R1106	10 pack (1 ml fill)	• Contains a sterile nylon swab with short (20 mm) breakpoint • Prefilled with DNA/RNA Shield™ (1 or 2 ml) and sterilized • Ideal for the general collection of swab samples (i.e., nose, mouth, throat)	General swab collection of samples (mouth, nose, throat, surfaces, etc.)
	R1107	50 pack (1 ml fill)		
	R1108	10 pack (2 ml fill)		
	R1109	50 pack (2 ml fill)		

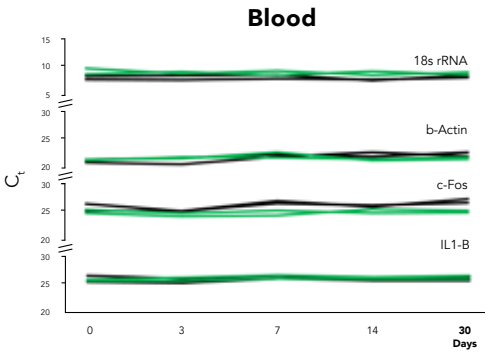
DNA/RNA Shield™ - Blood Collection Tube

Highlights

- *Nucleic acid preservation (at ambient temperature; cold-free)*
- *Pathogen inactivation (bacteria, fungus, parasites & viruses)*
- *Streamlined purification (no reagent removal, universally compatible, automatable)*

Description

Conveniently collect whole blood directly into DNA/RNA Shield™ blood vacuum tubes. Each evacuated tube instantly inactivates any harmful/pathogenic organisms and stabilizes the nucleic acid for prolonged periods at ambient temperature. Blood tubes are compatible with most blood collection sets designed for venipuncture (i.e., winged/butterfly needle).



RNA in blood is effectively stabilized in DNA/RNA Shield™ at ambient temperature.

Applications

- *Gene expression analysis*
- *miRNA analysis*
- *Bloodbourne pathogen detection*

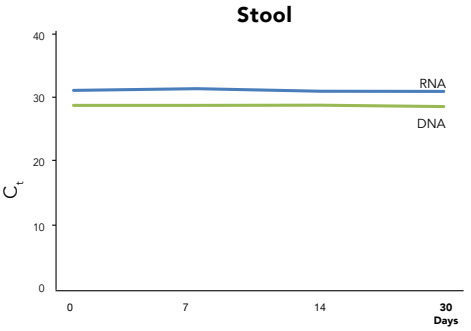
DNA/RNA Shield™ - Fecal Collection Tube

Highlights

- *Nucleic acid preservation (at ambient temperature; cold-free)*
- *Pathogen inactivation (bacteria, fungus, parasites & viruses)*
- *Streamlined purification (no reagent removal, universally compatible, automatable)*

Description

Store and inactivate fecal samples with the DNA/RNA Shield™ Fecal Collection Tube, which includes a fecal scoop cup, a scoop attached to its screwcap, and a lysis tube. Samples collected are ready for downstream microbiomic analysis.



RNA in stool is effectively stabilized in DNA/RNA Shield™ at ambient temperature.

Applications

- *Microbiomic analysis*
- *Gene expression analysis*
- *miRNA analysis*
- *Pathogen detection*

Product	Cat. No.	Size	Specifications	Uses
DNA/RNA Shield™ - Blood Collection Tube	R1150	50 pack	• A sterile evacuated blood collection tube (10 ml) that is prefilled with 6 ml DNA/RNA Shield™ • The blood draw volume of the tube is 3 ml	Whole blood collection
DNA/RNA Shield™ - Fecal Collection Tube	R1101	10 pack	• A 15 ml tube prefilled with 9 ml of DNA/RNA Shield™ • The tube is equipped with a scoop attached to its screwcap for convenient sample collection • The tube can collect up to 1 g or 1 ml of fecal specimen	Fecal sample collection (up to 1 g/1 ml)

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DNA/RNA Shield™ - Lysis Tube (Microbe)

Highlights

- *Nucleic acid preservation (at ambient temperature; cold-free)*
- *Pathogen inactivation (bacteria, fungus, parasites & viruses)*
- *Streamlined purification (no reagent removal, universally compatible, automatable)*

Description

Collect and inactivate samples in lysis tubes prefilled with DNA/RNA Shield™. Each tube is filled with ultra-high density BashingBeads™, specifically designed for optimal microbial lysis. Samples collected are ready for any sensitive downstream analysis. Each lysis tube can be paired with a sterile swab for initial sample handling.

Applications

- *Microbiomic analysis*
- *Gene expression analysis*
- *miRNA analysis*
- *Pathogen detection*

DNA/RNA Shield™ - Lysis Tube (Tissue)

Highlights

- *Nucleic acid preservation (at ambient temperature; cold-free)*
- *Pathogen inactivation (bacteria, fungus, parasites & viruses)*
- *Streamlined purification (no reagent removal, universally compatible, automatable)*

Description

Collect and inactivate samples in lysis tubes prefilled with DNA/RNA Shield™. Each tube is also filled with ultra-high density BashingBeads™, specifically designed for optimal tissue lysis. Samples collected are ready for any sensitive downstream analysis.

Applications

- *Microbiomic analysis*
- *Gene expression analysis*
- *miRNA analysis*
- *Pathogen detection*

Product	Cat. No.	Size	Specifications	Uses
DNA/RNA Shield™ - Lysis Tube (Microbe)	R1103	50 tubes	• A 2 ml tube prefilled with 1 ml of DNA/RNA Shield™ • Contains ultra-high density BashingBeads™ for homogenization	Collection and storage of tough-to-lyse microbes from feces, saliva, soil, etc.
DNA/RNA Shield™ - Lysis Tube (Microbe) with Swab	R1104	50 tubes/50 swabs		
DNA/RNA Shield™ - Lysis Tube (Tissue)	R1105	50 tubes		Collection of tissue, whole insects, and tough-to-lyse pathogens
DNA/RNA Shield™ - Collection Tube (BashingBeads™ not included)	R1102	50 tubes		Collection of solid tissues, and biological liquids

DNA/RNA Shield™ Reagent

Highlights

- *Nucleic acid preservation (at ambient temperature; cold-free)*
- *Pathogen inactivation (bacteria, fungus, parasites & viruses)*
- *Streamlined purification (no reagent removal, universally compatible, automatable)*

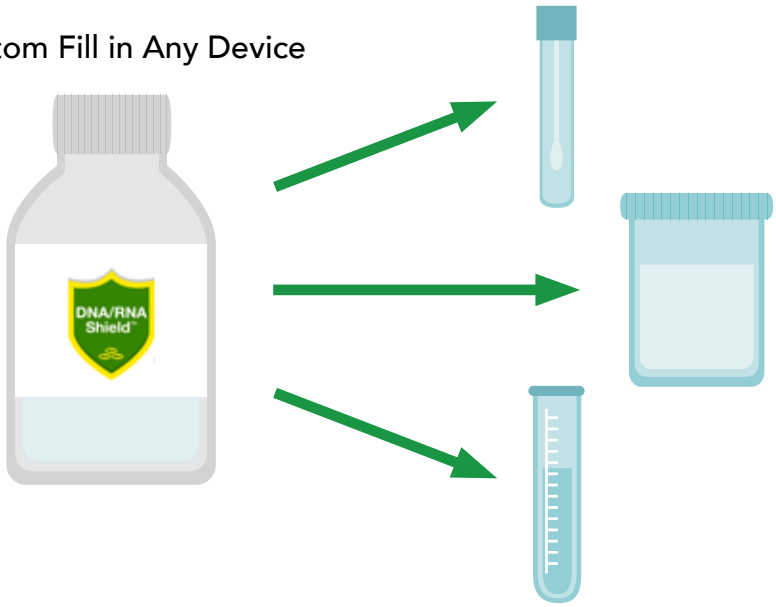
Description

DNA/RNA Shield™ ensures nucleic acid stability during sample storage/transport at ambient temperatures. There is no need for refrigeration or specialized equipment. DNA/RNA Shield™ effectively lyses cells and inactivates nucleases and infectious agents (virus), and it is compatible with various collection and storage devices (vacutainers, swabs, nasal, buccal, fecal, etc.).

Accommodates Any Sample

including cells, tissues, fecal samples, tough-to-lyse samples, soil samples, plants, microorganisms, and bodily fluids

Custom Fill in Any Device



Contact us with any custom needs at *busdev@zymoresearch.com*

Product	Cat. No.	Size	Applications	Uses
DNA/RNA Shield™ Reagent	R1100-50	50 ml	• Microbiomic analysis • Gene expression analysis • miRNA analysis • Pathogen detection	Sample stabilization at ambient temperatures; Ready for transport; Infectious agent inactivation
DNA/RNA Shield™ Reagent	R1100-250	250 ml		
DNA/RNA Shield™ Reagent (2X concentrate)	R1200-25	25 ml		
DNA/RNA Shield™ Reagent (2X concentrate)	R1200-125	125 ml		

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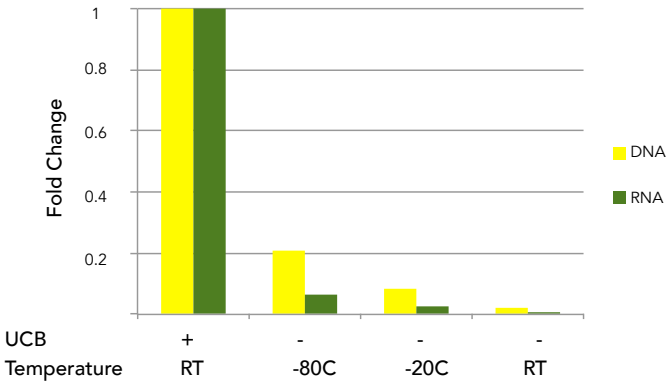
Highlights

- *Effectively preserves DNA and RNA in urine at ambient temperatures.*
- *Facilitates pelleting of both cellular and cell-free nucleic acids from large volume urine samples.*
- *Inhibits microbial growth during long-term (cold-free) storage of urine samples.*

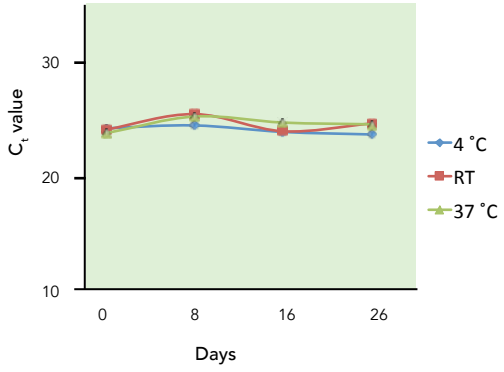
Description

Urine Conditioning Buffer™ (UCB) ensures nucleic acid stability in urine during sample storage/transport at ambient temperatures. There is no need for refrigeration or specialized equipment. UCB can be added to any urine collection device.



Superior Preservation

UCB provides superior preservation vs. conventional methods. Urine (with or without UCB) was preserved using different storage conditions: Room Temperature (RT), -20˚ C, and -80˚ C. HeLa cells were spiked in to urine before starting the RNA experiment. After two weeks of storage, total DNA (yellow) and total RNA (green) were purified using the *Quick*-DNA™ Urine Kit and a custom RNA extraction protocol by Zymo Research, respectively. Corresponding fold change of preserved nucleic acids was obtained from qPCR analysis. Experiment was performed in technical duplicates.



Reliable at Any Temperature

UCB preserves DNA in urine stored at different temperatures. Urine added with UCB was stored at different temperatures (4˚C, Room Temperature (RT), and 37 ˚C) and analyzed over a period of 26 days. At each time point, total DNA was isolated from samples using the *Quick*-DNA™ Urine Kit. Corresponding Ct values were obtained from qPCR analysis. Experiment was performed in technical duplicates.

Product	Cat. No.	Size	Specifications	Uses
Urine Conditioning Buffer (UCB)	D3061-1-140	140 ml	Store and/or transport urine samples with UCB™ for later purification of high-quality DNA/RNA.	Urine collection and preservation

5 Microbiomics

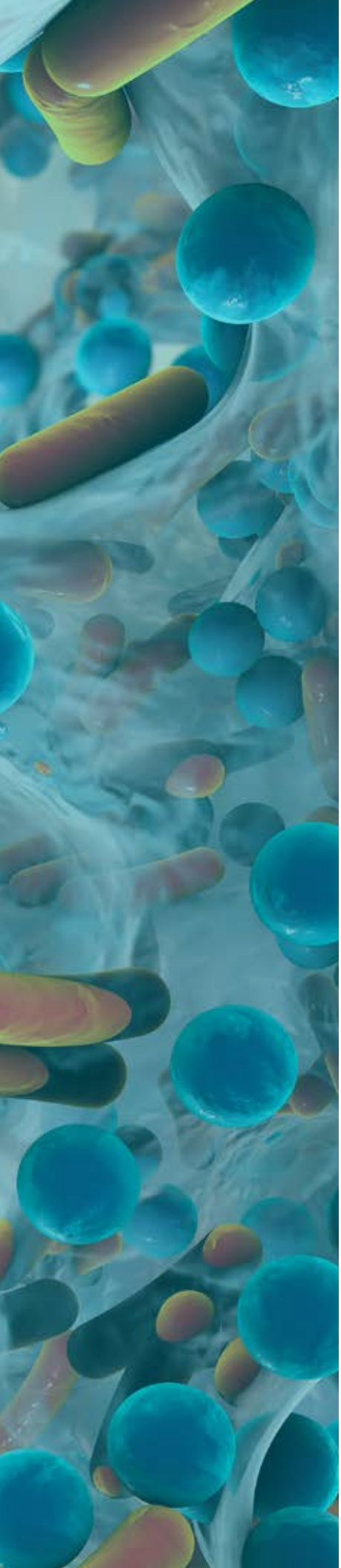
In recent years the advances in DNA sequencing and other genome-enabled technologies have lowered the cost and time requirements needed to sequence any organism. Next-Generation sequencing (NGS) of microbial communities has dramatically increased the amount of research and exploration in both the human and environmental microbial ecosystem.

When asked, many of the leading government agencies researching microbiomes expressed a strong interest in microbiome research as a means to solving problems, particularly those related to the production of food, the improvement of human health and ecosystem health, the production of clean, renewable energy and the manufacture of microbiome-based therapeutics and products[1].

Advancements in NGS as well as increased funding have enabled large-scale, multi-lab research of microbial communities. However, early quality control studies on microbiomics research suggest that, while the technology and funding are readily available, there are no standard reference materials or controls. The field is littered with data of errors and bias. The combination of variation in measurements between labs and lack of standard reference materials have led to growing concern within the scientific community about the reproducibility of research [2].

Despite the significant amounts of bias stalking every step of a microbiomic workflow, there are currently no established methods, references, and standards that could be used to gain quality microbiomics insights. The absence of these metrics removes the fundamental cornerstone of the scientific method: replication. From the smallest research lab to large commercial service providers, lack of replicable results is an openly admitted problem throughout the field.

The ZymoBIOMICS® product line was developed with the goal of eliminating bias across the entire microbiomic workflow. This new workflow employs the use of a collection reagent and storage devices, specially designed to inactivate all microbes (including viruses) and take a molecular snapshot of a sample at the time of collection, DNA extraction methods to uniformly lyse easy and tough-to-lyse microbes, and two novel sets of microbial standards to assess bias at extraction and analysis at each step of the workflow. The ZymoBIOMICS® product line is intended to offer a standardized metric to determine the accuracy of microbiomics/metagenomics workflows and enhance data reproducibility across labs.



ZymoBIOMICS®

ZymoBIOMICS®

1.Stulberg, Elizabeth, et al. "An assessment of US microbiome research." Nature Microbiology 1 (2016): 15015.
2. Sinha, Rashmi, et al. "The microbiome quality control project: baseline study design and future directions." Genome biology 16.1 (2015): 1.

The Challenge:

Early quality control studies of microbiomics research suggest that studies in this vast new frontier of research is littered with biased data, which has led to unintentionally inaccurate and irreproducible data (Stulberg et al., 2016). These inaccuracies stem from the complicated multi-step workflows associated with microbiomics. Starting at sample collection, all the way through bioinformatics analyses, each step of a microbiomic workflow contains potential for enormous amounts of variation. As multi-lab and longitudinal microbiomic studies have become more common, there is an urgent need for microbial reference materials to establish validated methods for reproducible data. Bias must be systemically evaluated through entire workflows and eliminated (or substantially reduced) by addressing its root cause in each step of these workflows.

Sample Collection And Storage
As the origin of the entire workflow, sample collection and preservation is one of the most critical steps for achieving high quality reproducible results. Yet, sample collection can vary greatly between labs. When a sample is stored or transported at ambient temperature, without a protective mechanism in place (e.g. preservation reagents or effective cold chain), microbes have markedly varied growth and survival rates. This can lead to drastically altered community profiles. Nucleic acid profiles can rapidly change due to degradation or transcription in response to environmental changes. To achieve an accurate representation of the original sample, collection and storage methods need to prevent the alteration of the nucleic acid profile to avoid inaccuracies and biases. While freezing samples at -80°C on site is the most ideal solution access to freezers is inconvenient or unfeasible in many situations, and transporting samples that require refrigeration or freezing is costly. Some preservation reagents also require reagent removal that can introduce bias by inadvertently causing uneven partitioning of the sample. When and how a sample is collected can also affect observed microbial profiles and should be carefully considered when designing a study.

Extraction
Nucleic acid extraction is also a major contributor to inaccurate biased profiles due to inferior cell lysis methods that fail to extract DNA uniformly from diverse microbes. Researchers have evaluated many different cell lysis mechanisms including mechanical, chemical, thermal, and enzymatic. Processes that involve chemical or thermal lysis often cause over-representation of easy-to-lyse organisms (e.g. Gram-negative bacteria) due to poor liberation of DNA from hardy, tough-to-lyse organisms (e.g. Gram-positive bacteria and yeast). Enzymatic lysis suffers from its inherent non-stochastic nature. Enzyme makes this method particularly vulnerable to biases, especially from highly diverse sample types such as soil. Mechanical lysis methodologies (e.g. sonication, blending, liquid nitrogen/mortar and pestle, French pressing, and bead beating) are considered the best approach due to their stochastic nature, with bead beating accepted most widely in the community as the gold standard. However, not all methods perform equally, and each can suffer from specific problems such as low yields, excessive nucleic acid shearing, and non-uniform lysis. Even bead beating methodologies that have not been that fully optimized, characterized, and validated for microbiomic applications can be biased. Simply combining an array of cell lysis mechanisms to achieve unbiased lysis does not necessarily reduce bias, despite potentially improving yields. When performing microbial composition profiling, combining more cell lysis mechanisms might only introduce additional types of bias into the process as opposed to reducing the bias overall.

Library Prep & Analysis
The library preparation process is also quite prone to bias and error. The 16S rRNA gene sequencing library preparation process can suffer from potentially significant bias due to the inherent weaknesses of its primary step, PCR. A common source of PCR-related bias include GC content variation in templates and degeneracy in primers. Amplification of the 16S rRNA gene using broad coverage primers is further challenged by the high similarity of the targets. PCR chimeric sequences - which are a result of the recombination between similar targets/templates - are thought to be the worst contributors of error and bias in this process (Gohl et al, 2016; Haas, et al, 2014). Library preparation for shotgun metagenomic sequencing can also be challenged by some PCR related bias/error. However, PCR-free library preparation is available given there is sufficient DNA input. Besides PCR-related bias, shotgun library preparation can be inaccurate in other ways, such as biased DNA fragmentation. In general, shotgun metagenomic sequencing is considered less biased as compared to targeted sequencing such as 16S sequencing.

Next-Generation sequencing (NGS) is generally thought to introduce little bias to the determination of microbial composition. However, all NGS platforms carry specific patterns of sequencing errors. For example, 454 and Ion Torrent sequencing platforms have high error rates in sequencing regions of homo-polynucleotides (Bragg et al., 2013, Gilles et al., 2013). Even with a sophisticated program for read-quality-based trimming, some sequencing errors will survive and potentially cause misleading interpretations. In 16S sequencing, sequencing errors can result in the assignment of fake taxa and the overestimation of alpha diversity.

Bioburden
As the field of microbiomics continues to develop another form of bias and error that has appeared is bioburden (nucleic acid contamination) introduced through the complex and lengthy processes required to sequence DNA from a sample (Salter et al., 2014 and Naccache et al., 2013). Sample handling, reagents, and kits are responsible for contributing to this error. Because NGS-based microbiome sequencing is highly sensitive, the contaminations introduced will be captured in most cases. Bioburden can result in over-estimation of the real microbial diversity of the samples. The impact of bioburden becomes magnified as sample biomass decreases. When sample biomass is substantially lower than bioburden, real signals can be completely buried under the background. Therefore, the level of bioburden dramatically impacts the detection limit of the technology. Bioburden is also a potential source of false positives in the case of NGS-based pathogen detection, in which pathogenic microbes are normally present at extremely low abundance.

Bioinformatics
Bioinformatics pipelines currently used in this field are far from perfect. Popular 16S sequencing data analysis pipelines (such as Qiime and Mothur) mostly rely on clustering sequences into Operational Taxonomic Units (OTUs), a process in which a variety of clustering algorithms have been applied, while there is no consensus on the best method. The situation is even more challenging when analyzing shotgun metagenomic data, because of limited read length in NGS technologies. De novo assembly of complete genomes from metagenomes is facing challenges that have no concrete solutions. If the focus is on microbial identification and composition profiling, assembly-free methods (such as MetaPhlan2 and mOTU) that rely on direct comparison of sequencing reads with a reference database might serve better. There have been many such assembly-free programs published in the literature or available from commercial vendors. Their performance varies significantly in the resolution of taxonomy levels, sensitivity and specificity.

ZymoBIOMICS®

A Comprehensive Solution for Microbiomics and Metagenomics

The Solution:

Zymo Research has made it a goal to eliminate bias across the entire microbiomics workflow. The ZymoBIOMICS® product line achieves this objective through a complete offering of standardized tools and services. Zymo offers microbial standards, sample collection devices, streamlined purification kits, and services, which are all optimized and validated to ensure the most accurate microbial community profiling.

In an effort to improve the quality and reproducibility of microbiomics analyses, Zymo Research has endeavored to develop microbial reference materials. ZymoBIOMICS® Microbial Community Standard (page 134) is the first commercially available standard for microbiomics and metagenomics studies. The microbial standard is a well-defined, accurately characterized mock community consisting of Gram-negative bacteria, Gram-positive bacteria, and yeast and with extremely low levels of impurities. The community contains microbes of varying sizes and cell wall composition. The wide range of lytic resistance enables characterization, optimization, and validation of lytic methods such as bead beading. It can be used as a defined input to assess the performance of entire microbiomic/metagenomic workflows, therefore enabling workflows to be optimized and validated. A mock microbial DNA community standard allows researchers to focus the optimization after the step of DNA extraction.

Sample Collection And Storage
Zymo's DNA/RNA Shield™ (page 136) was designed for microbiomic applications and satisfies all of the requirements for accurate community profiling, including preservation nucleic acids at ambient temperature, inactivating organisms, and enabling high throughput streamlined purification. Ambient temperature storage for up to one month allows for cold-free transportation and significantly reduced cold chain associated costs. DNA/RNA Shield's™ ability to inactivate organisms (bacteria, fungi, virus etc.) including pathogens contained in a sample eliminates safety concerns during transportation (e.g. border crossing) and sample processing (e.g. accidental leakage or spills in DNA extraction). DNA/RNA Shield™ also does not require any preprocessing such as reagent removal enabling high throughput automation and mitigating biases associated phase separations. DNA/RNA Shield™ takes a molecular snapshot of samples at the time of collection guaranteeing accurate microbial compositions and is available in various prefilled sample collection devices (e.g. swab/tubes, scoop/tubes, bead beating tubes, etc.).

Extraction
For nucleic acid extraction, Zymo offers the only kits designed specifically for microbiomics and validated using a mock microbial community standard. ZymoBIOMICS® DNA and RNA Kits (page 138-141) were developed to achieve uniform cell lysis from a wide range of organisms (e.g. Gram-negative/positive bacteria, fungus, protozoans, and algae) to ensure accurate microbial profiling. ZymoBIOMICS® DNA and RNA Kits achieve this by utilizing Zymo's unique bead beating matrix (featuring ultra-high density mixed beads) and novel chemistry that protects DNA against severe fragmentation during bead beating. The nucleic acid extraction kits are also equipped with our unique OneStep™ PCR Inhibitor removal spin-column, allowing ultra-pure DNA extraction from a variety of sample types, including feces, saliva, swabs, soil, water, sediments, biofilms, etc. The extracted DNA is ready for any downstream applications, including 16S rRNA gene sequencing and shotgun metagenomic sequencing. Another important feature of this DNA extraction kit is that it is built to have low bioburden, which makes it extremely useful when dealing with samples of low microbial biomass.

Bioburden
All ZymoBIOMICS® Kits are certified low-bioburden.

Library Prep, Analysis, and Bioinformatics
Due to the complicated nature of microbiomics workflows they are prone to bias and error, from collection to bioinformatic analyses, without careful design and implementation. If you do not want to deal with the complexity involved in a microbiomics workflow, Zymo offers ZymoBIOMICS® Sequencing Services, which currently provide microbial composition profiling with both targeted/amplicon sequencing (including 16S, fungal ITS and eukaryote 18S sequencing) and shotgun metagenomic sequencing. We ship sample collection devices prefilled with DNA/RNA Shield™ for you to collect samples; and then we take care of the rest! The whole workflow utilizes regents and kits that are low bioburden, optimized, and validated for microbiomics to provide the most accurate microbial composition profiling. The final report includes a comprehensive list of bioinformatics and statistics analyses commonly used in this field.

ZymoBIOMICS® – Standardizing Microbiomics

A Comprehensive Solution for Microbiomics and Metagenomics

References:
Stulberg, Elizabeth, et al. "An assessment of US microbiome research." Nature Microbiology 1 (2016): 15015.
Salter, Susannah J., et al. "Reagent and laboratory contamination can critically impact sequence-based microbiome analyses." BMC biology 12.1 (2014): 1.
Naccache, Samia N., et al. "The perils of pathogen discovery: origin of a novel parvovirus-like hybrid genome traced to nucleic acid extraction spin columns." Journal of virology 87.22 (2013): 11966-11977.
D. Gohl, et al. "Systematic improvement of amplicon marker gene methods for increased accuracy in microbiome studies" Nature Biotechnology 34, 942–949 (2016)
Haas, Brian J., et al. "Chimeric 16S rRNA sequence formation and detection in Sanger and 454-pyrosequenced PCR amplicons." Genome research 21.3 (2011): 494-504.
Bragg, Lauren M., et al. "Shining a light on dark sequencing: characterising errors in Ion Torrent PGM data." PLoS Comput Biol 9.4 (2013): e1003031.
Gilles, André, et al. "Accuracy and quality assessment of 454 GS-FLX Titanium pyrosequencing." BMC genomics 12.1 (2011): 245.

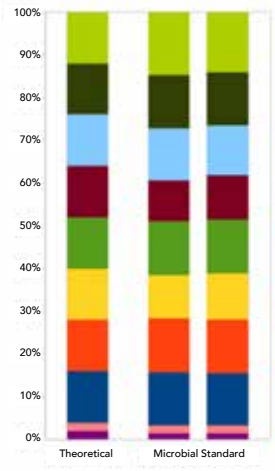
ZymoBIOMICS® Microbial Community Standard

Highlights

- *Mock microbial community of well-defined composition.*
- *Ideal for the validation, optimization, and quality control of microbiomics and metagenomic workflows.*
- *Perfect for assessing bias of DNA extraction methods since it contains both tough and easy-to-lyse microbes.*

Description

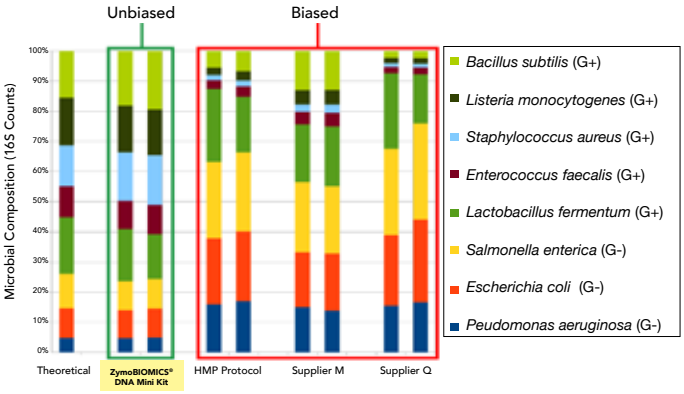
Microbial composition profiling techniques powered by Next-Generation sequencing are becoming routine in microbiomics and metagenomics studies. However, these analytical techniques can suffer from significant bias from collection to analysis. The ZymoBIOMICS® Microbial Community Standard is designed to assess bias and errors in the extraction methods of a microbiomics workflow. The Microbial Community Standard mimics a mixed microbial community of well-defined composition, containing three easy-to-lyse Gram-negative bacteria, five tough-to-lyse Gram-positive bacteria and two tough-to-lyse yeasts. Acting as a defined input from the beginning, the Microbial Community Standard can guide construction and optimization of entire workflows and can also be used as a routine quality control.



Species	Avg. GC (%)	Gram Stain	gDNA Abun. (%)
Pseudomonas aeruinosa	66.2	-	12
Escherichia coli	56.8	-	12
Salmonella enterica	52.2	-	12
Lactobacillus fermentum	52.8	+	12
Enterococcus faecalis	37.5	+	12
Syaphylococcus aureus	32.7	+	12
Listeria monocytogenes	38.0	+	12
Bacillus subtilis	43.8	+	12
Saccharomyces cerevisiae	38.4	Yeast	2
Cryptococcus neoformans	48.2	Yeast	2

Accurate Characterization

Containing three easy-to-lyse Gram-negative bacteria, five tough-to-lyse Gram-positive bacteria, and two tough-to-lyse yeasts, the ZymoBIOMICS® Microbial Community Standard is perfect for assessing bias in various DNA extraction methods. The microbial standards are accurately characterized, with a wide GC range (15%-85%) and contain negligible impurities (<0.01%), enabling easy exposure of artifacts, errors, and bias in microbiomics or metagenomic workflows.



Find Your Bias & Eliminate It

ZymoBIOMICS® Microbial Community Standard was used to compare different DNA extraction protocols. DNA samples were profiled by 16S rRNA gene targeted sequencing.

Product	Cat. No.	Size	Specifications	Uses
ZymoBIOMICS® Microbial Community Standard	D6300	10 preps.	Source: A mixture of ten inactivated microorganisms (bacterial and fungal) Storage Solution: cells are suspended in DNA/RNA Shiled™ (R1100-50) Impurity Level: < 0.01% foreign microbial DNA	Assess bias within collection, storage, and extaction protocol

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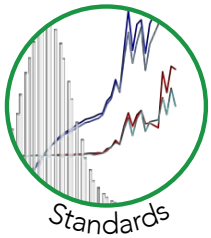
ZymoBIOMICS® Microbial Community DNA Standard

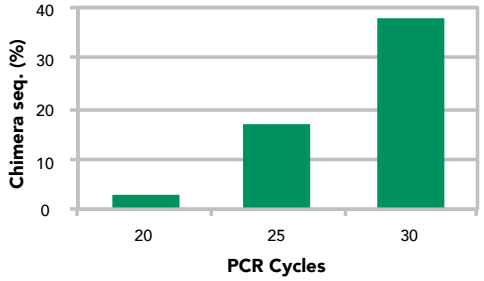
Highlights

- *A DNA standard of well-defined composition.*
- *Ideal for the validation, optimization, and quality control of microbiomics and metagenomics workflows.*
- *The DNA has a wide GC range of 15% – 85%.*



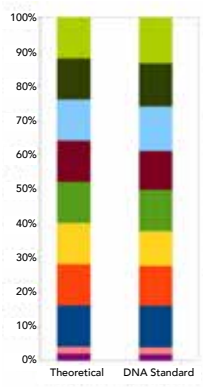
Description

One of the major challenges in the emerging field of microbiomics is the bias and errors introduced in the complex workflows. Besides nucleic acid purification, bias also arises from sequencing library preparation and subsequent processes. The ZymoBIOMICS® Microbial Community DNA Standard is designed to assess bias, errors and other artifacts after the step of nucleic acid purification. This DNA standard is created by pooling DNA extracted from pure cultures. It has accurately defined composition, negligible impurities (0.01%) and contains genomes of a wide range of GC content (15% - 85%). This DNA standard is designed to have the same microbial composition with the cellular version, the ZymoBIOMICS® Microbial Community Standard, so that they can be more powerful when working in tandem.



Addressing PCR Chimera

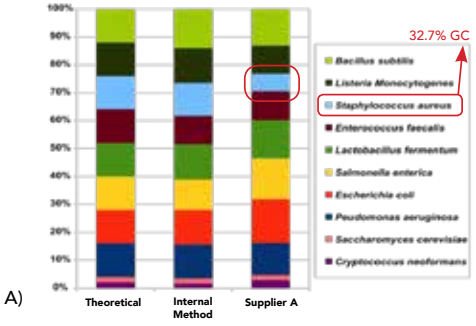
PCR chimera increase the number of PCR cycles during the library preparation process of 16S rRNA gene targeted sequencing. 20 ng ZymoBIOMICS® Microbial Community Standard was used a template. The PCR was performed with ZymoBIOMICS® Taq PreMix master mix and with primers that target the v3-4 region of 16S rRNA gene. Chimera percentage was determined with Uchime and using the 16S rRNA genes of the 8 bacterial strains in the standard as reference.

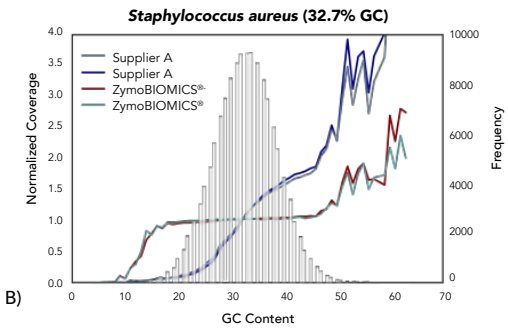


Species	Avg. GC (%)	Gram Stain	gDNA Abun. (%)
Pseudomonas aeruinosa	66.2	-	12
Escherichia coli	56.8	-	12
Salmonella enterica	52.2	-	12
Lactobacillus fermentum	52.8	+	12
Enterococcus faecalis	37.5	+	12
Syaphylococcus aureus	32.7	+	12
Listeria monocytogenes	38.0	+	12
Bacillus subtilis	43.8	+	12
Saccharomyces cerevisiae	38.4	Yeast	2
Cryptococcus neoformans	48.2	Yeast	2

Accurate Characterization

DNA from Gram-negative bacteria, five Gram-positive bacteria, and two tough-to-lyse yeasts. The ZymoBIOMICS® Microbial Community Standards are perfect for assessing bias in popular extraction methods. The microbial standards are accurately characterized, with a wide GC range (15%-85%) and contain negligible impurities (<0.01%), enabling easy exposure of artifacts, errors, and bias in microbiomics or metagenomic workflows.





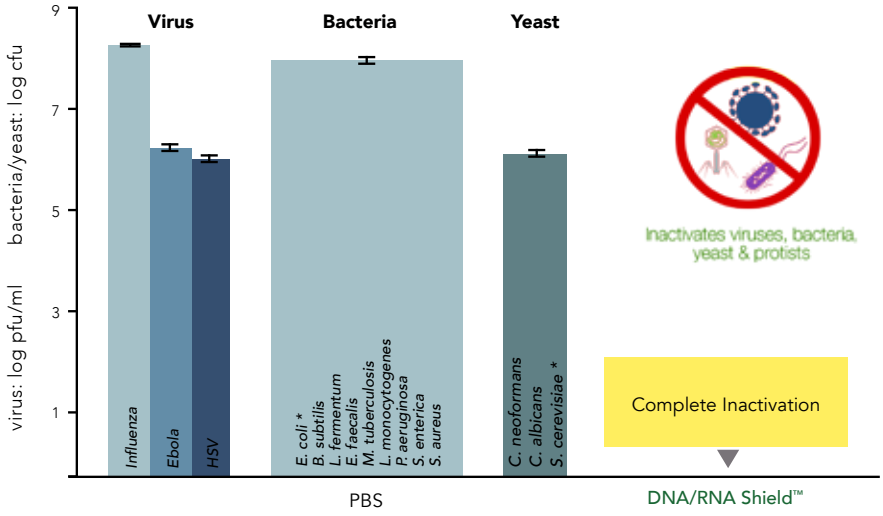
Assess GC Bias & Eliminate It

A) Assessing bias of two different library preparation processes in shotgun metagenomic sequencing using ZymoBIOMICS® Microbial Community Standard. Compared to our internal method, the Supplier A kit has some bias due to GC content variation. Sequencing was performed on MiSeq (2 x 150 bp). B) Raw reads were mapped to the 10 microbial genomes to evaluate the potential effect of GC content on sequencing coverage. Normalized coverage was calculated by normalization with the average sequencing coverage of each genome.

Product	Cat. No.	Size	Specifications	Uses
ZymoBIOMICS® Microbial Community DNA Standard	D6305	200 ng	Source: a mixture of genomic DNA from ten microbial strains Storage Solution: 10mM Tris-HIC and 0.1 mM EDTA, pH 8.0 Impurity Level: < 0.01% foreign microbial DNA	Assessing bias in library preparation of and 16S sequencing and shotgun sequencing
ZymoBIOMICS® Microbial Community DNA Standard	D6306	2,000 ng		

Technology Overview: DNA/RNA Shield™

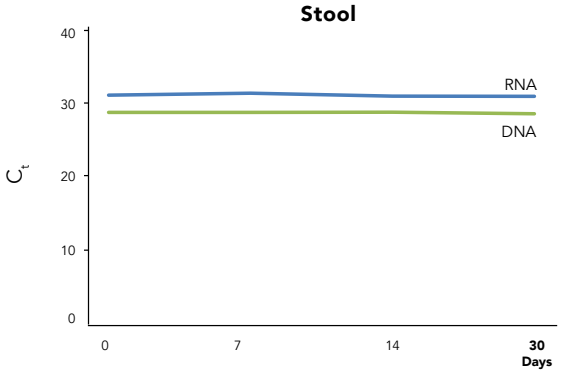
Take a molecular snapshot of your sample with DNA/RNA Shield™. This stabilization reagent breaks the cold chain and ensures nucleic acid stability during sample storage/transport at ambient temperatures. DNA/RNA Shield™ effectively lyses cells and inactivates nucleases and infectious agents, and it is compatible with various collection and storage devices (vacuum tubes, swabs (nasal, buccal, fecal), etc.).



Microbial Inactivation

Viruses, bacteria and yeast are effectively inactivated by DNA/RNA Shield™. Samples containing the infectious agent (virus, bacteria, yeast) were treated for 5 minutes with DNA/RNA Shield™ or mock (PBS). Titer (PFU) was subsequently determined by plaque assay. Validated by: Influenza A - D. Poole and Prof. A. Mehle, Department of Medical Microbiology and Immunology, University of Wisconsin, Madison; Ebola (Kikwit) - L. Avena and Dr. A. Griffiths, Department of Virology and Immunology, Texas Biomedical Research Institute; HSV-1/2 - H. Oh, F. Diaz and Prof. D. Knipe, Virology Program, Harvard Medical School; *E. coli, L. fermentum, B. subtilis, S. cerevisiae* – Zymo Research Corporation).

*Disclaimer: This graph only displays results from *E. coli* inactivation. Each microbe was tested independently and were combined into one graph for brevity. Bacterial cultures were grown between 10^8 - 10^9 cells and yest cultures were grown between 10^7 - 10^8 cells.

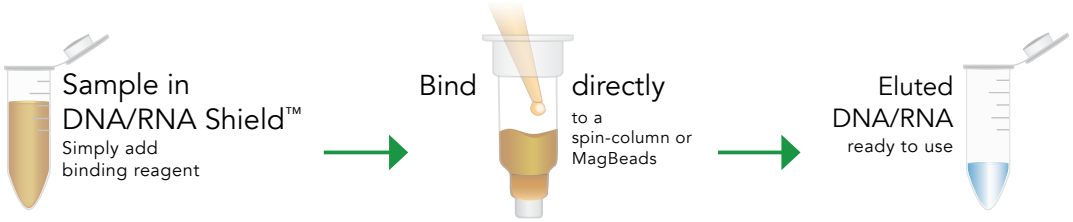


Nucleic Acid Stabilization at Ambient Temperature

DNA and RNA in stool is effectively stabilized in DNA/RNA Shield™ at ambient temperature. Graphs show: DNA and RNA controls from stool purified at the indicated time points and analyzed by (RT)qPCR.

Streamlined Purification

No Reagent Removal. Compatible with ZymoBIOMICS® Purification Products.



For more information about DNA/RNA Shield™ Bulk Reagent, see page 128

*Also compatible with most other purification products.

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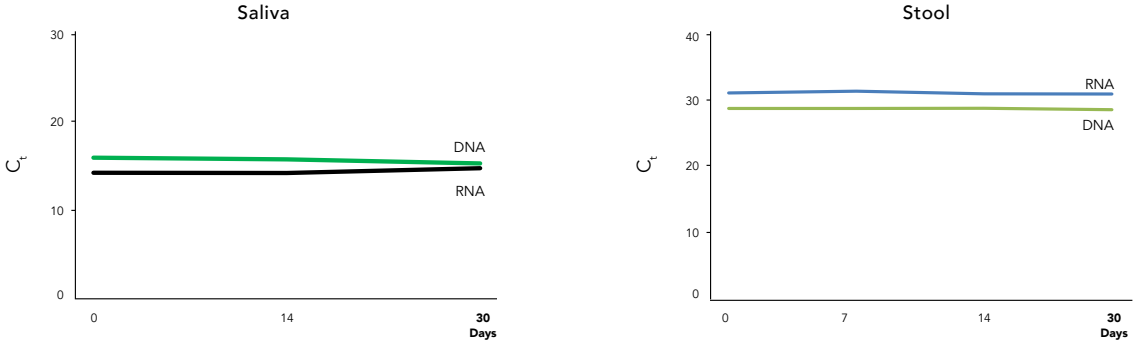
Highlights

- *Provides an accurate "molecular snapshot" of the sample at the time of collection by preserving nucleic acids at ambient temperature and inactivating microbes.*
- *Nucleic acid preservation (at ambient temperature; cold-free)*
- *Pathogen inactivation (bacteria, fungus, parasites & viruses)*
- *Streamlined purification (no reagent removal, universally compatible, automatable)*

Description

DNA/RNA Shield™ Collection Devices ensure nucleic acid stability during sample storage and transport at ambient temperatures. There is no need for refrigeration during transport or reagent removal during subsequent nucleic acid purification. The collection devices are ideal for the unbiased collection and storage of microbes to allow for non-biased microbiomics analysis. These collection devices effectively lyses cells and inactivates nucleases and infectious agents (virus), taking a molecular snapshot of a sample at the time of collection.

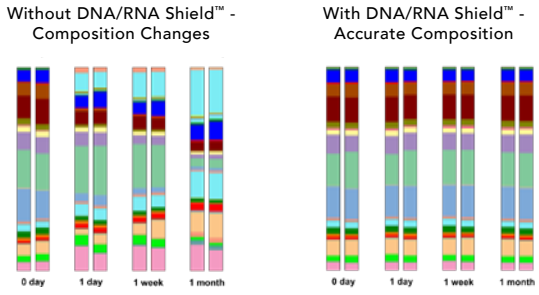
Nucleic Acid Stabilization At Ambient Temperature



DNA and RNA in saliva and stool is effectively stabilized in DNA/RNA Shield™ at ambient temperature. Graphs show: spike-in DNA and RNA controls from saliva and stool purified at the indicated time points and analyzed by (RT)qPCR. Controls: HSV-1 and HIV (AcroMetrix™, Life Technologies).

DNA/RNA Shield™ Preserves Microbial Composition at Ambient Temperature

Microbial composition of stool is unchanged after one month at ambient temperature with DNA/RNA Shield™. Stool samples suspended in DNA/RNA Shield™ and stored at room temperature were compared to stool without preservative for one month. They were sampled at the indicated time points and processed with ZymoBIOMICS® DNA Mini Kit. The extracted DNA was then subjected to microbial composition profiling via 16S rRNA gene targeted sequencing. Samples stored with DNA/RNA Shield™ had a constant microbial composition while the samples stored without shifted dramatically.



Product	Cat. No.	Size	Specifications	Uses
DNA/RNA Shield™ - Lysis Tube (Microbe)	R1103	50 pack	Tube Size: 2 ml Contents: mixed size BashingBeads™	Sample stabilization at ambient temperatures; Infectious agent inactivation; Ready for transport; Uniformly lyses all microbes; Directly compatible with ZymoBIOIMCS® DNA or RNA Miniprep Kit workflow
DNA/RNA Shield™ - Lysis Tube (Microbe) with Swab	R1104	50 tubes/50 swabs		
DNA/RNA Shield™ - Swab & Collection Tube	R1106	10 pack (1 ml fill)	Tube Size: 5 ml Contents: Sterile swab	Sample stabilization at ambient temperatures; Infectious agent inactivation; Ready for transport; Directly compatible with ZymoBIOIMCS® DNA or RNA Miniprep Kit workflow
	R1107	50 pack (1 ml fill)		
	R1108	10 pack (2 ml fill)		
	R1109	50 pack (2 ml fill)		
DNA/RNA Shield™ - Fecal Collection Tube	R1101	10 pack	Tube Size: 15 ml Contents: collection spoon attached to screwcap	

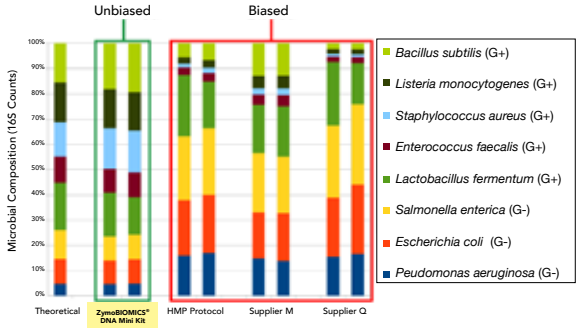
ZymoBIOMICS® DNA Kits

Highlights

- *Ultra-pure, inhibitor-free DNA from many microbiomic sample types (feces, soil, water, biofilms, swabs, body fluid, etc.) that is ideal for all downstream applications including PCR, arrays, 16s rRNA gene sequencing, and shotgun sequencing.*
- *Innovative lysis system enables efficient and unbiased lysis of microbes including Gram-positive/negative bacteria, fungus, protozoans, and algae for accurate microbial community profiling.*

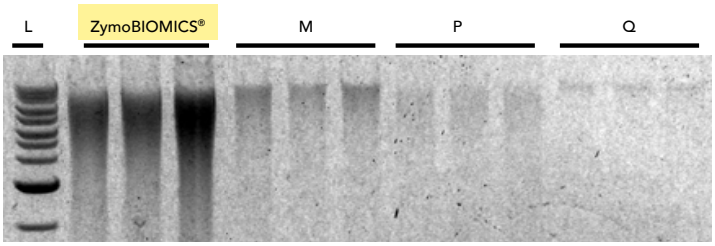
Description

The ZymoBIOMICS® DNA Kits are designed for purifying DNA from a variety of sample inputs that is immediately ready for microbiome or metagenome analyses. The ZymoBIOMICS® lysis system eliminates bias associated with unequal lysis efficiencies of different organisms (e.g. Gram-negative/positive bacteria, fungus, protozoans, and algae) making it ideal for microbial community profiling. Uniform mechanical lysis of tough microbes is achieved by bead beating with the innovative ultra-high density BashingBeads™.This kit is equipped with our *OneStep*™ PCR Inhibitor removal technology, enabling PCR reaction from inhibitor-rich environmental samples. Purified DNA ideal for all downstream applications including PCR, arrays, 16S rRNA gene sequencing, and shotgun sequencing. DNA Size is 15-20 kb.



Accurate Community Profiling

The ZymoBIOMICS® DNA Mini Kit provides accurate representation of the organisms extracted from the ZymoBIOMICS® Microbial Community Standard.



Superior Yields

The ZymoBIOMICS® DNA Miniprep Kit provides superior yields when compared to Suppliers M, P, and Q.

Product	Cat. No.	Size	Specifications	Uses
ZymoBIOMICS® DNA Miniprep Kit	D4300	50 preps.	Format: Spin-Cloumn Binding Capacity: 25 µg Elution Volume: 100 µl Processing Time: 20 minutes	Accurately isolates DNA of microbial communities from any sample type (feces, soil, water, biofilms, swabs, body fluid, etc.)
	D4300T	10 preps.		
ZymoBIOMICS® DNA Miniprep Kit (Lysis Matrix Not Included)	D4304	50 preps.		
ZymoBIOMICS® DNA Microprep Kit	D4301	50 preps.	Format: Spin-Cloumn Binding Capacity: 5 µg Elution Volume: 25 µl Processing Time: 20 minutes	
ZymoBIOMICS® 96 DNA Kit (includes ZR BashingBead™ Lysis Rack)	D4303	2 x 96 preps.	Format: 96-Well Binding Capacity: 5 µg Elution Volume: 10 µl Processing Time: 45 minutes	
ZymoBIOMICS® 96 DNA Kit (includes ZR BashingBead™ Lysis Tubes)	D4309	2 x 96 preps.		
ZymoBIOMICS® 96 DNA Kit (Lysis Matrix Not Included)	D4307	2 x 96 preps.	Format: 96-Well Binding Capacity: 5 µg Elution Volume: 10 µl Processing Time: 45 minutes	

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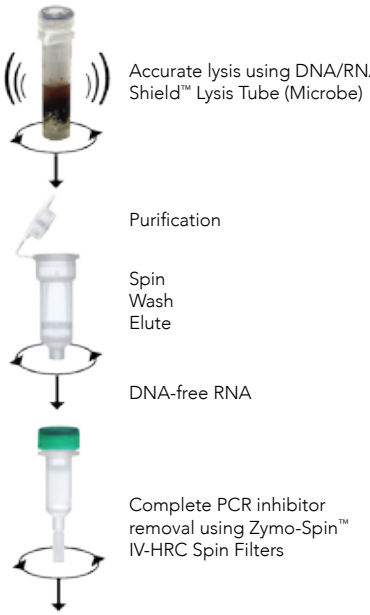
Highlights

- *Rapid, robust, and simple purification of high quality, inhibitor-free total RNA (including small/micro RNAs) from any sample including feces, soil, water, biofilms, swabs, saliva, and body fluids, etc.*
- *ZymoBIOMICS® innovative lysis system enables efficient and unbiased lysis of microbes including Gram-positive/negative bacteria, fungus, protozoans, algae, viruses, etc.*
- *DNA-free RNA is ready for use in any downstream application. DNase I included.*

Description

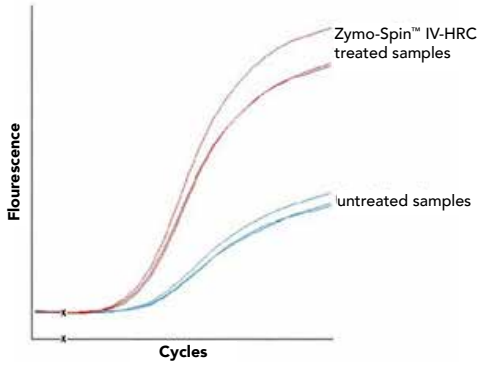
The ZymoBIOMICS® RNA Mini Kit is designed for purifying RNA from a wide array of sample inputs that is ready for microbiome or metagenome analyses. The ZymoBIOMICS® lysis system eliminates bias associated with unequal lysis efficiencies of different organisms (e.g. Gram-negative/positive bacteria, fungus, protozoans, and algae). The procedure uses Zymo-Spin™ Column technology that results in high-quality total RNA (including small RNAs 17-200 nt) that is free of PCR inhibitors and is ready for RT-PCR, hybridization, sequencing, etc.

Streamlined Workflow



Ultra-pure Total RNA

Ultra-pure RNA from Inhibitor-rich Samples



Total RNA isolated from human stool with or without inclusion of the Zymo-Spin™ IV-HRC Spin Filter during the ZymoBIOMICS® RNA Miniprep Kit protocol. Earlier amplification cycles indicate complete removal of PCR inhibitors.

Product	Cat. No.	Size	Specifications	Uses
ZymoBIOMICS® RNA Miniprep Kit	R2001	50 preps.	Format: Spin Column Binding Capacity: 100 µg Elution Volume: ≥ 10 µl RNA Size: ≥ 17 nucleotides	Accurately isolates RNA of microbial communities from any sample type (feces, soil, water, biofilms, swabs, body fluid, etc.)

ZymoBIOMICS® DNA/RNA Miniprep Kit

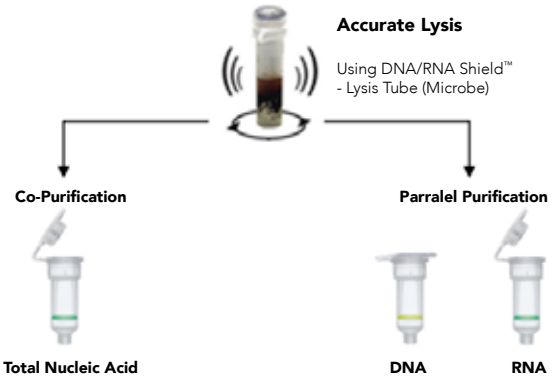
Highlights

- *Rapid, robust, and simple purification of high quality, inhibitor-free DNA and total RNA (including small/micro RNAs) from any sample including feces, soil, plant, water, biofilms, swabs, saliva, body fluids, etc.*
- *ZymoBIOMICS® innovative lysis system enables efficient and unbiased lysis of microbes including Gram-positive/negative bacteria, fungus, protozoans, algae, viruses, etc.*
- *High-quality DNA and DNA-free RNA is ready for use in any downstream application. DNase I included.*

Description

The ZymoBIOMICS® DNA/RNA Miniprep Kit is designed for purifying DNA and RNA from a wide array of sample inputs (e.g. feces, soil, plant, water, and biofilms) that is ready for microbiome or metagenome analyses. The ZymoBIOMICS® innovative lysis system eliminates bias associated with unequal lysis efficiencies of different organisms (e.g. Gram-negative/positive bacteria, fungus, protozoans, and algae). The provided DNA/RNA Shield™ preserves nucleic acids at ambient temperatures, providing an unbiased molecular snapshot of the sample. The procedure uses Zymo-Spin™ Column technology that results in high-quality DNA and total RNA (including small RNAs 17-200 nt) that is free of PCR inhibitors (e.g. polyphenols, humic acids, and fulvic acids). Ready for RT-PCR, arrays, sequencing, etc.

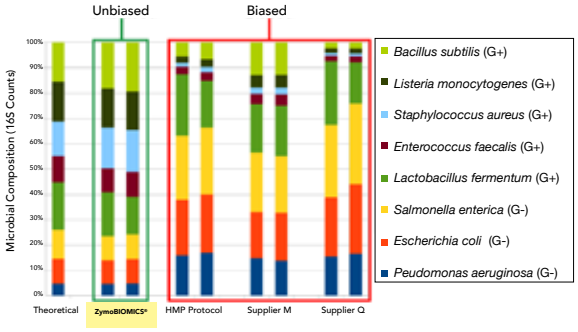
Streamlined Workflow



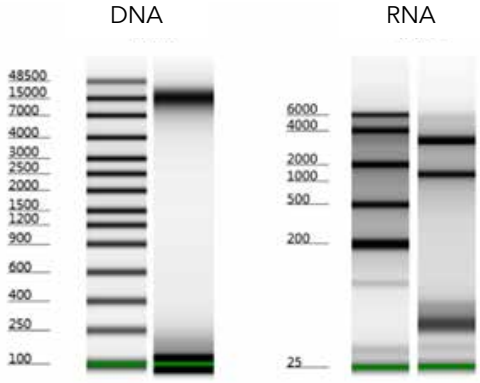
DNA & RNA in One Fraction

DNA & RNA in Separation Fractions

Accurate Community Profiling



The ZymoBIOMICS® DNA/RNA Miniprep Kit provides accurate representation of the organisms extracted from the ZymoBIOMICS® Microbial Community Standard.



Superior Yields

Human stool genomic DNA and total RNA isolated with the ZymoBIOMICS® DNA/RNA Mini Kit is highly intact. Quality assessed by Agilent 2200 TapeStation®.

Product	Cat. No.	Size	Specifications	Uses
ZymoBIOMICS® DNA/RNA Miniprep Kit	R2002	50 preps.	Format: Spin Column Binding Capacity: 100 µg Elution Volume: ≥ 10 µl RNA Size: ≥ 17 nucleotides	Accurate DNA/RNA isolation of microbial communities from any sample type (feces, soil, water, biofilms, swabs, body fluid, etc.)

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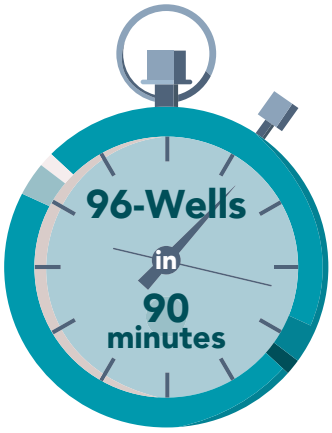
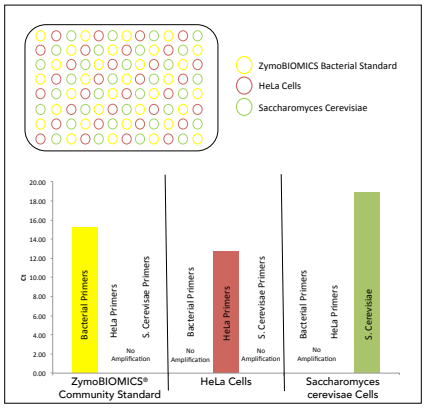
Highlights

- *High-throughput purification of high quality, inhibitor-free DNA from any sample including feces, soil, water, biofilms, swabs, saliva, and body fluids.*
- *The ZymoBIOMICS® innovative lysis system enables efficient and unbiased lysis of microbes including Gram-positive/negative bacteria, fungi, protozoans, algae, etc.*
- *The automation friendly workflow enables nearly any sample to be processed in as little as 90 minutes for 96 preps.*

Description

The ZymoBIOMICS® 96 MagBead DNA Kit is designed for purifying DNA from a wide array of sample inputs that is immediately ready for microbiome or metagenome analyses. The ZymoBIOMICS® lysis system eliminates bias associated with unequal lysis efficiencies of different organisms (e.g. Gram-negative/positive bacteria, fungi, protozoans, and algae), making it ideal for microbiomic studies. Unbiased mechanical lysis of tough microbes is achieved by bead beating with ultra high-density BashingBeads™. The automation-friendly workflow integrates PCR inhibitor removal technology directly into the purification system, removing complex precipitation steps commonly used in other methodologies. The kit's unique system allows for a simple bind, wash, elute procedure, which is unmatched in providing ultra-pure DNA, free of PCR inhibitors. Purified DNA is ideal for all downstream applications including PCR, arrays, 16S rRNA gene sequencing, and shotgun sequencing.





No Cross-Contamination

The ZymoBIOMICS® 96 MagBead DNA Kit provides cross-contamination free samples across a standard 96-well plate purification performed on a liquid handler. Samples were evaluated using quantitative PCR with primer sets targeted at the bacterial 16S gene, the human LINE gene, and the fungal ITS gene. PCR was performed in technical duplicates.

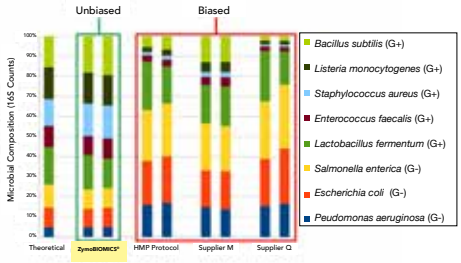
No Precipitation or Centrifugation Required

Bias-free Lysis

Quick Bind, Wash, Elute Workflow

Superior Yields and Integrity Ultra-Pure DNA

Accurate Profiling



The ZymoBIOMICS® 96 MagBead Kit provides accurate representation of the organisms extracted from the ZymoBIOMICS® Microbial Community Standard.

Product	Cat. No.	Size	Specifications	Uses
ZymoBIOMICS® 96 MagBead DNA Kit (includes ZR BashingBead™ Lysis Rack)	D4302	2 x 96 preps.	Format: 96-Well Binding Capacity: 5-20 µg Elution Volume: 50-200 µl Processing Time: 90 minute	Accurate high-throughput DNA isolation of microbial communities from any sample type (feces, soil, water, biofilms, swabs, body fluid, etc.)
ZymoBIOMICS® 96 MagBead DNA Kit (Lysis Matrix Not Included)	D4306	2 x 96 preps.		
ZymoBIOMICS® 96 MagBead DNA Kit (includes ZR BashingBead™ Lysis Tubes)	D4308	2 x 96 preps.		

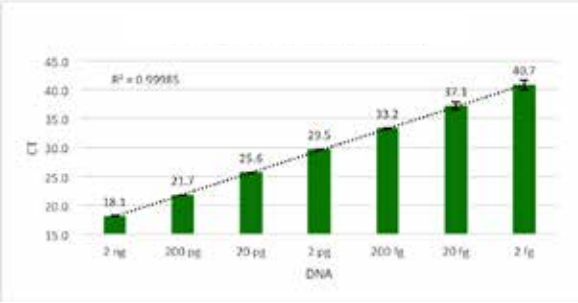
ZymoBIOMICS® PCR PreMix

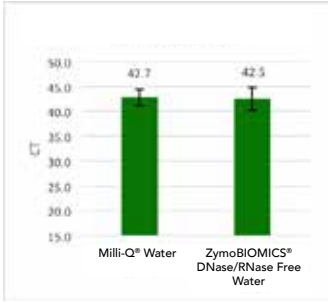
Highlights

- *Simply add water, DNA, primers and go!*
- *Certified low-bioburden.*
- *Robust amplification for the detection of low copy DNA.*
- *Ideal for highly sensitive applications.*

Description

The ZymoBIOMICS® PCR PreMix is supplied as a 2X concentrated "master mix", which contains all the reagents needed to perform PCR and other molecular downstream analysis with the addition of probes or fluorescent dyes. It features a "hot-start" DNA polymerase that has 3'-terminal transferase activity. The PreMix is validated low-bioburden in regards to bacterial contamination. The addition of "A" overhangs to amplified DNA makes it ideal for use in TA-cloning. Simple and easy to use: just add water, primers, and template DNA to the ZymoBIOMICS® PCR PreMix then heat and go!





Sensitive Detection Range Free of Bacterial DNA

Quantification of no template controls (NTCs) via real-time PCR was determined by amplification of the 16S rRNA gene, after the addition of 2.5 µM SYTO® 9 to a 20 µl reaction volume. Real-time PCR was performed for 45 cycles to determine the amount of bacterial contamination. NTCs include Millipore filtered water and DEPC treated Millipore filtered water.

Femto™ Bacterial DNA Quantification Kit

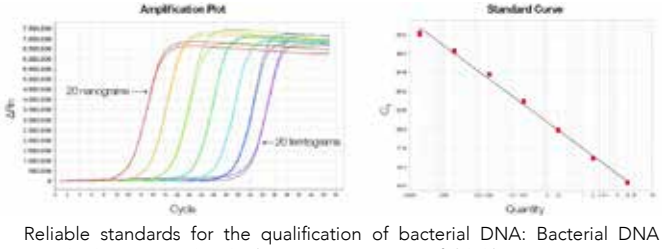
Highlights

- *Quantify as little 20 femtograms of DNA in as little as 1 µl of sample.*
- *High specificity and sensitivity for DNA in a background of non-target DNA.*
- *Fast and simple: add samples to the PreMix... and quantify.*

Description

The Femto™ Bacterial DNA Quantification Kit can detect and quantify as little as 20 fg of bacterial DNA in 1 µl of purified biological liquids with high specificity and sensitivity. Bacterial DNA can be reliably quantified in a background of non-bacterial DNA, making it ideal for downstream applications that require accurate DNA input amounts such as quantifying bacteria DNA template for Next-Generation sequencing library preparation and metagenomic analysis.

Reliable Quantification



Reliable standards for the qualification of bacterial DNA: Bacterial DNA Standards (measured in dupliactes) comprise a 10-fold dilution series ranging from 20 ng to 20 fg.

Product	Cat. No.	Size	Specifications	Uses
ZymoBIOMICS® PCR Premix	E2056	50 rxns.	Source: Recombinant Enzyme Activity: 5' - 3' DNA polymerization Optimum Reaction Temperature: 72 °C	For amplification of DNA intended for highly sensitive applications; Low bioburden
ZymoBIOMICS® PCR Premix	E2057	200 rxns.		
Femto™ Bacterial DNA Quantification Kit	E2006	100 rxns.	Detection Dye: SYTO 9® DNA Input: 20 fg - 20 ng Standards Included	Bacterial DNA quantification

SYTO 9® is a registered trademark of Molecular Probes

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Highlights

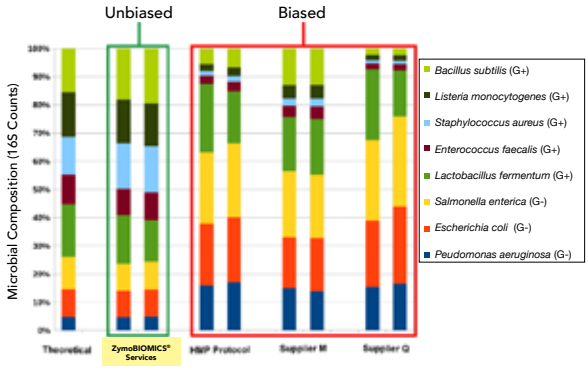
- *Zymo Research offers the most comprehensive services for 16S rRNA and Shotgun sequencing from any sample type.*
- *ZymoBIOMICS® Services are validated using the ZymoBIOMICS® Community Standards to ensure accurate, publication-quality data.*
- *Services include low-bioburden processing and DNA/RNA isolation using the ZymoBIOMICS® product line for the most accurate taxonomic profiling.*

Description

Next-Generation sequencing services for discovery, identification, and characterization of microbial communities. All ZymoBIOMICS® Services feature state-of-the-art sample prep technologies, validation using the ZymoBIOMICS® Microbial Community Standards, Illumina Sequencing Technologies, cutting-edge bioinformatics, and competitive pricing. Each project is fully customizable, simply send in your samples and you will receive publication-ready data.

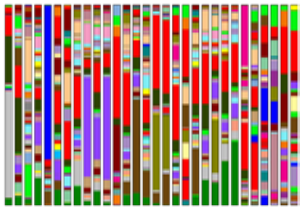
A Comprehensive Solution for Microbiomics and Metagenomics

Validated, Accurate Workflows from Collection to Analysis

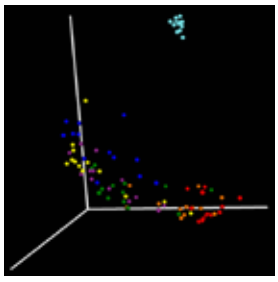


ZymoBIOMICS® Services are validated using the ZymoBIOMICS® Microbial Community Standards for unbiased, accurate community profiling

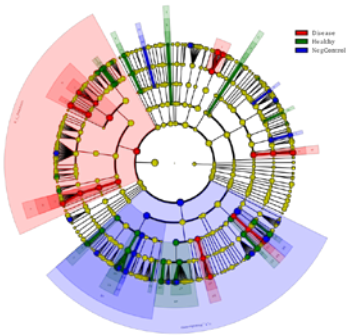
Comprehensive, Customizable Bioinformatics & Data Analysis



Composition Barplots

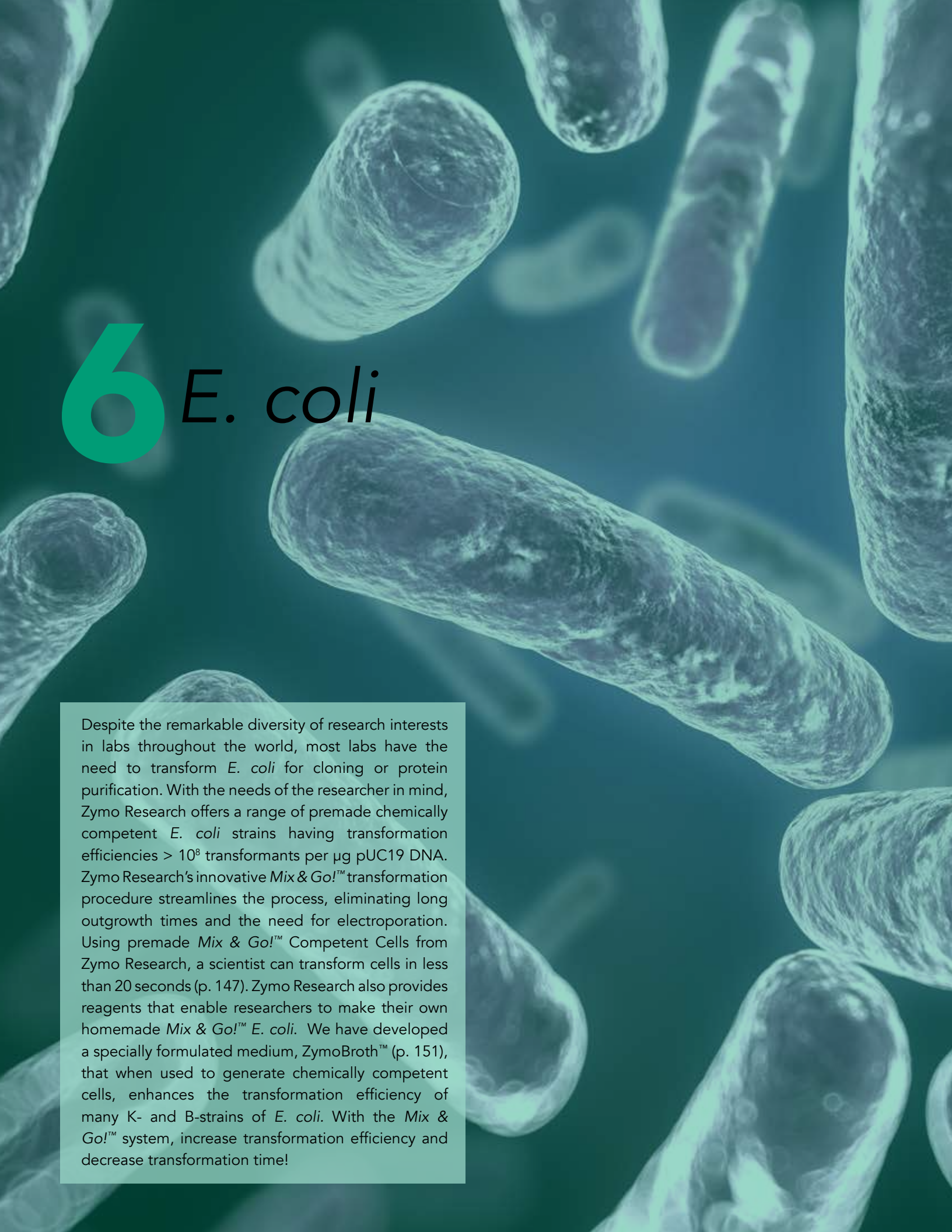


Beta-Diversity



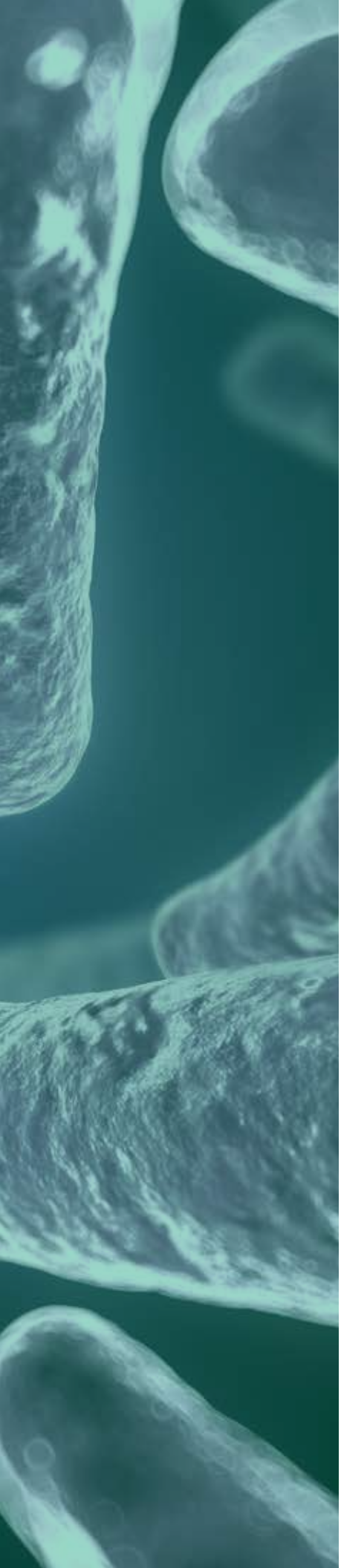
LEfSe Cladogram

Inquire today at www.zymoresearch.com/zymobiomics



6 *E. coli*

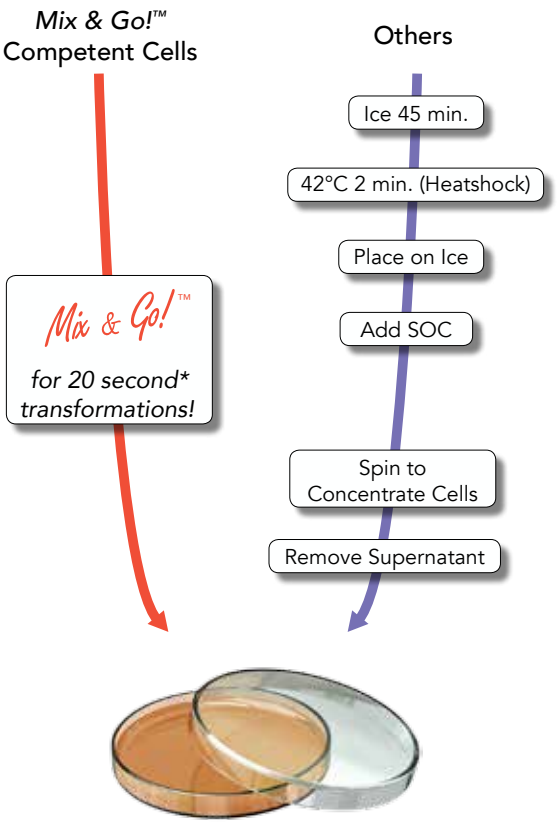
Despite the remarkable diversity of research interests in labs throughout the world, most labs have the need to transform *E. coli* for cloning or protein purification. With the needs of the researcher in mind, Zymo Research offers a range of premade chemically competent *E. coli* strains having transformation efficiencies > 10^8 transformants per µg pUC19 DNA. Zymo Research's innovative *Mix & Go!*™ transformation procedure streamlines the process, eliminating long outgrowth times and the need for electroporation. Using premade *Mix & Go!*™ Competent Cells from Zymo Research, a scientist can transform cells in less than 20 seconds (p. 147). Zymo Research also provides reagents that enable researchers to make their own homemade *Mix & Go!*™ *E. coli*. We have developed a specially formulated medium, ZymoBroth™ (p. 151), that when used to generate chemically competent cells, enhances the transformation efficiency of many K- and B-strains of *E. coli*. With the *Mix & Go!*™ system, increase transformation efficiency and decrease transformation time!



Mix & Go!™ Competent *E. coli*

XJ Autolysis™ *E. coli*

Transformation Reagents



*Ampicillin selection only

Product Guide: *Mix & Go!™* Competent Cells

	JM109	Zymo 5α	HB101	C600	TG1	Zymo 10B
Specifications						
Strain Background	K-12	K-12	K-12	K-12	K-12	K-12
General Cloning		✓	✓	✓	✓	✓
Plasmid Isolation	✓	✓	✓	✓	✓	✓
Protein Expression						
Production of ssDNA (F'episome)	✓				✓	
Suppression of Amber Mutations (glnV44 or supE44)	✓	✓	✓	✓	✓	
Blue-White Selection (lacZΔM15)	✓	✓			✓	✓
High-quality and Yield of Plasmid Miniprep DNA (endA1)	✓	✓				✓
Reduced Recombination. Insert Stability (recA1 or recA13)	✓	✓				✓
Plasmid Size	Up to 10-15 kb		Up to 10-15 kb	Up to 10-15 kb	Up to 10-15 kb	
Transformation of Large Plasmids (deoR)		Up to 20-32 kb				Up to 20-32 kb
Ampicillin Resistant (bla or ampR)						
Chloramphenicol Resistant (cat or CmR or CamR)						
Tetracycline Resistant (Tn10 or tetR)						
Kanamycin Resistant (KanR)						
Nalidixic Acid Resistant (gyrA96 or NalR)	✓	✓				
Streptomycin Resistant (StrR)			✓			✓
Genotype	F`[traD36 proA+B+ laclq Δ(lacZ)M15] Δ(lac-proAB) glnV44 (supE44) e14- (McrA-) thi gyrA96 (NalR) endA1 hsdR17(rk- mk+) relA1 recA1	F- φ80lacZΔM15 Δ(lacZYA-argF)U169 deoR nupG recA1 endA1 hsdR17(rK- mK+) phoA glnV44 (supE44) thi-1 gyrA96 relA1, λ-	F- Δ(gpt-proA)62 leuB6 glnV44 (supE44) ara-14 galK2 lacY1 Δ(mcrC-mrr) xyl-5 mtl-1 recA13 thi-1 rpsL20 (SmR)	F- [e14-(McrA-) or e14+(McrA+)] thr-1 leuB6 thi-1 lacY1 supE44 rfbD1 fhuA21	F'[traD36 laclq Δ(lacZ) M15 proA+B+] glnV (supE) thi-1 Δ(mcrB-hsdSM)5 (rK- mK- McrB-) thi Δ(lac-proAB)	F- mcrA Δ(mrr-hsdRMS-mcrBC) Φ80lacZΔM15 ΔlacX74 recA1 endA1 araD139 Δ(ara leu) 7697 galU galK rpsL nupG λ-
Catalog Number	T3003	T3007	T3011	T3015	T3017	T3019

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Mix & Go!™ Competent Cells

Highlights

- *Mix & Go!™ transformation procedure with transformation efficiencies of 10^8 - 10^9 transformants/µg of plasmid DNA.*
- *Simply add DNA and then spread. DNA transformation in as little as 20 seconds!*
- *Uses: bacterial transformations, DNA cloning, blue-white screening*

Description

The *Mix & Go!™* Competent Cells are premade, chemically competent cells for simple and highly efficient DNA transformation. *Mix & Go!™* Competent Cells are made chemically competent by a method that completely eliminates the need for heat shocking and related procedures. For transformation, simply mix DNA with cells and then spread onto solid medium – *Mix & Go!™* The premade *Mix & Go!™* Competent Cells are highly efficient (> 10^8 transformants / µg pUC19) and can be used for cloning, sub-cloning, PCR fragment cloning, library construction, etc. *Mix & Go!™* Competent Cells are supplied as a pack of 10 convenient 100 µl/tube single use aliquots or in a 96-tube format with removable 8-tube strips for your high-throughput transformation needs.

JM109

		Cat. No.	Size
Genotype	F`[traD36 proA+B+ laclq Δ(lacZ)M15] Δ(lac-proAB) glnV44 (supE44) e14- (McrA-) thi gyrA96 (NalR) e ndA1 hsdR17(rk- mk+) relA1 recA1	T3003	10 x 100 µl aliquots (10 tubes)
		T3005	96 x 50 µl aliquots (96-well plate)

Zymo 5α

		Cat. No.	Size
Genotype	F-ϕ80lacZΔM15 Δ(lacZYA-argF)U169 deoR nupG recA1 endA1 hsdR17(rK-mK+) phoA glnV44 (supE44) thi-1 gyrA96 relA1, λ-	T3007	10 x 100 µl aliquots (10 tubes)
		T3009	96 x 50 µl aliquots (12 x 8-tube strips)
		T3010	96 x 50 µl aliquots (96-well plate)

HB101

		Cat. No.	Size
Genotype	F- Δ(gpt-proA)62 leuB6 glnV44 (supE44) ara-14 galK2 lacY1 Δ(mcrC-mrr) xyl-5 mtl-1 recA13 thi-1 rpsL20 (SmR)	T3011	10 x 100 µl aliquots (10 tubes)
		T3013	96 x 50 µl aliquots (96-well plate)

C600

		Cat. No.	Size
Genotype	F- [e14-(McrA-) or e14+(McrA+)] thr-1 leuB6 thi-1 lacY1 glnV44 (supE44) rfbD1 fhuA21	T3015	10 x 100 µl aliquots (10 tubes)

TG1

		Cat. No.	Size
Genotype	F'[traD36 laclq Δ(lacZ) M15 proA+B+] glnV (supE) thi-1 Δ(mcrB-hsdSM)5 (rK-mK- McrB-) thi Δ(lac-proAB)	T3017	10 x 100 µl aliquots (10 tubes)

Zymo 10B

		Cat. No.	Size
Genotype	F- mcrA Δ(mrr-hsdRMS-mcrBC) Φ80lacZΔM15 ΔlacX74 recA1 endA1 araD139 Δ(ara leu) 7697 galU galK rpsL nupG λ-	T3019	10 x 100 µl aliquots (10 tubes)
		T3020	96 x 50 µl aliquots (96-well plate)

Product Guide: XJ Autolysis™ *E. coli* Strains

	XJa Autolysis™	XJa (DE3) Autolysis™	XJb Autolysis™	XJb (DE3) Autolysis™
Specifications				
Strain Background	K-12	K-12	B	B
General Cloning	✓	✓		
Plasmid Isolation	✓	✓		
Protein Expression			✓	✓
For General Screening	✓	✓		
For Recombinant Protein Expression			✓	✓
Production of ssDNA (F'episome)	✓	✓		
T7 Promoter Transcription (λDE3)		✓		
Autolysis (ΔaraB::λR)	Autolysis inducible by Arabinose	Autolysis Inducible by Arabinose	Autolysis Inducible by Arabinose	Autolysis Inducible by Arabinose
Suppression of Amber Mutations (glnV44 or supE44)	✓	✓		
Blue-White Selection (lacZΔM15)	✓	✓		
High-quality and Yield of Plasmid Miniprep DNA (endA1)	✓	✓		
Reduced recombination. Insert stability (recA1 or recA13)	✓	✓		
Plasmid Size	Up to 10 kb	Up to 10 kb	Up to 10 kb	Up to 10 kb
Transformation of Large Plasmids (deoR)				
Ampicillin Resistant (bla or ampR)				
Chloramphenicol Resistant (cat or CmR or CamR)	✓	✓	✓	✓
Tetracycline Resistant (Tn10 or tetR)				
Kanamycin Resistant (KanR)				
Nalidixic Acid Resistant (gyrA96 or NalR)				
Streptomycin Resistant (StrR)				
Genotype	F`[traD36 proA+B+ laclq Δ(lacZ)M15] Δ(lac-proAB) glnV44 (supE44) e14- (McrA-) thi gyrA96 (NalR) endA1 hsdR17(rK-mK+) relA1 recA1 ΔaraB::λR, cat (CmR)	F`[traD36 proA+B+ laclq Δ(lacZ)M15] Δ(lac-proAB) glnV44 (supE44)e14- (McrA-) thi gyrA96 (NalR) endA1 hsdR17(rK-mK+) relA1 recA1 ΔaraB::λR, cat (CmR), λ(DE3)	F- ompT hsdSB(rB-mB-) gal dcm ΔaraB::λR, cat (CmR)	F- ompT hsdSB(rB-mB-) gal dcm ΔaraB::λR, cat (CmR), λ(DE3)
Catalog Number	T3021/T5021	T3031/T5031	T3041/T5041	T3051/T5051

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XJ Autolysis™ *E. coli* Strains

Highlights

- *Straightforward transformation procedure with up to 10^8 - 10^9 transformants/µg plasmid.*
- *Simple, fast, and controlled autolysis of E. coli.*
- *Available with DE3 lysogen for T7 promoter transcription.*

Description

XJ Autolysis™ *E. coli* strains are a new alternative for bacterial transformation and lysis. These strains are efficiently lysed following arabinose-induced expression of the bacteriophage λ endolysin protein, coupled to a single freeze-thaw cycle. The strains simplify protein expression and purification. They are also applicable for nucleic acid purification, and available with a DE3 lysogen encoding the T7 polymerase for expressing recombinant proteins driven by the T7 promoter.

	XJa Autolysis™ (*E. coli*, K-strain JM109)	**XJb Autolysis™** (*E. coli*, B-strain BL21)
Cell Growth	Grows well, especially when medium is supplemented with 1 mM Mg^{2+}.	A very robust strain, reaching higher OD's than *E. coli* K-strains.
Autolysis	Lyses easily. The parent strain JM109 itself will release about 20% of cellular protein after one freeze-thaw cycle. This strain will lyse in a wide range of buffer conditions.	XJb lysis efficiency is 10-20 % lower than XJa. For optimal lysis, more care needs to be taken when selecting the lysis buffer. However, even very low concentrations of a detergent may improve lysis significantly.
Protein Expression	Suitable for general screening, but proteases may degrade small or otherwise unstable recombinant proteins.	XJb is ideal for recombinant protein expression. It lacks Lon and OmpT proteases, leading to higher protein yields.
DNA Extraction	This strain is $EndA^-$ and yields high quality DNA preparations.	XJb is not optimal for DNA extraction.
DNA Stability	The $RecA^-$ mutation in XJa stabilizes repetitive DNA sequences.	This strain is RecA positive.
Genotype	F^-[traD36 $proA^+B^+$ $lacI^q$ Δ(lacZ)M15] Δ(lac-proAB) glnV44 (supE44) e14$^-$ ($McrA^-$) thi gyrA96 (Nal^R) endA1 hsdR17(r_K^- m_K^+) relA1 recA1 ΔaraB::λR, cat (Cm^R)	F^- ompT $hsdS_B$(r_B^- m_B^-) gal dcm ΔaraB::λR, cat (Cm^R)

Product	**Cat. No.**	**Size**	**Uses**
XJa Autolysis™	T5021	1 glycerol stock, 1 ml 500X L-Arabinose	Recombinant protein expression
	T3021	10 x 100 µl Mix & Go!™ Competent Cells, 1 ml 500X L-Arabinose	
XJa (DE3) Autolysis™	T5031	1 glycerol stock, 1 ml 500X L-Arabinose	
	T3031	10 x 100 µl Mix & Go!™ Competent Cells, 1 ml 500X L-Arabinose	
XJb Autolysis™	T5041	1 glycerol stock, 1 ml 500X L-Arabinose	
	T3041	10 x 100 µl Mix & Go!™ Competent Cells, 1 ml 500X L-Arabinose	
XJb (DE3) Autolysis™	T5051	1 glycerol stock, 1 ml 500X L-Arabinose	
	T3051	10 x 100 µl Mix & Go!™ Competent Cells, 1 ml 500X L-Arabinose	

Mix & Go!™ E. coli Transformation Kit & Buffer Set

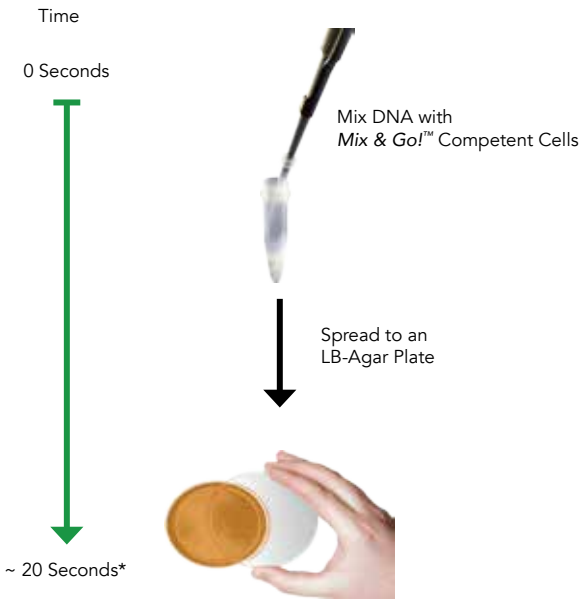
Highlights

- *Make your own highly efficient chemically competent cells: 10^8-10^9 transformants/ µg of plasmid DNA for most common lab strains.*
- *No heat shock or related procedures: simply add DNA and spread onto a plate - Mix & Go!™*

Description

The *Mix & Go!™ E. coli* Transformation Kit and *Mix & Go!™ E. coli* Buffer Set are convenient methods for the preparation of competent *E. coli* cells for simple and highly efficient DNA transformation. The *Mix & Go!™* method completely eliminates the requirement for heat shocking and related procedures. Instead, *Mix & Go!™* bacterial transformation can be performed by adding DNA to *Mix & Go!™* Competent Cells and spreading onto a plate. Transformation efficiencies are typically on the order of 10^8-10^9 transformants/ µg plasmid DNA with most *E. coli* strains.

Uniquely formulated reagents make it easy to generate *Mix & Go!™* Competent Cells from current *E. coli* strains that are available in the laboratory. Simply grow the *E. coli* strain of your choice, wash, then resuspend the cells in the provided buffers. The cells are now transformation ready! The *Mix & Go!™ E. coli* Transformation Kit includes all buffers and ZymoBroth™ medium to generate 20 ml of *Mix & Go!™* Competent Cells. The *Mix & Go!™ E. coli* Transformation Buffer Set includes all buffers that are required to generate 60 ml of *Mix & Go!™* Competent Cells, and the medium (broth) is supplied by the user.



Product	Cat. No.	Size	Specifications	Uses
Mix & Go!™ E. coli Transformation Kit	T3001	up to 20 ml	Reagents for Competent Cell Preparation ZymoBroth™ Growth Medium	Preparation of competent *E. coli*
Mix & Go!™ E. coli Transformation Buffer Set	T3002	up to 60 ml	Reagents for Competent Cell Preparation	

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ZymoBroth™

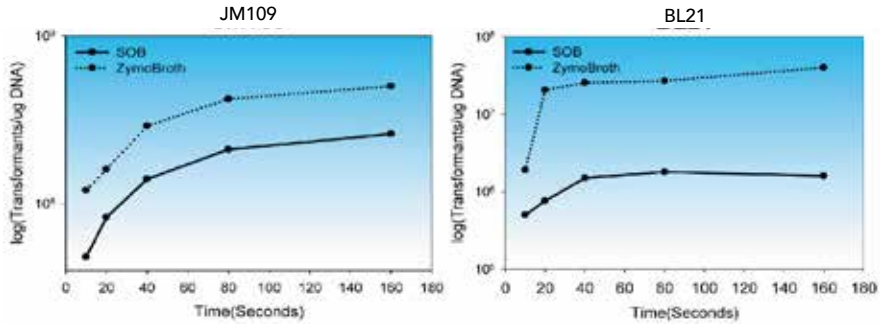
Highlights

- *Uniquely formulated growth medium for making highly competent E. coli for DNA transformation.*
- *Choice growth medium for difficult-to-transform E. coli strains.*

Description

ZymoBroth™ (ZB) is a specially formulated growth medium used for the preparation of highly competent *E. coli* cells for DNA transformation. When compared to classic SOB growth medium, ZymoBroth™ dramatically increases transformation efficiency, typically on the order of 5 - 100 fold (depending on the *E. coli* strain). As part of our popular *Mix & Go!™ E. coli* Transformation Kit, ZB enables researchers to generate their own homemade *Mix & Go!™ E. coli* for DNA transformation. ZB medium has been tested on a wide range of *E. coli* strains. Our data indicate that ZB medium stimulates the transformation efficiency of all *E. coli* strains tested, including K12 derivatives (such as JM109, HB101, etc.) and B strain derivatives (such as BL21, etc.).

Transformation efficiencies of strains generated with ZymoBroth™ and SOB media. ZymoBroth™ dramatically increases the transformation efficiencies of a broad range of *E. coli* strains. Generally, ZymoBroth™ enhances transformation efficiencies better for difficult-to-transform strains.



Transformation kinetics. *Mix & Go!™ E. coli* prepared with ZymoBroth™ display fast transformation kinetics and high transformation efficiencies.

Product	Cat. No.	Size	Uses
ZymoBroth™	M3015-100	100 ml	Chemically competent *E. coli* preparation
	M3015-500	500 ml	

Rattler™ Plating Beads

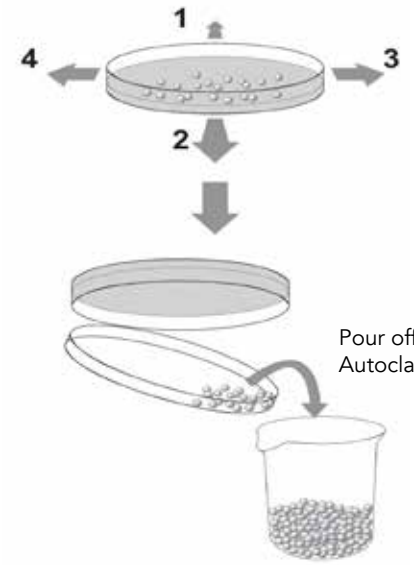
Highlights

- *Sterile 4.5 mm glass plating beads that are convenient and easy to use.*
- *No flaming required.*
- *Quickly spread cells evenly over the entire growth surface of a plate.*
- *Ideal when plating yeast for two-hybrid screens.*

Description

Zymo Research offers Rattler™ Plating Beads to save the researcher time and effort when plating bacteria or yeast. The sterile glass beads are simply poured onto solid plated medium together with a liquid cell suspension, and the mixture is shaken to distribute the cells evenly over the medium's surface. This allows for numerous plates to be processed quickly and efficiently. Pour the Rattler™ beads onto a series of plates, stack, and shake simultaneously in a side to side motion. The beads can be easily removed following inversion of the plates and pouring off from the plate lids. Using the Rattler™ Plating Beads is simple, easy, and saves you time. The beads come sterile in polycarbonate bottles and can be reused following cleaning and autoclaving.

Shake Beads to Spread Cells



Pour off Rattler™ Beads, Autoclave and Reuse.

Product	Cat. No.	Size	Specifications	Uses
Rattler™ Plating Beads - 230 g/bottle	S1001	1 bottle	Material: Solid, glass 4.5mm beads can be washed, autoclaved, and reused Packaging: Polycarbonate, autoclavable wide mouth bottle. The bulk format is supplied non-sterile as a 25 kg bag	Spreading inocula on solid media (plates)
	S1001-5	5 bottles		
Rattler™ Plating Beads - bulk format (non-sterile)	S1001-B	25 kg bag		

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FAQs about *Mix & Go!™* Competent Cells

Premade *Mix & Go!™* Competent Cells:

Will performing heat shock improve my transformation efficiency?
It may be beneficial if making a library, otherwise the heat shock is not needed.

Can my volume of DNA input be greater than the recommended <5%?
The efficiency can decrease several fold as the volume increases. If your DNA is too dilute, we recommend using the DNA Clean & Concentrator® (see p. 84) prior to transformation.

Mix & Go!™ Transformation Kit and Buffer Set:

I'm working with a wild-type strain of bacteria, will it work and how can I boost transformation efficiency?
This system is optimized for use with lab strains (K12 and B derivatives). Wild type strains generally have low efficiencies. Here are some tips for boosting efficiency:

1. ZymoBroth™: *E. coli* cells prepared with this optimized growth medium exhibit faster transformation kinetics and higher transformation efficiencies. This may be as high as several fold to a log increase.
2. Boosting Transformation:
   a. Heat Shock: Incubate with DNA on ice for 30 minutes, followed by 5 minutes at 37°C. This is a mild heat shock step and has no detrimental effects, it will only improve transformation efficiency.
   b. Outgrowth: After the transformation mixture has incubated, add 4 volumes of SOC and incubate for 1 hour at 37°C with gentle shaking at 200-300 rpm. Afterwards, spread the mixture directly onto pre-warmed culture plates.

7 Yeast Research

At Zymo Research, our first products were those for yeast. This inspired the three "budding yeast" that are part of our company's logo today. In addition to those technologies described in previous chapters for yeast DNA and RNA purification, we also provide yeast growth and transformation products. For transformation of yeast and fungus, a uniquely formulated YPD medium (YPD Plus™) increases the transformation efficiencies for most yeast strains by ≥ 50%. Our Frozen-EZ Yeast Transformation II™ Kit has been designed to make yeast transformation easier and more efficient compared to conventional methods. We also provide several specialty products for yeast researchers that include α-Factor/a-Factor Mating Pheromone and 5-Fluoroorotic Acid. The Zymolyase and Yeast Protein Kit remain important reagents for yeast lysis and protein purification, respectively.

Yeast Lytic Enzyme

Yeast Plasmid And DNA Purification

Yeast Transformation

Yeast Mating Pheromone

Specialty Chemicals And Others

Zymolyase - Yeast Lytic Enzyme

Highlights

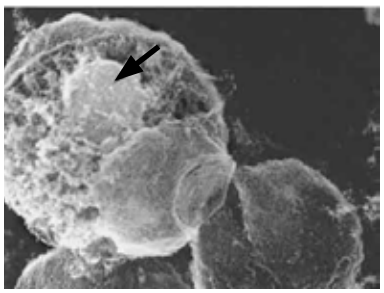
- *Zymolyase (100T equivalent) prepared from Arthrobacter luteus (essential enzyme activities: β-1,3-glucan laminaripentao-hydrolase and β-1,3-glucanase).*
- *Provided lyophilized together with a buffer for reconstitution.*
- *Also available combined with RNase A (R-Zymolyase).*

Description

Digestion of yeast and fungal cell walls is necessary for many experimental procedures including spheroplasting, immunofluorescence, transformation, protein purification, and others. The use of lytic enzymes like Zymolyase is routinely used for digestion. The Zymolyase from Zymo Research is prepared from *Arthrobacter luteus*, lyophilized, and packaged with a resuspension buffer. The buffer has been optimized to confer maximal levels of enzymatic activity. The main activities of the enzyme are β-1,3 glucanase and β-1,3-glucan laminaripentao-hydrolase, which hydrolyze glucose polymers at the β-1,3-glucan linkages releasing laminaripentaose as the principal product. Optimal Zymolyase activity is at 30°-37°C; lytic activity ceases at higher temperatures.

R-Zymolyase includes 0.5 U/µl RNase A when reconstituted.

Susceptible fungal genera: *Asbya, Candida, Debaryomyces, Eremothecium, Endomyces, Hansenula, Hanseniaspora, Kloekera, Kluyveromyces, Lipomyces, Metschikowia, Pichia, Pullularia, Saccharomyces, Saccharomycodes, Saccharomycopsis, Schizosaccahromyces, Torulopsis.*



Zymolyase can be used for enzymatic digestion of yeast glycan coats and for spheroplast formation. The arrow indicates the nucleus and intracellular components of a spheroplast through a partially digested plasma membrane.*

*Source: A protocol for isolation and visualization of yeast nuclei by scanning electron microscopy (SEM). Elena Kiseleva, Terry D Allen, Sandra A Rutherford, Steve Murray, Ksenia Morozova, Fiona Gardiner, Martin W Goldberg & Sheona P Drummond. Nature Protocols 2, 1943 - 1953 (2007) Published online: 9 August 2007 doi:10.1038/nprot.2007.251

Product	Cat. No.	Size	Specifications	Uses
Zymolyase - Yeast Lytic Enzyme	E1004	1,000 U	Enzyme Concentration: 5 U/µl Total Protein Concentration: 10 - 15 mg/ml Storage: -70°C Unit Definition: One lytic unit (U) is defined as a 10% decrease in O. D. at 800 nm for 30 minutes	Spheroplast/Protoplast formation; Yeast cell fusion; Yeast transformation; Other fungi
	E1005	2,000 U		
R-Zymolyase (with RNase)	E1006	1,000 U		

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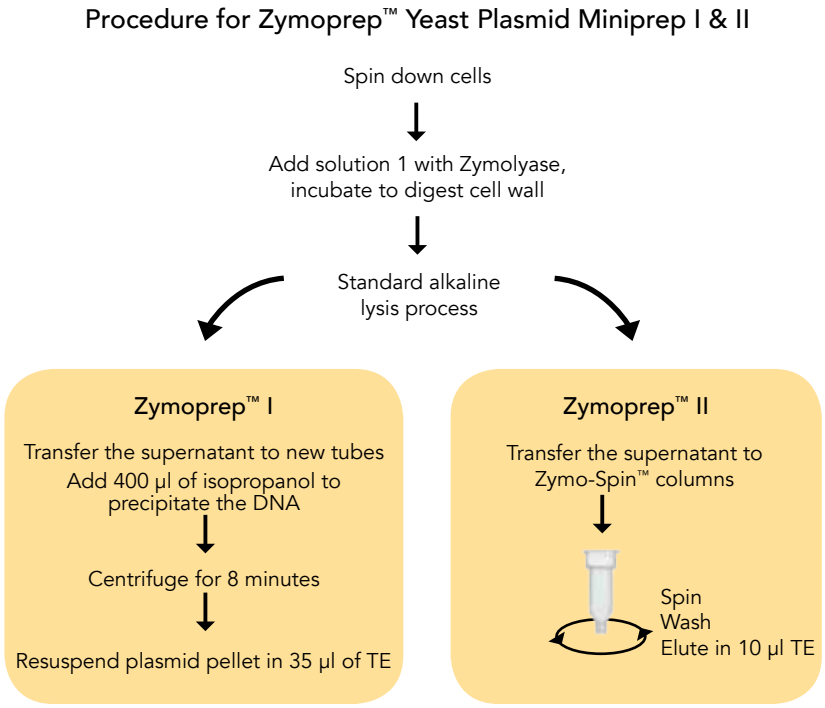
Zymoprep™ Yeast Plasmid Miniprep I, II

Highlights

- *Simple procedures for plasmid rescue from yeast.*
- *Ideal for low-copy and hard-to-isolate plasmids.*
- *For isolation of plasmid DNA intended for downstream applications such as PCR, transformation, hybridization, etc.*

Description

The Zymoprep™ Yeast Plasmid Miniprep provides all the necessary reagents for plasmid isolation from *S. cerevisiae*, *C. albicans* and *S. pombe*, and any fungi whose cell walls are susceptible to yeast lytic enzyme lysis. The procedure is simple and efficient, with no need for glass beads or phenol. Reliably recover plasmid DNA from yeast colonies, patches on plates, or as liquid cultures. The system is ideal for low-copy number and hard to isolate plasmids. Eluted plasmid DNA can be used directly for *E. coli* transformation, PCR, and Southern blot analysis.



Product	Cat. No.	Size	Specifications	Uses
Zymoprep™ Yeast Plasmid Miniprep I	D2001	100 preps.	Format: Isopropanol Precipitation Elution Volume: ≥ 35 µl Processing Time: 35 - 90 minutes DNA Size Limits: ≤ 23 kb	Plasmid recovery from yeast
Zymoprep™ Yeast Plasmid Miniprep II	D2004	50 preps.	Format: Spin-Column Elution Volume: ≥ 10 µl Processing Time: 35 - 90 minutes Binding Capacity: 5 µg DNA Size Limits: ≤ 23 kb	

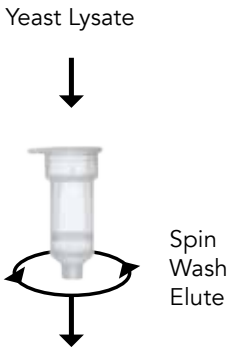
YeaStar™ Genomic DNA Kit

Highlights

- *Efficient DNA isolation from a broad spectrum of fungal species susceptible to yeast lytic enzyme (i.e., Zymolyase) lysis.*
- *Genomic DNA can be used for Southern blotting, PCR, restriction enzyme digestion, etc.*

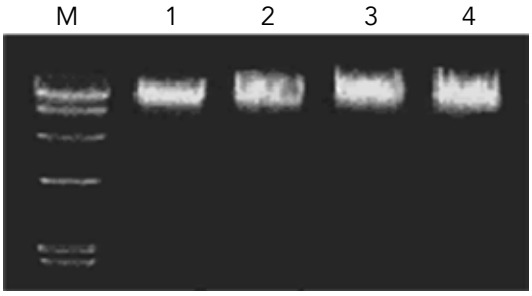
Description

The YeaStar™ Genomic DNA Kit is designed for reliable and efficient isolation of genomic DNA from a broad spectrum of fungal species, including *Aspergillus fumigatus, Aspergillus nidulans, Aspergillus nivens var. aureus, Candida albicans, Pichia pastoris, Saccharomyces cerevisiae, Schizosaccharomyces pombe*, and any fungi whose cell walls are susceptible to yeast lytic enzyme. The kit is based on highly efficient enzyme lysis and Zymo-Spin™ column technology. Each standard prep yields about 7 - 20 µg of DNA with a size distribution of 35 - 60 kb. The resulting genomic DNA can be used for direct analysis including Southern blotting, PCR, restriction endonuclease digestion, etc.



Ultra-pure DNA for...

- ✓ PCR
- ✓ Southern Blotting
- ✓ Endonuclease Digestion



Agarose gel electrophoresis of DNA prepared using the YeaStar™ Genomic DNA Kit. Lanes: M: λ-DNA Hind III marker; 1: *S. cerevisiae*; 2: *P. pastoris*; 3: *C. albicans*; 4: *S. pombe*.

Product	Cat. No.	Size	Specifications	Uses
YeaStar™ Genomic DNA Kit	D2002	40 preps.	Format: Spin-Column Binding Capacity: 25 µg Elution Volume: ≥ 60 µl Processing Time: 1.5 hours	Yeast; Zymolayse-sensitive fungi

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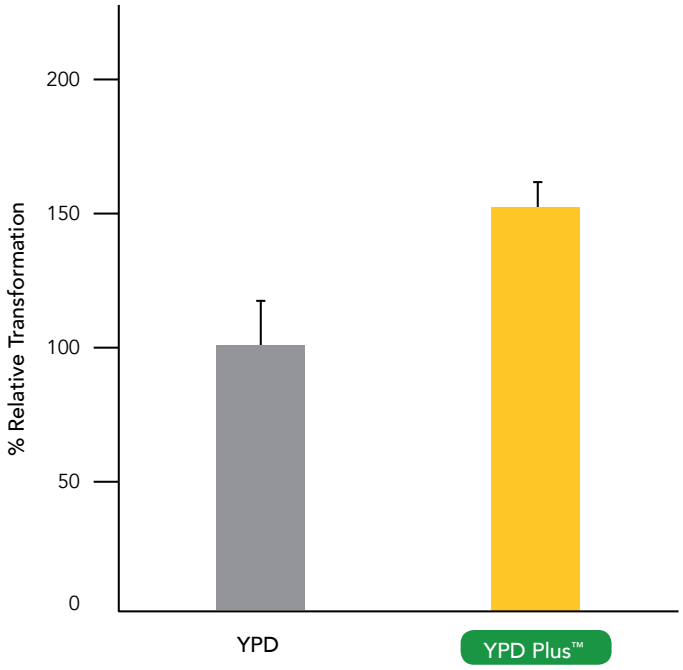
YPD Plus™

Highlights

- *Specialized medium used for yeast outgrowth that increases transformation efficiency > 50% when compared to conventional YPD medium.*
- *Ideal for yeast strains exhibiting poor growth characteristics.*

Description

The outgrowth step in yeast transformation protocols is often critical for increasing overall yeast transformation efficiencies. This is useful when attempting to maximize transformation efficiencies for library screening or transforming yeast with multiple plasmids. YPD Plus™ is a specially formulated to increase yeast transformation efficiencies by > 50%. YPD Plus™ is recommended for mutant yeast strains exhibiting poor growth characteristics that are not amenable to transformation. Simply supplement a yeast transformation reaction mixture with YPD Plus™ to achieve consistent increases in yeast transformation efficiencies.



Comparison of YPD vs. Zymo Research's YPD Plus™ medium. Yeast transformations were performed with outgrowth performed in either standard YPD or YPD Plus™ medium. The relative percentage of transformants is shown in the graph to the left. Each plot represents the relative transformation efficiency averaged from six individual transformations.

Product	Cat. No.	Size	Uses
YPD™ Plus	Y1003-50	50 ml	Yeast transformation & outgrowth
	Y1003-100	100 ml	

Frozen-EZ Yeast Transformation II™ Kit

Highlights

- *Yeast cells with high transformation efficiencies can be prepared in under 10 minutes.*
- *Simple method for transforming yeast with single or multiple plasmids in less than 1 hour.*
- *No carrier DNA required.*

Description

The Frozen-EZ Yeast Transformation II™ Kit is designed to make yeast transformations and library screening easier and more efficient than currently available methods. The yeast cells can be used immediately for transformation or can be stored (i.e., ≤ -70°C) for use at a later time. Yeast prepared with this kit can be transformed with both circular and linear DNAs. Also, the Frozen-EZ Yeast Transformation II™ Kit can be used with other fungi including *C. albicans*, *S. pombe*, and *P. pastoris*.

Product	Cat. No.	Size	Specifications	Uses
Frozen-EZ Yeast Transformation II™ Kit	T2001	120 rxns.	Transformation Efficiency: 10^5 - 10^6 cfu/µg Transformation DNA Input: 0.2 - 1.0 µg Competent Cell Stability: ≥ 1 year at -70°C	Competent yeast cell preparation; Compatibility: *S. cerevisiae*, *S. pombe*, *C. albicans*, *P. pastoris*

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α-Factor Mating Pheromone

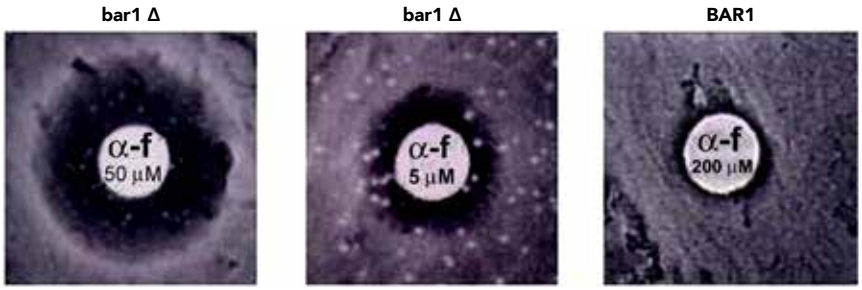
Highlights

- *Aqueous solution of yeast α-factor (alpha-factor) mating pheromone.*

Description

When yeast "a" and "α" cells encounter mating pheromones of the opposite cell type they induce genes necessary for mating, arrest the cell cycle in G1, alter cell surface and nuclear determinants, and also undergo dramatic morphological elongation into pear shapes, affectionately termed "schmooing". These alterations prepare the yeast cells for mating and fusion to form stable diploids. The a/α diploids are not responsive to mating pheromone of either type, but can be induced to undergo meiosis via nutrient deprivation. The use of yeast mating pheromones has pioneered the study of the cell cycle, cellular morphology, transcriptional induction, as well as signal transduction pathways.

Zymo Research provides the α-factor peptide mating pheromone as a ready to use liquid that has been optimized for both activity and stability and is guaranteed to retain biological function through multiple freeze-thaw cycles.



Activity test of α-Factor. α-Factor peptide pheromone (10 μl) was applied to sterile filters on a lawn of MATa cells, which were either wild-type for the BAR1 (200 μM, right) protease or bar1 Δ (50 μM, left; 5 μM, center). Sensitivity to the α-factor is evident as the zone of clearing (G, arrested cells). Cells that have the BAR1 protease deletion are more sensitive to α-Factor than BAR-1-protease-positive wild strain which require ~20 - 50X more pheromone to arrest the cells.

a-Factor Mating Pheromone

Highlights

- *Aqueous solution of yeast a-factor (A-factor) mating pheromone.*

Description

a-Factor is one of the two mating pheromones in baking yeast. It is the "opposite" sex of mating pheromone α-Factor (alpha-factor). When yeast a and α cells encounter the opposite mating pheromones, they induce genes necessary for mating, arrest the cell cycle in G1, altering cell surface and nuclear determinates, and also cause morphological changes.

Product	Cat. No.	Size	Specifications	Uses
α-Factor Mating Pheromone	Y1001	240 µl	Concentration: 10 mM in 0.1 M sodium acetate, pH 5.2, (i.e., 4 mg/240 µl) Recommended Usage Concentration: ~5 µM (bar1 Δ) to 100 µM (BAR1) Peptide Sequence: TRP-LEU-GLN-LEU-LYS-PRO-GLY-GLN-PRO-MET-TYR Molecular Weight: 1684.0 Activity Test: G1 arrest Purity: > 98% by HPLC Storage: -20°C	Yeast mating induction; G1 phase arrest
a-Factor Mating Pheromone	Y1004-500	500 µl	Concentration: 1 mg/ml in methanol Molecular Weight: 1630 Activity Test: G1 arrest Purity: > 80% by HPLC Storage: -20°C	

5-Fluoroorotic Acid (5-FOA)

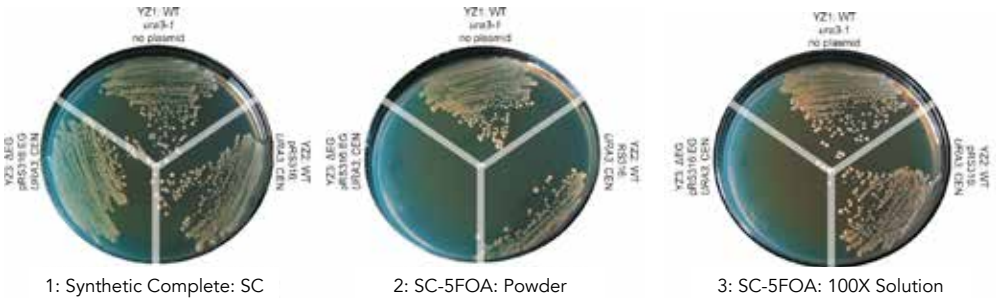
Highlights

- *Yeast genetic counter-selection agent.*
- *Available as an ultra-pure powder (> 98% purity) or as a solution in DMSO.*

Description

Using 5-Fluoroorotic Acid (5-FOA) for the counter-selection of yeast is a common genetic screening method. Curing yeast strains of plasmids, plasmid shuffling, allelic replacement, and two-hybrid screens are methods that can employ the use of 5-FOA. Otherwise nontoxic to yeast, 5-FOA is converted to the toxic form (i.e., 5-flurouracil) in strains expressing the functional URA3 gene coding for orotine-5'-monophosphate decarboxylase that is involved in the synthesis of uracil. Yeast strains that are phenotypically Ura+ become Ura- and 5-FOAR after selection.

The question of 5-FOA solubility is often raised by researchers using ultra-pure (> 98%) 5-FOA powder because of its insolubility in water. Thus, we provide a 100X concentrated (100 mg/ml) 5-FOA solution in DMSO. This has been tested and validated on the basis of counter selection activity (see below).



1: Synthetic Complete: SC 2: SC-5FOA: Powder 3: SC-5FOA: 100X Solution

Counter selection of yeast using 5-FOA. Yeast strains that are auxotrophic for uracil (ura3-1) were tested for their ability to grow on 5-FOA containing media. Three strains were tested: wt alone (YZ1), wt with a URA3 marked low copy plasmid (YZ2), and a mutant strain with a deletion of an essential gene (ΔEG) that could not lose a complementing URA3 plasmid (YZ3).

From left to right, top to bottom are synthetic complete glucose medium (SC): 1. SC, synthetic complete no 5FOA; 2. Standard - SC-5-FOA (SC-5-FOA made from ultra-pure 5-FOA powder, 1 g/liter) 3. SC-5-FOA made from 100X 5-FOA solution.

For each plate, Top: Yeast strain: YZ1 wild-type, Ura- (wt, ura-3-52), Right: Yeast strain: YZ2, wt carrying a low copy, URA3 plasmid alone, and Left: Yeast strain: YZ3: ΔEG, containing the complementing plasmid (pRS316: EG, URA3, CEN). The counter selection against strain YZ3 was evident for all media containing 5-FOA with no 5-FOA^R colonies evident (see left panels, YZ3: in plates 2, and 3). Cells from control strains YZ1 and YZ2 were able to grow on 5-FOA media.

Product	Cat. No.	Size	Specifications	Uses
5-FOA (powder)	F9001-1	1 g	Appearance: White crystalline powder Molecular Weight: 174.0 Method for Determining Identity: TLC, melting point and lot comparison Purity: Estimated >98% byt TLC, melting point, and lot comparison Solubility: 50 mg in 1 ml (1:1 NH_4OH:H_2O) with gentle heating, > 100 mg/ml DMSO Storage: Store in freezer	Yeast Counter-selection; Yeast Two-hybrid Screen; Plasmid Curing; Plasmid Shuffling; Allelic Replacement
	F9001-5	5 g		
100X 5-FOA (liquid)	F9003	10 ml		

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YeaStar™ RNA Kit

Highlights

- *Recovery of purified RNA from a wide range of fungus species using Zymo-Spin™ Column technology.*
- *Omits the use of glass beads and organic denaturants.*
- *Eluted RNA is suitable for use in RT-PCR or other RNA-based procedures.*

Description

The YeaStar™ RNA Kit enables RNA isolation from a broad spectrum of fungi including: *Aspergillus fumigatus, Aspergillus nidulans, Aspergillus nivens var. aureus, Candida albicans, Pichia pastoris, Saccharomyces cerevisiae, Schizosaccharomyces pombe*. The kit is ideal for the purification of high-quality, total RNA from any fungus that can be lysed by yeast lytic enzyme. The kit facilitates the purification of 10-25 µg of total RNA from 1-1.5 ml of cultured cells using innovative Zymo-Spin™ Column technology.

Product	Cat. No.	Size	Specifications	Uses
YeaStar™ RNA Kit	R1002	40 preps.	Format: Spin Columns Elution Volume: ≥ 60 µl Binding Capacity: 25 µg/prep. Size Limits: ≥ 200 nt Processing Time: 30 minutes	Yeast; Fungi sensitive to lysis with yeast lytic enzyme (i.e. Zymolayse)

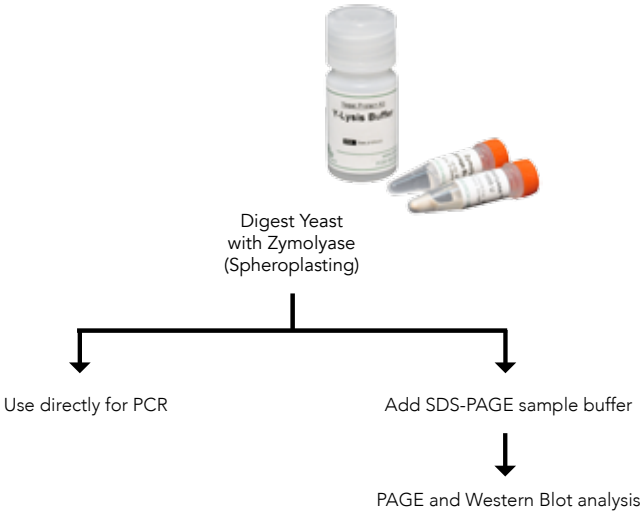
Yeast Protein Kit™

Highlights

- *Convenient, rapid method for efficient lysis of yeast for downstream protein and DNA analyses.*
- *The procedure can be used for any fungal species susceptible to yeast lytic enzyme (Zymolyase) digestion.*

Description

The Yeast Protein Kit™ is a simple and convenient method for the rapid, thorough lysis of yeast cells. The kit has been optimized for use with *S. cerevisiae* and *C. albicans* but can be used for any fungal species that is susceptible to yeast lytic enzyme (Zymolyase) digestion. The digestion procedure effectively generate spheroplasts of yeast cells, making them ideal for both protein and DNA analyses including Western blotting and PCR, respectively.



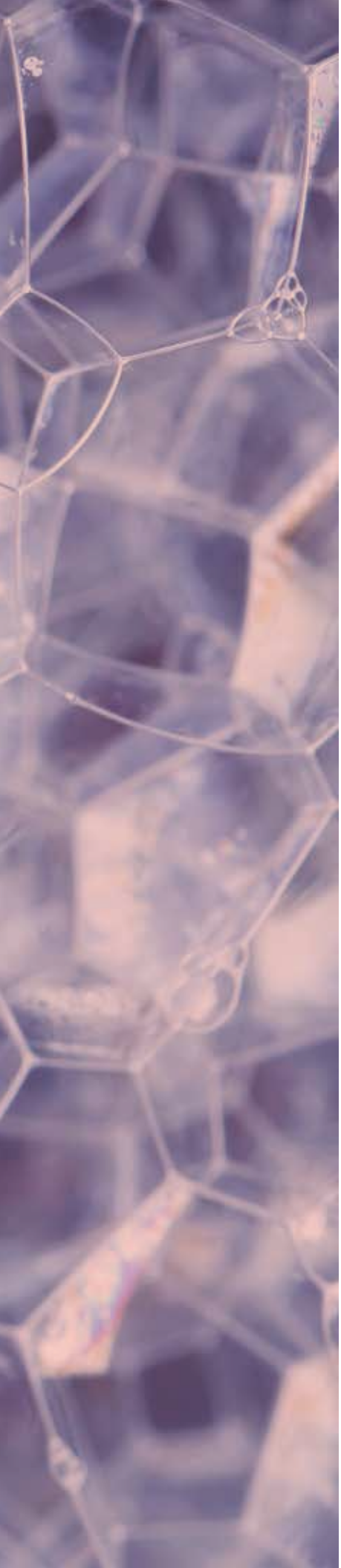
Product	Cat. No.	Size	Uses
Yeast Protein Kit™	Y1002	200 preps.	Yeast Cell Lysis; Protein Analysis; DNA Analysis

8 Protein Expression & Enzymes

Although the expression of recombinant proteins in *E. coli* is a routine procedure, high level expression or overexpression is not always attainable. Zymo Research has designed products to exploit the fact that high levels of protein expression can be consistently obtained when the processes of cell expansion and protein expression are kept separate. This is easily achieved with the use of the Dual Media Set™ where the over-expression of many proteins can be reliably controlled. In conjunction with the Dual Media Set™, our XJ Autolysis™ expression strains (p. 149) are ideal hosts for recombinant protein expression. With these strains, bacterial cell lysis is complete after a single freeze/thaw cycle. Researchers will find the single step lysis procedure simple, reproducible, and faster than conventional methods.

The His-Spin Protein Miniprep™ provides researchers a simple, fast method for His-tagged protein purification. The procedure is based on innovative protein purification chemistry as well as state of the art Zymo-Spin™ Column technology. Up to 1 mg of His-tagged protein can be purified per preparation in as little as 5 minutes. The purified protein can be used directly in enzymatic assays, protein biochemical analyses, SDS-PAGE, and other applications. The straightforward spin-wash-elute protocol ensures results are obtained in minutes, not hours.

In addition to epigenetic enzymes presented in the Epigenetics Section (p. 36-40), Zymo Research offers several others, including DNase I (RNase-free), Proteinase K, RNase A, and Zymolyase that are detailed in this chapter.



Culture Media & Bacterial Strains Used For Protein Expression

His-Tagged Protein Purification

Enzymes

Dual Media Set™

Highlights

- *Simple, reliable method for high level recombinant protein expression in E. coli.*
- *Eliminates the need to monitor cell density and the time of inducer addition.*
- *Synchronizes cultures that express different recombinant proteins.*

Description

Although recombinant protein expression in *E. coli* has become routine, high level protein expression or overexpression is not always attainable for every protein. Our research has shown that high level protein expression can be achieved consistently when two processes, cell expansion and protein expression, are kept separate.

The Dual Media Set™, different from commonly used protein expression procedures using Luria-Bertani (LB) medium or other specially prepared medium, contains two specially formulated media: Expansion Broth (EB) and Overexpression Broth (OB). For expansion, *E.coli* cells are grown in EB which keeps the production of recombinant protein repressed. To initiate high level protein expression, OB is simply added to the culture. By using the Dual Media Set™, protein overexpression can be reliably controlled for many recombinant proteins (see Figure 2). In some circumstances, when the expressed protein is either toxic or insoluble, overexpression may be counter-productive. In such cases, protein production can be kept at a minimum by adding the inducer IPTG (for lac-based promoters) to cells growing in EB (see Figure 1).

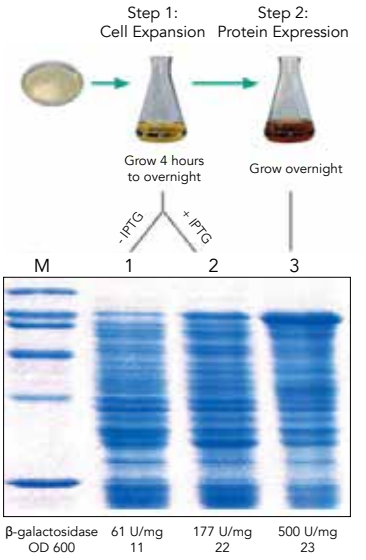


Figure 1. Controlled overexpression of β-galactosidase. Cells were grown in EB, where only background levels of the T7-lac promoter-controlled product are produced (1). Moderate amounts of the enzyme were produced by incubating overnight in EB with IPTG (2), the highest amounts of protein are produced in OB (3).

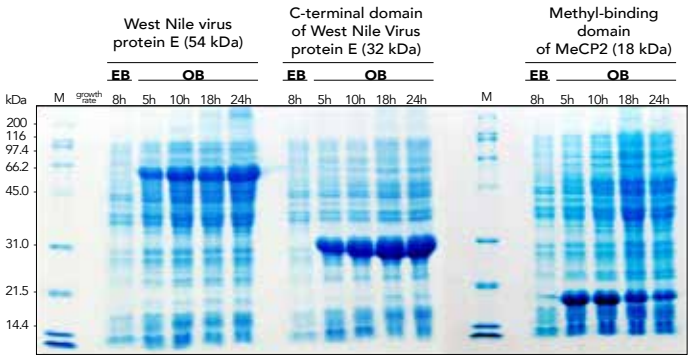


Figure 2. SDS-PAGE of cell proteins after growth using the Dual Media Set™. M – protein markers; 1-5, West Nile virus protein E (54 kDa): 1, repressed expression in EB, 2-5, over-expression in OB for 5, 10, 18, and 24 hours, respectively, after inoculation with uninduced EB culture; 6-10, C-terminal domain of West Nile virus protein E (32 kDa): 6, repressed expression in EB, 7-10, over-expression in OB for 5, 10, 18, and 24 hours, respectively, after inoculation with uninduced EB culture; 11-15, Methyl-binding domain of MeCP2 (18 kDa): 11, repressed expression in EB, 12-15, over-expression in OB for 5, 10, 18, and 24 hours, respectively, after inoculation with uninduced EB culture.

Product	Cat. No.	Size	Uses
Dual Media Set™ (EB + OB)	M3011	100 ml EB - 500 ml OB	Recombinant protein expression
Expansion Broth (EB)	M3012-100	100 ml	
	M3012-500	500 ml	
Overexpression Broth (OB)	M3013-100	100 ml	
	M3013-500	500 ml	

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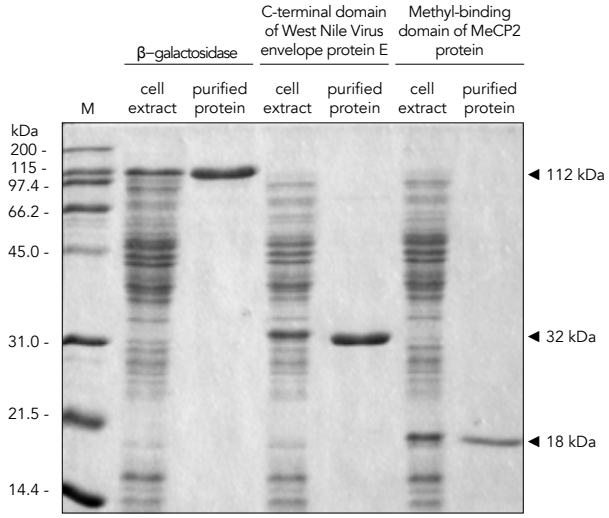
His-Spin Protein Miniprep™

Highlights

- *Fast (5 minute) method for the purification of His-tagged proteins from cell free extracts.*
- *Screen bacterial colonies directly on the basis of protein expression vs. plasmid DNA.*
- *No special instrumentation is required other than a benchtop microcentrifuge.*

Description

The His-Spin Protein Miniprep™ provides researchers with a method for fast His-tagged protein purification. The easy-to-follow procedure is based on a nickel-charged His-Affinity Gel (IMAC), innovative protein purification, and unique Zymo-Spin™ Column technology. Up to 1 mg of His-tagged protein can be purified in as little as 5 minutes and can be eluted into as little as 100 µl of the provided His-Elution Buffer. The purified protein can be used directly for enzymatic assays, protein biochemical analyses, SDS-PAGE, as well as other protein based applications. The His-Spin Protein Miniprep™ has been optimized to yield maximal protein purity indices: a single protein band is often visualized following Coomassie Blue staining of proteins in SDS-PAGE gel (see figure below). The straightforward spin-wash-elute protocol dramatically simplifies protein purification and results are obtained in minutes, not hours!



Purification of 6X His-fusion proteins. *E. coli* cell extracts, containing indicated proteins (i.e., 112, 32, 18 kDa) expressed as a N-terminal 6X His-fusion, as well as the proteins purified using His-Spin Protein Miniprep™ were analyzed by SDS-PAGE in a 15% (w/v) polyacrylamide gel, and stained with Coomassie Blue. The recombinant proteins were purposely expressed to a low level to demonstrate the efficiency of the His-Spin Protein Miniprep™.

Product	Cat. No.	Size	Specifications	Uses
His-Spin Protein Miniprep™	P2001	10 preps.	Format: Spin-Column Protein Binding Capacity: 1 mg His-affinity Gel	His-tagged protein purification
	P2002	50 preps.		
His-Affinity Gel	P2003-2	14 ml		

Enzymes

5-hmC Glucosyltransferase

5-hmC Glucosyltransferase from Zymo Research is a highly active enzyme that specifically tags 5-hydroxymethylcytosine in DNA with a glucose moiety yielding glucosyl-5-hydroxymethylcytosine. Glucosylation of 5-hydroxymethylcytosine by 5-hmC Glucosyltransferase can be used for sequence-specific, locus-specific, as well as global quantification of 5-hydroxymethylcytosine. See p. 39 for details.

Specifications: Provided with 10X 5-hmC GT Reaction Buffer and 10X UDPG.
Enzyme Concentration: 2 U/µl
Optimum Reaction Temperature: 30°C
Standard Reaction Time: 2 hours
Unit Definition: One unit (U) is defined as the amount of enzyme needed to protect 1 µg of 5-hmC DNA Standard [D5405-3] from Csp6I restriction enzyme digestion via glucosylation in a reaction incubated at 30°C for 1 hour.

Cat. No.	Size
E2026	100 U
E2027	200 U

Atlantis dsDNase

Atlantis dsDNase is a double-strand DNA specific endonuclease that cleaves phosphodiester bonds in DNA to yield homogeneous populations of core nucleosomes.

Specifications: Typical buffer consists of 20 mM Tris-HCl (pH 7.5) and 5 mM MgCl2.
Enzyme Concentration: 0.1 U/µl
Inactivation: 5X MN Stop Buffer or EDTA.
Optimum Reaction Temperature: 42°C
Unit Definition: One unit (U) is defined as the amount of enzyme needed to produce an increase in absorbance at 260 nm of 0.001 per minute, using 50 mg/ml high MW DNA in 50 mM Na-acetate pH 5.0 and 5 mM MgCl2 (Kunitz, 1950).
Standard Reaction Time: 20 min.

Cat. No.	Size
E2030	12.5 U

CpG Methylase (M. SssI)

The CpG Methylase from Zymo Research completely methylates all cytosine bases at the C5 position in double-stranded, non-methylated and hemi-methylated DNA having the dinucleotide sequence 5′…CpG…3′. The reaction conditions are optimized to maximize the processivity of the enzyme to ensure rapid, complete, and reproducible methylation of DNA for accurate DNA methylation analysis. See p. 38 for details.

Specifications: Provided in solution (4 U/µl) with 10X CpG Reaction Buffer and 20X SAM (S-adenosylmethionine).
Source: Recombinant methylase is isolated from *E. coli* expressing the methyltransferase gene from Spiroplasma sp. strain MQ1.
Heat Inactivation: 65°C for 20 min.
Unit Definition: One unit (U) is the amount of enzyme required to protect 1µg of λ DNA from cleavage by BstUI restriction endonuclease in a total reaction volume of 20 µl for 1 hour at 37°C.

Cat. No.	Size
E2010	200 U
E2011	400 U

GpC Methylase (M. CviPI)

The GpC Methylase from Zymo Research completely methylates all cytosine bases at the C5 position in double-stranded, non-methylated and hemi-methylated DNA having the dinucleotide sequence 5′…GpC…3′. The reaction conditions are optimized to maximize the processivity of the enzyme to ensure rapid, complete, and reproducible methylation of DNA for accurate DNA methylation analysis. See p. 38 for details.

Specifications: Provided in solution (4 U/µl) with 10X GpC Reaction Buffer and 20X SAM (S-adenosylmethionine).
Source: Recombinant GpC Methylase is isolated from *E. coli* expressing the methyltransferase gene from a Chlorella virus.
Heat Inactivation: 65°C for 20 min.
Unit Definition: One unit (U) is defined as the amount of enzyme required to protect 1 µg of λ DNA against cleavage by HaeIII restriction endonuclease in a total reaction volume of 20 µl for 1 hour at 37°C.

Cat. No.	Size
E2014	200 U
E2015	1,000 U

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DNA Degradase™ and DNA Degradase Plus™

DNA Degradase™ and DNA Degradase Plus™ from Zymo Research are nuclease mixes that quickly and efficiently degrade DNA into individual nucleotides or nucleosides, respectively. DNA Degradase™ is ideal for whole-genome DNA methylation analysis by a number of downstream applications (i.e., HPLC, LC/MS, TLC, etc.). Digestion is performed via a simple one-hour, one-step procedure. See p. 37 for details.

Specifications: Provided with 10X DNA Degradase™ Reaction Buffer.
Enzyme Concentration: 10 U/µl
Enzyme Inactivation: 70°C for 20 min.
Optimum Reaction Temperature: 37°C
Unit Definition: One unit (U) is the amount of enzyme required to degrade 1 µg of λ DNA in a total reaction volume of 25 µl for 1 hour at 37°C.

Cat. No.	Product	Size
E2016	DNA Degradase™	500 U
E2017	DNA Degradase™	2,000 U
E2020	DNA Degradase™ Plus	250 U
E2021	DNA Degradase™ Plus	1,000 U

dsDNA Shearase™ Plus

dsDNA Shearase™ Plus is an endonuclease that cleaves phosphodiester bonds in DNA to yield oligonucleotides with 5′-phosphate and 3′-hydroxyl termini. It has a particularly strong preference for dsDNA and generates random-ended DNA fragments of the desired size in a single step. This enzyme is compatible with low volume inputs thus minimizing sample loss. See p. 39 for details.

Specifications: Provided with 5X dsDNA Shearase™ Plus Reaction Buffer.
Enzyme Concentration: 1 U/µl
Inactivation: 65°C for 5 min.
Optimum Reaction Temperature: 42°C
Unit Definition: One unit (U) is defined as the amount of enzyme required to convert 250 ng human DNA into fragments in the range of 100-500 bp in 20 minutes at 42°C in a total reaction volume of 10 µl.
Standard Reaction Time: 20 min.

Cat. No.	Size
E2018-50	50 U
E2018-200	200 U

DNase I Set

DNase I (RNase-free) cuts both double-stranded and single-stranded DNA, producing 3′-OH oligonucleotides. It is typically used for selectively degrading DNA in the presence of RNA. This DNase is suited for applications such as nick translation, production of random fragments, cleavage of genomic DNA for footprinting, removal of DNA template after *in vitro* transcription, and removal of DNA from RNA samples prior to applications such as RT-PCR. It is compatible with all of our RNA kits featuring in-column DNase digestion.

Specifications: Lyophilized enzyme provided with DNA Digestion Buffer.
Heat Inactivation: 65°C for 10 min.
Unit Definition: One unit (U) is defined as the amount of enzyme required to degrade 1 µg λ DNA completely in 10 minutes at 37°C in a 50 µl reaction volume (40 mM Tris-HCl, pH 8.0, 10 mM NaCl, 6 mM MgCl2, and 10 mM CaCl2). One unit of enzyme is equivalent to one Kunitz unit under these assay conditions.

Cat. No.	Size
E1010	250 U

Micrococcal Nuclease

Micrococcal Nuclease cleaves single-stranded and double-stranded DNA and RNA. Complete digestion with Micrococcal Nuclease yields mono- and oligonucleotides with 3′-phosphates.

Specifications: Typical buffer consists of 20 mM Tris-HCl, (pH 8.8), 1 mM CaCl2. CaCl2 is essential for activity.
Enzyme Commission Number: (E.C. 3.1.31.1)
Enzyme Concentration: 0.1 U/µl
Optimum Reaction Temperature: 37°C
Unit Definition: One unit (U) will produce 1.0 µmole of acid soluble polynucleotides from native DNA per min at pH 8.8 at 37°C, based on EM/260 = 10,000 for the mixed nucleotides.

Cat. No.	Size
D5220-1	10 U/100 µl

Proteinase K

Proteinase K is a stable serine protease with broad substrate specificity and will degrade many proteins in their native conformation even in the presence of detergents (e.g., SDS). The enzyme is frequently used in molecular biology applications to digest unwanted proteins such as nucleases from DNA and/or RNA preparations from microorganisms, cells, and plants.

Specifications: Lyophilized enzyme provided with Proteinase K Storage Buffer.
Enzyme Commission Number: (EC 3.4.21.64)
Source: *Engyodontium album*
pH and Temperature Range: 4.0 to 12.0 (8.0 is optimum), 25 to 65°C.
Specific Activity: > 30 units/mg protein
Unit Definition: One unit (U) of enzyme will hydrolyze urea-denatured hemoglobin to produce 1.0 µmole of tyrosine per minute at pH 7.5 at 37°C.

Cat. No.	Size
D3001-2-5	5 mg
D3001-2-20	20 mg

Quest*Taq*™ PreMix and Quest*Taq*™ qPCR PreMix

Quest*Taq*™ PreMix is supplied as a convenient 2X concentrated "master mix for robust PCR with little or no by-product formation. It has been optimized for the non-biased amplification of cystosine, 5-methylcytosine (5-mC), 5-hydroxymethylcytosine (5-hmC), and glucosyl-5-hydroxymethylcytosine (g5-hmC) containing DNA, ensuring high yield amplification across a wide range of templates. The Quest*Taq*™ PreMix differs from Quest*Taq*™ qPCR PreMix in that it excludes SYTO® 9 dye from the PreMix solution, making it compatible with real-time and quantitative PCR with fluorescent dyes of the researcher's choosing. Quest*Taq*™ DNA Polymerase has 3′-terminal transferase activity. The addition of "A" overhangs to amplified DNA makes it ideal for use in TA-cloning. See p. 37 for details.

Specifications: Provided as a 2X PreMix (E2050, E2051) or 2X qPCR PreMix (E2052, E2053) containing SYTO® 9 dye.
Source: Recombinant Enzyme
Activity: 5′ – 3′ polymerization
Enzyme Concentration: Reaction conditions at 1X (20 µl total volume) will contain 2 units of Quest*Taq*™ DNA polymerase
Optimum Reaction Temperature: 72°C
Unit Definition: One unit (U) is defined as the amount of enzyme required for the incorporation of 10 nmol dNTPs into an acid-insoluble form in 30 minutes at 72°C.

Cat. No.	Product	Size
E2050	Quest*Taq*™ PreMix	50 rxns.
E2051	Quest*Taq*™ PreMix	200 rxns.
E2052	Quest*Taq*™ qPCR PreMix	50 rxns.
E2053	Quest*Taq*™ qPCR PreMix	200 rxns.

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RNase A

Pancreatic RNase A specifically cleaves at the 3′-side of pyrimidine (uracil or cytosine) phosphate bonds. The enzyme does not hydrolyze DNA, because DNA lacks 2′-OH groups essential for the formation of cyclic intermediates. The enzyme can also be used to hydrolyze RNA from protein samples. It is compatible for use in RNase protection assays, to remove unspecifically bound RNA, in the analysis of RNA sequences, to hydrolyze RNA contained in protein samples, and in the purification of DNA.

Specifications: Lyophilized enzyme.
Enzyme Commission Number: (EC 3.1.27.5)
Source: Bovine Pancreas
Enzymatic Activity: 50 - 100 Kunitz units per mg protein.

Cat. No.	Size
E1008-8	8 mg
E1008-24	24 mg

Zymolyase

Digestion of yeast and fungal cell walls is necessary for many experimental procedures including spheroplasting, immunofluorescence, transformation, protein purification, and others. The use of lytic enzymes like Zymolyase are routinely used for digestion. The Zymolyase from Zymo Research is prepared from *Arthrobacter luteus* and is 100T equivalent. The storage buffer provided with the lyophilized enzyme has been optimized to confer maximal levels of enzymatic activity. R-Zymolyase also contains RNase A. See p. 156 for details.

Specifications: Lyophilized enzyme provided with Zymolyase Storage buffer.
Source: *Arthrobacter luteus*
Activity: β-1,3-glucanase
Essential Enzyme: β-1,3-glucan laminaripentaohydrolase
Optimum pH and Temperature: pH 7.5, 35°C (lysis of viable yeast), pH 6.5, 45°C (hydrolysis of yeast glucan)
Unit Definition: One unit (U) of lytic activity is defined as the amount of enzyme that catalyzes a 10% decrease in optical density at 800 nm (OD800) in 30 minutes.
Assay Condition: Yeast (0.8 - 1.0 OD_{800}) in 50 mM potassium phosphate, pH 7.5, 10 mM 2-mercaptoethanol.

Cat. No.	Product	Size
E1004	Zymolyase	1,000 U
E1005	Zymolyase	2,000 U
E1006	R-Zymolyase	1,000 U

Zymo*Taq*™ DNA Polymerase

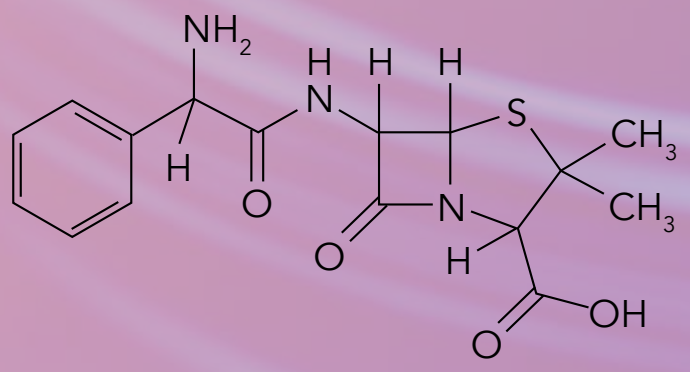
Zymo*Taq*™ DNA Polymerase contains all the reagents needed to perform "hot-start" PCR. The inclusion of a heat-activated, thermostable DNA polymerase reduces primer dimer and nonspecific product formation that can occur during PCR. This unique product is specifically designed for the amplification of bisulfite-treated DNA for methylation detection, but is applicable for conventional PCR. The product generates specific amplicons with little or no by-product formation. Simple and easy to use: Heat at 95°C for 10 minutes to initiate polymerization. Zymo*Taq*™ DNA Polymerase is a heat-activated, "hot start" polymerase that has 3′-terminal transferase activity. The addition of "A" overhangs to amplified DNA makes it ideal for use in TA-cloning. See p. 36 for details.

Specifications: Provided as a PreMix (E2003, E2004) or as a component of a set (E2001, E2002).
Source: Recombinant enzyme
Activity: 5′ - 3′ DNA polymerization
Optimum Reaction Temperature: 72°C
Unit Definition: One unit (U) is defined as the amount of enzyme required for the incorporation of 10 nM dNTPs into an acid-insoluble form in 30 minutes at 72°C.

Cat. No.	Product	Size
E2001	Zymo*Taq*™ DNA Polymerase	50 rxns.
E2002	Zymo*Taq*™ DNA Polymerase	200 rxns.
E2003	Zymo*Taq*™ PreMix	50 rxns.
E2004	Zymo*Taq*™ PreMix	200 rxns.

9 Antibiotics & Chemicals

Zymo Research offers a range of premade, ready to use high quality antibiotics and chemicals to satisfy your research needs. Our ready-to-use ampicillin (shown below), chloramphenicol, kanamycin, and tetracycline solutions are perfect for use in bacterial selection procedures.



Antibiotics

Chemicals

Antibiotic	Description	Resistance	Working Concentration (For *E. coli*)
Ampicillin (Ap)	For Gram (+) and (-) bacteria. Penicillin derivative that prevents bacterial cell wall synthesis.	Resistance to ampicillin is conferred by the *bla* gene which encodes β-lactamase that cleaves the β-lactam bond of the antibiotic.	20 - 100 µg/ml
Chloramphenicol (Cm)	For Gram (+) and (-) bacteria and some mycobacteria. Chlorampenicol inhibits bacterial protein synthesis by binding the 50S ribosomal subunit.	Resistance to chloramphenicol is conferred by the *cat* gene which encodes an acetyltransferase that acetylates and inactivates the antibiotic.	20 µg/ml
Kanamycin (Km)	For Gram (+) and (-) bacteria. Kanamycin binds to 70S ribosomes resulting in dysfunctional translation of mRNA.	Resistance to kanamycin is conferred by an aminoglycoside phosphotransferase that modifies the antibiotic, preventing its interaction with ribosomes.	30 µg/ml
Tetracycline (Tc)	For Gram (+) and (-) bacteria. Tetracycline inhibits bacterial protein synthesis by binding the 30S ribosomal subunit.	Resistance to tetracycline is conferred by the *tet* gene product that alters the bacterial cell membrane and transport of the antibiotic into the cell.	10 - 20 µg/ml

Antibiotics

Ampicillin Sodium

Description

Premade ampicillin solution. Ampicillin inhibits bacterial cell wall synthesis. Commonly used to select for ampicillin resistant plasmid bearing strains of bacteria. Effective against both Gram (-) and Gram (+) bacteria.

Purity: ≥98%
Concentration: 100 mg/ml
Storage: -20° C

Cat. No.	Size
A1001-5	5 ml
A1001-25	5 x 5 ml

Chloramphenicol

Description

Premade chloramphenicol solution. Chloramphenicol inhibits bacterial protein synthesis by binding 50S ribosomal subunit. Commonly used for the amplification of vectors in Gram (-) bacteria. Effective against both Gram (-) and Gram (+) bacteria and some mycobacteria.

Purity: ≥97%
Concentration: 10 mg/ml
Storage: -20° C

Cat. No.	Size
A1002-5	5 ml
A1002-25	5 x 5 ml

Kanamycin Sulfate

Description

Premade kanamycin solution. Kanamycin inhibits bacterial protein synthesis by binding 70S ribosomes resulting in dysfunctional translation of mRNA commonly used to select for cosmid vectors. Effective against both Gram (-) and Gram (+) bacteria.

Purity: ≥98%
Concentration: 35 mg/ml
Storage: -20° C

Cat. No.	Size
A1003-5	5 ml
A1003-25	5 x 5 ml

Tetracycline Hydrochloride - Reagent Grade

Description

Premade tetracycline solution. Tetracycline inhibits bacterial protein synthesis by binding the 30S ribosomal subunit. Effective against both Gram (-) and Gram (+) bacteria.

Purity: ≥98%
Concentration: 10 mg/ml
Storage: -20° C

Cat. No.	Size
A1004-5	5 ml
A1004-25	5 x 5 ml

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5-FOA (5-Fluoroorotic Acid)

Description

Synthetic 5-FOA monohydrate powder or 100X (100 mg/ml) solution in DMSO. See p. 162 for details.

Formula: $C_5H_3FN_2O_4 \bullet H_2O$
M. W.: 174.0 g/mol
Purity: ≥ 98%

Cat. No.	Size
F9001-1	5-FOA 1g (Powder)
F9001-5	5-FOA 5g (Powder)
F9003	100X 5-FOA 10 ml (Liquid)

Arabinose

Description

Concentrated arabinose inducer for XJ Autolysis™ strains.

Concentration: 500X; 1.5 M L-arabinose, 0.5 M MgCl2
Storage: -20° C

Cat. No.	Size
A2001-1	1 ml
A2001-10	10 x 1ml

His-Affinity Gel

Description

Nickel affinity gel used for the purification of histidine-tagged proteins. 6% beaded agarose. ≥ 15 mg/ml protein binding capacity. See His-Spin Protein Miniprep™, p. 167, for details.

Concentration: 50% suspension in 30% ethanol
Storage: 4° C

Cat. No.	Size
P2003-2	14 ml

IPTG (Isopropyl-β-D-thiogalactopyranoside)

Description

Premade IPTG in water.

Purity: 98%
Concentration: 0.5 M
Storage: -20° C

Cat. No.	Size
I1001-5	5 ml
I1001-25	5 x 5 ml

X-Gal (5-bromo-4-chloro-3-indolyl β-D-galactopyranoside)

Description

Sterile, ready to use X-Gal solution.

Concentration: 2% w/v in DMF
Storage: -20° C

Cat. No.	Size
X1001-5	5 ml
X1001-25	5 x 5 ml

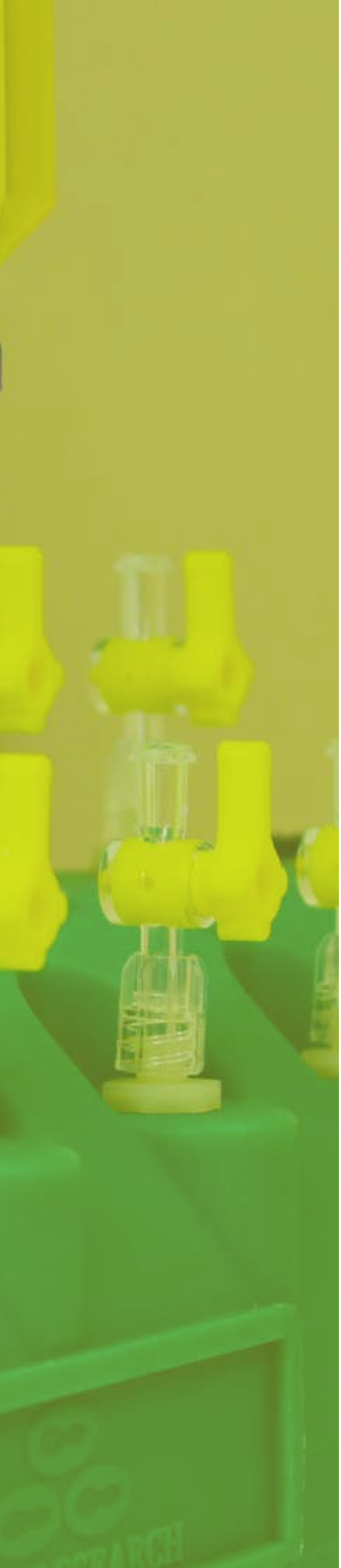
10 Columns, Plates, Instruments & Accessories

The nucleic acid binding columns are vital components of the kits presented in preceding chapters. Most of these columns, plates, filters, tubes, and other accessories can be purchased separately and are highlighted in this chapter.

Column design is crucial to the quality of eluted nucleic acid.Zymo Research's Zymo-Spin™ series of columns and plates are uniquely designed to make high yield recovery of DNA and RNA simple, fast, and reliable. The columns and plates contain silica-based matrices of exclusive chemical composition, which are optimized for maximal adsorption of DNA and/or RNA and efficiently remove contaminants during the purification process. Our Zymo-Spin™ technology ensures rapid and complete filtration of solutions through the column matrix, eliminating the likelihood of buffer carryover.

For instance, our innovative Zymo-Spin™ I column has zero retention volume and an elution volume as low as 6 µl, something no other supplier can claim. Likewise, the Zymo-Spin™ I-96 filtration plate integrates our existing Zymo-Spin™ I column technology into a durable 96-well format that can be used for simple, rapid cleaning and concentration of nucleic acids in centrifugation based protocols. Other Zymo-Spin™ columns are designed for processing larger samples and binding greater amounts of nucleic acid, but the principle is the same: high-quality, high-yield DNA or RNA.

Products featuring BashingBead™ lysis technology were spotlighted in the chapters on environmental DNA and RNA purification. ZR BashingBead™ Lysis Tubes and ZR-96 BashingBead™ Lysis Racks may be purchased separately. Additionally, we carry cell disrupters and accessories from several manufacturers. Each of these machines can be used for easy and efficient cell lysis with the ZR BashingBead™ products. For manual homogenization of tissues, Zymo Research offers Squisher™ homogenization devices in single, 8-well, and 96-well formats. These homogenizers can be cleaned and reused for the simple, efficient processing of tissue samples, such as liver, brain, mouse tail snips, *Drosophila*, other insects, etc.

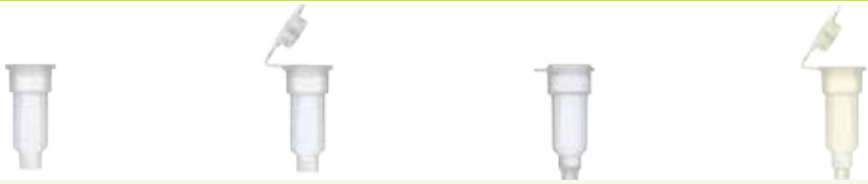


Technology Overview: Zymo-Spin™ Columns

Zymo-Spin™ I Columns

Name	Zymo-Spin™ I	Zymo-Spin™ IC	Zymo-Spin™ IC-XL	Zymo-Spin™ IC-S
Format	DNA/RNA binding	DNA/RNA binding	DNA/RNA binding	DNA binding
DNA Binding Capacity / RNA Binding Capacity	5 µg / 10 µg	5 µg / 10 µg	10 µg / 20 µg	5 µg / 10 µg
Elution	≥ 6 µl	≥ 6 µl	≥ 10 µl	≥ 10 µl
Compatibility	microcentrifuge, vacuum manifold	microcentrifuge, vacuum manifold	microcentrifuge, vacuum manifold	microcentrifuge, vacuum manifold
Matrix / Construction	silica-based / polypropylene	silica-based / polypropylene	silica-based / polypropylene	silica-based / polypropylene
Cat. No. / Size	C1003-50 – 50 pack C1003-250 – 250 pack	C1004-50 – 50 pack C1004-250 – 250 pack	C1002-25 – 25 pack C1002-100 – 100 pack	C1015-25 – 25 pack C1015-100 – 100 pack

Zymo-Spin™ II Columns



Name	Zymo-Spin™ II	Zymo-Spin™ IIC	Zymo-Spin™ IIN	Zymo-Spin™ IIC-XL
Format	DNA/RNA binding	DNA/RNA binding	DNA/RNA binding	DNA/RNA binding
DNA Binding Capacity / RNA Binding Capacity	25 µg / 50 µg	25 µg / 50 µg	25 µg / 50 µg	25 µg / 50 µg
Elution	≥ 25 µl	≥ 25 µl	≥ 25 µl	≥ 35 µl
Compatibility	microcentrifuge	microcentrifuge, vacuum manifold	microcentrifuge, vacuum manifold	microcentrifuge, vacuum manifold
Matrix / Construction	silica-based / polypropylene	silica-based / polypropylene	silica-based / polypropylene	silica-based / polypropylene
Cat. No. / Size	C1008-50 – 50 pack C1008-250 – 250 pack	C1011-50 – 50 pack C1011-250 – 250 pack	C1019-50 – 50 pack C1019-250 – 250 pack	C1102-25 – 25 pack C1102-50 – 50 pack

Zymo-Spin™ III Columns

Name	Zymo-Spin™ III	Zymo-Spin™ IIIC	Zymo-Spin™ IIICG
Format	DNA/RNA binding	DNA/RNA binding	DNA/RNA binding
DNA Binding Capacity / RNA Binding Capacity	25 µg / 100 µg	25 µg / 100 µg	25 µg / 100 µg
Elution	≥ 35 µl	≥ 35 µl	≥ 35 µl
Compatibility	microcentrifuge, vacuum manifold	microcentrifuge, vacuum manifold	microcentrifuge, vacuum manifold
Matrix / Construction	silica-based / polypropylene	silica-based / polypropylene	silica-based / polypropylene
Cat. No. / Size	C1005-50 – 50 pack C1005-250 – 250 pack	C1006-50 – 50 pack C1006-250 – 250 pack	C1006-50-G – 50 pack C1006-250-G – 250 pack

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Zymo-Spin™ IV Columns



Name	Zymo-Spin™ IV	Zymo-Spin™ IV-HRC	Zymo-Spin™ IV-µHRC
Format	filtration column	DNA/RNA inhibitor removal filtration column	DNA/RNA inhibitor removal filtration column
Volumetric Capacity	700 µl	50 - 200 µl	10 - 50 µl
Compatibility	microcentrifuge, vacuum manifold	microcentrifuge, vacuum manifold	microcentrifuge, vacuum manifold
Matrix / Construction	silica-based with 10-20 µm pore size / polypropylene, snap off base, sealable screw cap	silica-based with 10-20 µm pore size, PCR/RT inhibitor removal resin / polypropylene, snap off base, sealable screw cap	silica-based with 10-20 µm pore size, PCR/RT inhibitor removal resin / polypropylene, snap off base, sealable screw cap
Cat. No. / Size	C1007-50 – 50 pack C1007-250 – 250 pack	C1010-50 – 50 pack	C1022-50 – 50 pack

Zymo-Spin™ V Columns


Name	Zymo-Spin™ V	Zymo-Spin™ V-E
Format	DNA/RNA binding	DNA/RNA binding
DNA Binding Capacity / RNA Binding Capacity	100 µg / 200 µg	125 µg / 250 µg
Elution	≥ 100 µl	≥ 100 µl
Compatibility	microcentrifuge, centrifuge, vacuum manifold, syringe (luer-lok top)	microcentrifuge, centrifuge, vacuum manifold, syringe (luer-lok top)
Matrix / Construction	silica-based / polypropylene	silica-based / polypropylene
Cat. No. / Size	C1012-25 – 25 pack C1012-50 – 50 pack	C1024-25 – 25 pack C1024-50 – 50 pack

Zymo-Spin™ VI Columns


Name	Zymo-Spin™ VI	Zymo-Spin™ VI-P
Format	DNA/RNA binding	Plasmid DNA binding
Binding Capacity / Elution	500 µg / ≥ 1 ml	10 mg / ≥ 2 ml
Compatibility	centrifuge, vacuum manifold, luer-lok bottom assembly	centrifuge, vacuum manifold, luer-lok bottom assembly
Matrix / Construction	silica-based / polypropylene	silica-based / polypropylene
Cat. No. / Size	C1013-10 – 10 pack C1013-20 – 20 pack	C1044-5 – 5 pack

Zymo-Spin™ I

The Zymo-Spin™ I column can be used either in microcentrifuges or on vacuum manifolds for the purification of DNA and/or RNA. The Zymo-Spin™ I features durable polypropylene construction and contains a unique silica-based matrix that allows purification of up to 5 µg of DNA, and 10 µg of RNA, in ≥ 6 µl eluate. Capacity is 800 µl.

Cat. No.	Size
C1003-50	50 pack
C1003-250	250 pack

Zymo-Spin™ IC

Capped version of the Zymo-Spin™ I column. The Zymo-Spin™ IC column can be used either in microcentrifuges or on vacuum manifolds for the purification of DNA and/or RNA. The Zymo-Spin™ IC features durable polypropylene construction and contains a unique silica-based matrix that allows purification of up to 5 µg of DNA, and 10 µg of RNA, in ≥ 6 µl eluate. Capacity is 800 µl.

Cat. No.	Size
C1004-50	50 pack
C1004-250	250 pack

Zymo-Spin™ IC-XL

The Zymo-Spin™ IC-XL column can be used either in microcentrifuges or on vacuum manifolds for the purification of DNA and/or RNA. The Zymo-Spin™ IC-XL features durable polypropylene construction and contains a unique silica-based matrix that allows purification of up to 10 µg of DNA, and 20 µg of RNA, in ≥ 10 µl eluate. Capacity is 1 ml.

Cat. No.	Size
C1002-25	25 pack
C1002-50	50 pack

Zymo-Spin™ IC-S

The Zymo-Spin™ IC-S column can be used either in microcentrifuges or on vacuum manifolds for the purification of DNA and/or RNA and fluorescent dye removal. The Zymo-Spin™ IC-S features durable polypropylene construction and contains a unique silica-based matrix that allows purification of up to 5 µg of DNA, and 10 µg of RNA, in ≥ 10 µl eluate. Capacity is 900 µl.

Cat. No.	Size
C1015-25	25 pack
C1015-100	100 pack

Zymo-Spin™ IB

The black, opaque Zymo-Spin™ IB column can be used either in microcentrifuges or on vacuum manifolds for the purification of DNA and/or RNA and fluorescent dye removal. The Zymo-Spin™ IB features durable polypropylene construction and contains a unique silica-based matrix that allows purification of up to 5 µg of DNA, and 10 µg of RNA, in ≥ 6 µl eluate. Capacity is 800 µl.

Cat. No.	Size
C1014-50	50 pack
C1014-250	250 pack

Zymo-Spin™ PI

The Zymo-Spin™ PI column features durable polypropylene construction and is the same column featured in the His-Spin Protein Miniprep™ (p. 167). Capacity is 800 µl. Note: Column only, does not contain His-Affinity Gel.

Cat. No.	Size
P2003-1	50 pack

Zymo-Spin™ II

The Zymo-Spin™ II column features durable polypropylene construction and contains a unique silica-based matrix that allows purification of up to 25 µg of DNA, and 50 µg of RNA, in ≥ 25 µl eluate. Capacity is 800 µl.

Cat. No.	Size
C1008-50	50 pack
C1008-250	250 pack

Zymo-Spin™ IIC

The Zymo-Spin™ IIC column can be used either in microcentrifuges or on vacuum manifolds for the purification of DNA and/or RNA. The Zymo-Spin™ IIC features durable polypropylene construction and contains a unique silica-based matrix that allows purification of up to 25 µg of DNA, and 50 µg of RNA, in ≥ 25 µl eluate. Capacity is 900 µl.

Cat. No.	Size
C1011-50	50 pack
C1011-250	250 pack

Zymo-Spin™ IIC-XL

The Zymo-Spin™ IIC-XL column can be used either in microcentrifuges or on vacuum manifolds for the purification of high molecular weight DNA and/or RNA. The Zymo-Spin™ IIC-XL features durable polypropylene construction and contains a unique silica-based matrix that allows purification of up to 25 µg of DNA, and 50 µg of RNA, in ≥ 35 µl eluate. Capacity is 900 µl.

Cat. No.	Size
C1102-25	25 pack
C1102-50	50 pack

Zymo-Spin™ IIN

The Zymo-Spin™ IIN column can be used either in microcentrifuges or on vacuum manifolds for the purification of DNA and/or RNA. The Zymo-Spin™ IIN features durable polypropylene construction and contains a unique silica-based matrix that allows purification of up to 25 µg of DNA, and 50 µg of RNA, in ≥ 25 µl eluate. Capacity is 900 µl.

Cat. No.	Size
C1019-50	50 pack
C1019-250	250 pack

Zymo-Spin™ III

The Zymo-Spin™ III column can be used either in microcentrifuges or on vacuum manifolds for the purification of DNA and/or RNA. The Zymo-Spin™ III features durable polypropylene construction and contains a unique silica-based matrix that allows purification of up to 25 µg of DNA, and 100 µg of RNA, in ≥ 35 µl eluate. Capacity is 800 µl.

Cat. No.	Size
C1005-50	50 pack
C1005-250	250 pack

Zymo-Spin™ IIIC

Capped version of the Zymo-Spin™ III column. The Zymo-Spin™ IIIC column can be used either in microcentrifuges or on vacuum manifolds for the purification of DNA and/or RNA. The Zymo-Spin™ IIIC features durable polypropylene construction and contains a unique silica-based matrix that allows purification of up to 25 µg of DNA, and 100 µg of RNA, in ≥ 35 µl eluate. Capacity is 800 µl.

Cat. No.	Size
C1006-50	50 pack
C1006-250	250 pack

Zymo-Spin™ IIICG

Capped version of the Zymo-Spin™ III column with a green retention ring. The Zymo-Spin™ IIICG column can be used either in microcentrifuges or on vacuum manifolds for the purification of DNA and/or RNA. The Zymo-Spin™ IIICG features durable polypropylene construction and contains a unique silica-based matrix that allows purification of up to 25 µg of DNA, and 100 µg of RNA, in ≥ 35 µl eluate. Capacity is 800 µl.

Cat. No.	Size
C1006-50-G	50 pack
C1006-250-G	250 pack

Zymo-Spin™ IV

The Zymo-Spin IV™ is a durable polypropylene filtration column that features a unique snap-off base and sealable orange screw cap. It is ideal for clarifying solutions, including crude cell lysates and homogenates. The silica filtration membrane has an approximate 10 - 20 µm pore size. Capacity is 700 µl.

Cat. No.	Size
C1007-50	50 pack
C1007-250	250 pack

Zymo-Spin™ IV-HRC

The Zymo-Spin™ IV-HRC is a durable polypropylene filtration column filled with a unique matrix that features a unique snap off base and sealable green screw cap. It is ideal for removing PCR/RT inhibitors including polyphenols, humic acids and fulvic acids from DNA/RNA preparations derived from water or soil microbes. The column filtration membrane has an approximate 10 - 20 µm pore size. Capacity is 50 - 200 µl.

Cat. No.	Size
C1010-50	50 pack

Zymo-Spin™ IV-µHRC

The Zymo-Spin™ IV-µHRC is a durable polypropylene filtration column filled with a unique matrix that features a unique snap-off base and sealable yellow screw cap. It is ideal for removing PCR/RT inhibitors including polyphenols, humic acids, and fulvic acids from DNA/RNA preparations derived from water or soil microbes. The column filtration membrane has an approximate 10 - 20 µm pore size. Capacity is 10 - 50 µl.

Cat. No.	Size
C1022-50	50 pack

Zymo-Spin™ V

The versatile Zymo-Spin™ V column can be used either in microcentrifuges, centrifuges, or on-vacuum manifolds for the purification of DNA and/or RNA. This column features a luer-lok top allowing it to be easily attached to a syringe. The Zymo-Spin™ V features durable polypropylene construction and contains a unique silica-based matrix that allows purification of up to 100 µg DNA or RNA in ≥ 100 µl eluate. Capacity is 800 µl.

Cat. No.	Size
C1012-25	25 pack
C1012-50	50 pack

Zymo-Spin™ V-E

The versatile Zymo-Spin™ V-E column can be used either in microcentrifuges, centrifuges, or on-vacuum manifolds for the purification of DNA and/or RNA. This column features a luer-lok top allowing it to be easily attached to a syringe, reservoir, or prefilter. The Zymo-Spin™ V-E features durable polypropylene construction and contains a unique silica-based matrix for the purification of up to 125 µg DNA or RNA in ≥ 100 µl elution buffer or water. The capacity of the spin column is 400 µl.

Cat. No.	Size
C1024-25	25 pack
C1024-50	50 pack

Zymo-Spin™ VI

The versatile Zymo-Spin™ VI column can be used either in centrifuges or on-vacuum manifolds for the purification of DNA and/or RNA. Exclusive to this column is a luer-lok bottom assembly. The Zymo-Spin™ VI features durable polypropylene construction and contains a unique silica-based matrix that allows purification of up to 500 µg DNA or RNA in ≥ 1 ml eluate. Capacity is 15 ml.

Cat. No.	Size
C1013-10	10 pack
C1013-20	20 pack

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Zymo-Spin™ VI-P

Available as a refill for the ZymoPURE™ Plasmid Gigaprep Kit. The Zymo-Spin™ VI-P can be used in centrifuges or on vacuum manifolds for the purification of plasmid DNA. Exclusive to this column is a Luer-Lock bottom assembly and conical tip. The Zymo-Spin™ VI-P features durable polypropylene construction and a unique silica-based matrix that allows for purification of up to 10 mg of plasmid DNA in ≥ 2 ml eluate when used in combination with ZymoPURE™ Plasmid Prep buffers. Capacity is 15 ml and can be increased to 615 ml when used in conjunction with the 600 ml reservoir (Cat No. C1033-5).

Cat. No.	Size
C1044-5	5 pack

Collection/Filter Assemblies

Zymo-Spin™ III-P with 15 ml and 50 ml Reservoir

Available as a refill for the ZymoPURE™ Plasmid Midiprep Kit. The versatile Zymo-Spin™ III-P with 15 ml conical and 50 ml reservoirs can be used in centrifuges or on vacuum manifolds for the purification of plasmid DNA. The Zymo-Spin™ III-P features durable polypropylene construction and a unique silica-based matrix that allows for purification of up to 300 µg of plasmid DNA in ≥ 100 µl eluate when used in combination with ZymoPURE™ Plasmid Prep buffers. Capacity with reservoir assembly is 65 ml.

Cat. No.	Size
C1040-5	5 pack

Zymo-Spin™ V with Reservoir

The Zymo-Spin™ V with Reservoir assembly can be used in conjunction with centrifuges and on vacuum manifolds for the purification of DNA and/or RNA. The spin-column and reservoir feature durable polypropylene construction, and features a unique silica-based matrix for the purification of up to 100 µg DNA or RNA in ≥ 100 µl elution buffer or water. Capacity of the spin column with reservoir is 15 ml.

Cat. No.	Size
C1016-25	25 pack
C1016-50	50 pack

Zymo-Spin™ V-P with 15 ml and 50 ml Reservoir

Available as a refill for the ZymoPURE™ Plasmid Maxiprep Kit. The versatile Zymo-Spin™ V-P with 15 ml conical and 50 ml reservoirs can be used in centrifuges or on-vacuum manifolds for the purification of plasmid DNA. The Zymo-Spin™ V-P features durable polypropylene construction and a unique silica-based matrix that allows for purification of up to 1.2 mg of plasmid DNA in ≥ 200 µl eluate when used in combination with ZymoPURE™ Plasmid Prep buffers. Capacity with reservoir assembly is 65 ml.

Cat. No.	Size
C1042-5	5 pack

Zymo-Spin™ V-E with Zymo Midi Filter™

The Zymo-Spin™ V-E with Zymo Midi Filter™ assembly can be used in conjunction with centrifuges and on-vacuum manifolds for the purification of DNA and/or RNA. The spin-column and filter feature durable polypropylene construction. The spin-column features a unique silica-based matrix for the purification of up to 125 µg DNA or RNA in ≥ 100 µl elution buffer or water. The capacity of the spin-column with filter is 15 ml.

Cat. No.	Size
C1021-25	25 pack

Zymo-Spin™ VI with Reservoir

The Zymo-Spin™ VI with Reservoir assembly can be used with vacuum manifolds for the purification of DNA and/or RNA. The spin-column and reservoir feature durable polypropylene construction. The spin-column features a unique silica-based matrix for the purification of up to 500 µg DNA or RNA in ≥ 1 ml elution buffer or water. The capacity of the spin-column with filter is 75 ml.

Cat. No.	Size
C1018-10	10 pack
C1018-20	20 pack

Zymo-Spin™ VI with Zymo Maxi Filter™

The Zymo-Spin™ VI with Zymo Maxi Filter™ assembly can be used with vacuum manifolds for the purification of DNA and/or RNA. The spin-column and filter feature durable polypropylene construction. The spin-column features a unique silica-based matrix for the purification of up to 500 µg DNA or RNA in ≥ 1 ml elution buffer or water. The capacity of the spin-column with filter is 75 ml.

Cat. No.	Size
C1017-10	10 pack
C1017-20	20 pack

ZymoPURE™ Syringe Filter and Plunger Set

The ZymoPURE™ Syringe Filter features durable polypropylene construction and novel filtration media that allows for rapid clarification of up to 60 ml of neutralized bacterial lysate using the supplied polypropylene plunger. Each ZymoPURE™ Syringe Filter also includes a pre-attached ABS Luer-Lock plug in order to keep the tip clean and free from leaking during processing. Syringe filters and plungers are non-sterile and coated with silicone lubricant for easier handling.

Cat. No.	Size
C1036-5	5 pack

ZymoPURE™ Giga Filter

The ZymoPURE™ Giga Filter features durable polypropylene construction and novel filtration media that allows for rapid clarification of up to 500 ml of neutralized bacterial lysate using a vacuum source. The ZymoPURE™ Giga Filter also has a uniquely designed fitting that permits use with either 33 mm or 45 mm-neck glass bottles. Filter units are non-sterile and include a polypropylene cap for the reservoir.

Cat. No.	Size
C1038-1	1 pack

ZRC-GF Filter™

The ZRC-GF Filter™ syringe filter features durable polypropylene construction and contains a 1.6 µm pore size glass fiber filtration membrane. The filter is ideal for separating the cellular component from biological liquids (e.g., urine) and is the same filter featured in the ZR Urine DNA and RNA Isolation kits.

Cat. No.	Size
C1009-20	20 pack
C1009-50	50 pack

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Reservoirs

50 ml Reservoir

The 50 ml Reservoir, used in conjunction with a luer-lock column, can be used with vacuum manifolds for the purification of DNA and/or RNA. The reservoir is designed to ensure no liquid is left behind during processing. The reservoir features durable polypropylene construction. The volume capacity of the reservoir is 50 ml.

Cat. No.	Size
C1032-25	25 pack

600 ml Reservoir

The 600 ml Reservoir, used in conjunction with a luer-lock column, can be used with vacuum manifolds for the purification of DNA and/or RNA. The large volume capacity is perfect for large-scale purification such as plasmid Gigapreps (e.g. ZymoPURE™ Gigaprep). The reservoir is designed to ensure no liquid is left behind during processing. The reservoir features durable polypropylene construction. The volume capacity of the reservoir is 600 ml.

Cat. No.	Size
C1033-5	5 pack

Tubes

Collection Tube (2.0 ml)

Durable polypropylene collection tube that is used in conjunction with the Zymo-Spin™ line of spin-columns (i.e., Zymo-Spin™ I through Zymo-Spin™ V). Capacity is 2 ml.

Cat. No.	Size
C1001-50	50 tubes
C1001-500	500 tubes
C1001-1000	1000 tubes

DNase/RNase-free Tube (1.5 ml)

DNase/RNase-free 1.5 ml microcentrifuge tubes made of durable polypropylene construction.

Cat. No.	Size
C2001-50	50 tubes
C2001-100	100 tubes

Clear Tubes (2.0 ml)

Clear 2.0 ml skirted tubes made of durable polypropylene construction. Available as V-bottom or U-bottom tubes provided with caps.

	Cat. No.	Size
V-bottom	C1025-50	50 tubes
	C1025-500	500 tubes
U-bottom	C1027-50	50 tubes
	C1027-500	500 tubes

Amber Tubes (2.0 ml)

Amber 2.0 ml skirted tubes made of durable polypropylene construction. Available as V-bottom or U-bottom tubes provided with caps.

	Cat. No.	Size
V-bottom	C1026-50	50 tubes
	C1026-500	500 tubes
U-bottom	C1028-50	50 tubes
	C1028-500	500 tubes

ZR BashingBead™ Lysis Tubes (2.0 mm)

Each impact resistant 2 ml tube contains 0.7 ml dry volume 2.0 mm ZR BashingBead™ lysis matrix. The state of the art, ultra-high density beads are fracture resistant, chemically inert, and ideal for disrupting tough-to-lyse biological samples. These beads are ideal for tissues, insects, plant material, etc.

Cat. No.	Size
S6003-50	50 pack

ZR BashingBead™ Lysis Tubes (mixed 0.5mm & 0.1 mm)

Each impact resistant 2 ml tube contains 0.6 ml dry volume mixed 0.5 mm and 0.1mm ZR BashingBead™ lysis matrix. The state of the art, ultra-high density beads are fracture resistant, chemically inert, and ideal for disrupting tough-to-lyse biological samples. These beads are ideal for tissues, insects, plant material, etc.

Cat. No.	Size
S6012-50	50 pack

DNA Affinity Beads

MagBinding Beads

Paramagnetic DNA affinity matrix. Featured in Zyppy™ 96 Plasmid MagBead MiniPrep (p. 66) and EZ DNA Methylation™ MagPreps (p. 13-15).

Cat. No.	Size
D4100-2-6	6 ml
D4100-2-8	8 ml
D4100-2-12	12 ml
D4100-2-16	16 ml
D4100-2-24	24 ml

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Technology Overview: Zymo-Spin™ Plates

Silicon-A™ Plates

Name	Silicon-A™ Plate	Silicon-A™-HRC Plate
Format	DNA/RNA binding - up to 5 µg of DNA, and 10 µg of RNA, per well	DNA/RNA inhibitor removal, filtration plate
Capacity / Elution	600 µl per well / ≥ 30 µl	up to 100 µl/well
Dimensions (HxWxL)	19 mm x 83 mm x 125 mm	19 mm x 83 mm x 125 mm
Compatibility	centrifuge	centrifuge
Matrix / Construction	silica-based / polypropylene	silica-based, PCR/RT inhibitor removal resin / polypropylene
Cat. No. / Size	C2001 – 2 plates	C2009 – 2 plates

Zymo-Spin™ I-96 Plates

Name	Zymo-Spin™ I-96 Plate	Zymo-Spin™ I-96 Shallow Well Plate
Format	DNA/RNA binding - up to 5 µg of DNA, and 10 µg of RNA, per well	DNA/RNA binding - up to 5 µg of DNA, and 10 µg of RNA, per well
Capacity / Elution	1.1 ml per well / ≥ 10 µl	600 µl per well / ≥ 10 µl
Dimensions (HxWxL)	35 mm x 83 mm x 125 mm	19 mm x 83 mm x 125 mm
Compatibility	centrifuge	centrifuge
Matrix / Construction	silica-based / polypropylene	silica-based / polypropylene
Cat. No. / Size	C2004 – 2 plates	C2004-SW – 2 plates

Zymo-Spin™ IB-96 Plates

Zymo-Spin™ I-96-XL Plates

Name	Zymo-Spin™ IB-96 Plate	Zymo-Spin™ I-96-XL Plate
Format	DNA/RNA binding - up to 5 µg of DNA, and 10 µg of RNA, per well	DNA/RNA binding - up to 5 µg of DNA, and 10 µg of RNA, per well
Capacity / Elution	600 µl per well / ≥ 10 µl	1.1 ml per well / ≥ 50 µl
Dimensions (HxWxL)	19 mm x 83 mm x 125 mm	35 mm x 83 mm x 125 mm
Compatibility	centrifuge	centrifuge
Matrix / Construction	silica-based / polypropylene	silica-based / polypropylene
Cat. No. / Size	C2006 – 2 plates	C2010 – 2 plates

96-Well Plates, Blocks, & Racks

Silicon-A™ Plate

The Silicon-A™ Plate can be used in centrifuges for the large scale (i.e., 96-well) purification of DNA and/or RNA. Its low-profile, durable polypropylene construction and unique silica-based matrix make it perfect for purifying up to 5 µg of DNA, and 10 µg of RNA, in ≥ 30 µl eluate per well. Capacity is 600 µl per well.

Cat. No.	Size
C2001	2 plates

Silicon-A™ -HRC Plate

The Silicon-A™-HRC Plate can be used in centrifuges for large-scale (i.e., 96-well) purification of DNA and/or RNA. Its low-profile, durable polypropylene construction and unique matrix make it ideal for removing polyphenolic compounds (e.g. melanin, humic acids, tannins, etc.) that can inhibit PCR and RT in non-pure DNA and RNA preparations, respectively. Capacity is 100 µl per well.

Cat. No.	Size
C2009	2 plates

Zymo-Spin™ I-96 Plate

The Zymo-Spin I-96™ Plate can be used in centrifuges for the large-scale (i.e., 96-well) purification of DNA and/or RNA. Its durable polypropylene construction and unique silica-based matrix make it perfect for purifying up to 5 µg of DNA, and 10 µg of RNA, in ≥ 10 µl eluate per well. Capacity is 1.1 ml (C2004) or 600 µl (C2004-SW) per well.

Cat. No.	Size
C2004	2 plates
C2004-SW	2 plates

Zymo-Spin™ IB-96 Plate

The Zymo-Spin™ IB-96 Plate can be used in centrifuges for large-scale (i.e., 96-well) purification of DNA and/or RNA. Its low-profile, durable polypropylene construction and unique silica-based matrix make it perfect for purifying up to 5 µg of DNA, and 10 µg of RNA, in ≥ 15 µl/well elution buffer or water. Opaque black in color. Capacity is 600 µl per well.

Cat. No.	Size
C2006	2 plates

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Zymo-Spin™ I-96-XL Plate

The Zymo-Spin™ I-96-XL Plate can be used in centrifuges for the large-scale (i.e., 96-well) purification of high molecular weight DNA and/or RNA. Its deep-well, durable polypropylene construction and unique silica-based matrix make it perfect for purifying up to 25 µg of DNA, and 50 µg of RNA, in ≥15 µl eluate per well. Capacity is 1.1 ml per well.

Cat. No.	Size
C2010	2 plates

Collection Plate

The 96-well Collection Plates feature deep-well, durable, clear polypropylene construction. Each has a level footprint and conforms to laboratory standards. Adaptable for use with either Silicon-A™, Zymo-Spin™ I-96, Zymo-Spin™ IB-96, and Zymo-Spin™ I-96-XL plates. Capacity is 2 ml per round bottom well.

Cat. No.	Size
C2002	2 plates

Elution Plate

These clear polypropylene plates have a level footprint and conform to laboratory standards. Adaptable for use with either Silicon-A™ plates or Zymo-Spin™ I-96 filtration plates. Capacity is 350 µl per "V" bottom well.

Cat. No.	Size
C2003	2 plates

96-Well PCR/Conversion Plate

96-well, non-skirted PCR plate with easy-to-read alphanumeric labels. Rimmed wells minimize cross contamination. Provided with adhesive, pierceable foil cover. Capacity is 200 µl per well.

Cat. No.	Size
C2008	2 plates
C2005	2 plates/foils

96-Well Block

96-Well Block features durable, clear polypropylene construction. Each has a level footprint and conforms to laboratory standards. Capacity is 2 ml per round bottom well.

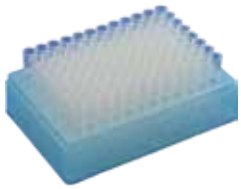
Cat. No.	Size
P1001-2	2 blocks
P1001-10	10 blocks

96-Well Block with Cover Foil

96-Well Block with Cover Foil feature durable, clear polypropylene construction. Each has a level footprint and conforms to laboratory standards. Provided with adhesive, pierceable foil cover. Capacity is 2 ml per round bottom well.

Cat. No.	Size
P1002-2	2 blocks/foils

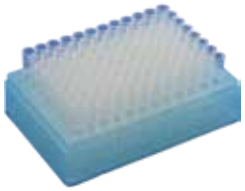
ZR-96 BashingBead™ Lysis Rack (0.5 & 0.1 mm)



Each impact resistant 1.1 ml tube contains 0.5 ml dry volume 0.5 & 0.1 mm ZR BashingBead™ lysis matrix. Tubes are in a 96-well rack with caps and a cover for high throughput processing. The state of the art, ultra-high density beads are fracture resistant, chemically inert, and ideal for disrupting tough-to-lyse biological samples. These beads are ideal for microbes and fungi in soil, feces, sludge, etc.

Cat. No.	Size
S6002-96-3	1 rack

ZR-96 BashingBead™ Lysis Rack (2.0 mm)



Each impact resistant 1.1 ml tube contains 0.5 ml dry volume 2.0 mm ZR BashingBead™ lysis matrix. Tubes are in a 96-well rack with caps and a cover for high throughput processing. The state of the art, ultra-high density beads are fracture resistant, chemically inert, and ideal for disrupting tough-to-lyse biological samples. These beads are ideal for tissues, insects, plant material, etc.

Cat. No.	Size
S6002-96-2	1 rack

96-Well Plate Cover Foil

Pierceable aluminum foil with strong adhesive strength for sealing 96-well plates and blocks. Ideal for cold storage. Dimensions are 82.6 x 132.6 mm.

Cat. No.	Size
C2007-2	2 foils
C2007-6	6 foils

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Cell Disrupters & Accessories

TerraLyzer™

The TerraLyzer™ can be used to lyse microbes in soil, sediment, sludge, and fecal samples and can effectively process tough-to-lyse fungal, algal, plant, and animal tissues. It can be used at any remote location and in most weather conditions when immediate sample collection, processing, and preservation are required by the researcher. The device is compatible with most 2.0 ml tubes containing lysis matrix, though ZR BashingBead™ Tubes should be used to obtain maximum yields of DNA/RNA/Protein from tough-to-lyse and environmental sample sources.

Description	Cat. No.	Size
TerraLyzer™	S6022	1 unit

Disruptor Genie®

The Disruptor Genie® is an automated cell disruption device that is commonly used for the disruption and lysis of yeast, bacteria, and plant and animal tissue. Provided with a head assembly to accommodate up to (twelve) 2 ml tubes. Intended for use with ZR BashingBead™ Lysis Tubes.

Description	Cat. No.	Size
120V	S6001-2-120	1 unit
230V, European Plug	S6001-2-230	1 unit

FastPrep®-24

The FastPrep®-24 Instrument is an unique, high-speed benchtop homogenizer that employs a powerful, proprietary technology for the rapid lysis of almost any sample in 40 seconds or less. The FastPrep® Instrument makes it possible to isolate DNA, RNA, and protein from sources that are virtually impossible to lyse without the use of its rapid reciprocating motion.

Cat. No.	Size
S6005	1 unit

FastPrep® Accessories

A

B

C

Description	Cat. No.	Size
A. HiPrep™ Adapter (48 x 2 ml tubes)	S6005-1	1 unit
B. CoolPrep™ Adapter (24 x 2 ml tubes)	S6005-2	1 unit
C. TeenPrep™ Adapter (12 x 15 ml tubes)	S6005-3	1 unit

Manual Homogenizers

Squisher™-Single

The Squisher™-Single features durable polypropylene construction and, although disposable, can be cleaned and reused to homogenize small samples of tissue in preparation for DNA, RNA, or protein extraction and purification. Works well with liver and brain tissue as well as mouse tail snips and small insects. Intended for use with conventional style 1.5 ml microcentrifuge tubes.

Cat. No.	Size
H1001	10 pack
H1001-50	50 pack

Squisher™-8 with 96-Well Block

The Squisher™-8 features durable polypropylene construction and although disposable, can be cleaned and reused to homogenize up to 8 small samples of tissue simultaneously in preparation for DNA, RNA, or protein extraction and purification. Works well with liver and brain tissue as well as mouse tail snips and small insects. Comes with 96-Well deep well blocks for efficient sample recovery.

Cat. No.	Size
H1002-5	5 pk/1 blocks
H1002-20	20 pk/2 blocks

Squisher™-96 with 96-Well Block

The Squisher™-96 features durable polypropylene construction and although disposable, can be cleaned and reused to homogenize up to 96 small samples of tissue simultaneously in preparation for DNA, RNA, or protein extraction and purification. Works well with liver and brain tissue as well as small insects. Comes with 96-Well deep-well blocks for efficient processing and sample recovery.

Cat. No.	Size
H1004-2	2 pk/2 blocks

Plating Beads

Rattler™ Plating Beads

Rattler™ Plating Beads saves the researcher time and effort when plating either bacterial or yeast cells. Sterile glass plating beads are convenient and easy to use. 230 g/bottle. See p. 152 for more details.

Cat. No.	Size
S1001	1 bottle
S1001-5	5 bottles
S1001-B	25kg bag (bulk)

Other Instruments & Accessories

Vortex-Genie® 2

The Vortex-Genie® 2 offers variable speed for precise mixing from gentle to vigorous, has hands-free or touch-on control, and may be used in cold rooms or incubators. A broad range of attachments are available for most tubes, plates, and other containers. See below.

Description	Cat. No.	Size
120V	S5001	1 unit
230V, European Plug	S5002	1 unit

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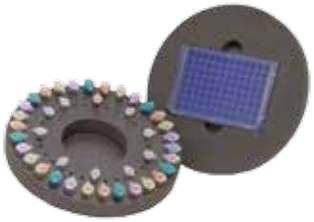
Vortex-Genie® Family Accessories



A & B

C

D

Description	Cat. No.	Size
A. Microtube Foam Inserts: Accommodates up to 60 microtubes. Fits into 6 in. platform	S5001-1	2 units
B. Microplate Foam Inserts: Accommodates one microplate. Fits into 6 in. platform	S5001-2	2 units
C. 29-37mm Tube Foam Inserts: Fits into recessed platform	S5001-3	2 units
D. Pop-off Cup: Mixing and vortexing in single tubes. Use with Vortex-Genie® 1, Disruptor Genie®, and the Vortex-Genie® 2 family	S5001-4	1 unit

E

F

G

Description	Cat. No.	Size
E. Horizontal 50 ml Tube Holder: Holds 6 tubes	S5001-5	1 unit
F. Horizontal 15 ml Tube Holder: Holds 12 tubes. Use with any Vortex-Genie® 2	S5001-6	1 unit
G. Horizontal Microtube Holder: Holds 24 microtubes. Use with any Vortex-Genie® 2	S5001-7	1 unit

MagStir Genie®

The MagStir Genie® allows programmable high/low speed stirring. High and low speed range including reverse and interval stirring for applications ranging from gentle stirring for cell culture to aggressive mixing for viscous polymers. There are three power levels for various sample viscosities. The low-profile magnetic stirrers use microprocessor control for precise and reproducible operation without heat build-up from internal friction.

Description	Cat. No.	Size
120V	S5009	1 unit

EZ-Vac™ Vacuum Manifold

The EZ-Vac™ Vacuum Manifold features durable chemical-resistant construction and is capable of processing up to 20 samples simultaneously using vacuum pressure. The vacuum manifold allows researchers to simplify their nucleic acid purification workflows further by eliminating the need for multiple centrifugation steps and disposal of flow-through from collection tubes.

Cat. No.	Size
S7000	1 unit

Product Charts

DNA Clean-up

Product Chart

	DNA Clean & Concentrator® -5	ZR-96 DNA Clean & Concentrator® -5	DNA Clean & Concentrator® -25	DNA Clean & Concentrator® -100	DNA Clean & Concentrator® -500	ZR-96 DNA Clean-up Kit™	Oligo Clean & Concentrator™	ZR-96 Oligo Clean & Concentrator™	Select-a-Size DNA Clean & Concentrator®
Specifications									
Format	Spin-Column	96-Well	Spin-Column	Spin-Column	Spin-Column	96-Well	Spin-Column	96-Well	Spin-Column
Binding Capacity	5 µg	5 µg	25 µg	100 µg	500 µg	5 µg	5 µg	5 µg	3 µg
Elution Volume	≥ 6 µl	≥ 6 µl	≥ 25 µl	≥ 150 µl	≥ 2 ml	≥ 30 µl	≥ 6 µl	≥ 10 µl	≥ 10 µl
Processing Time	2 min.	15 min.	2 min.	15 min.	25 min.	20 min.	2 min.	20 min.	7 min.
Applications									
cDNA/ssDNA Purification	•	•	•	•	•	•			
M13 Phage DNA	•	•	•	•	•	•			
PCR Clean-up	•	•	•	•	•	•			•
Enzyme Removal	•	•	•	•	•	•	•	•	
dNTP/Dye Removal	•	•	•	•	•	•	•	•	
Probe Purification	•	•	•	•	•	•	•	•	
DNA/RNA Oligo Clean-up							•	•	
High Molecular Weight DNA Clean-up									
Size Selection (eg. Library Prep, primer dimer removal)									•
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Product Chart

Specifications	Genomic DNA Clean & Concentrator®-10		Genomic DNA Clean & Concentrator®-25		ZR-96 Genomic DNA Clean & Concentrator®-5		ZR DNA Sequencing Clean-up Kit™		ZR-96 DNA Sequencing Clean-up Kit™		OneStep™ PCR Inhibitor Removal		OneStep-96™ PCR Inhibitor Removal		Zymoclean™ Gel DNA Recovery Kit		ZR-96 Zymoclean™ Gel DNA Recovery Kit		Zymoclean™ Large Fragment DNA Recovery Kit	
Format	Spin-Column	96-Well	Spin-Column	96-Well	Spin-Column	96-Well	Spin-Column	96-Well	Spin-Column	96-Well	Spin-Column	96-Well	Spin-Column	96-Well	Spin-Column	96-Well	Spin-Column	96-Well	Spin-Column	96-Well
Binding Capacity	10 µg	5 µg	25 µg	5 µg	5 µg	5 µg	No DNA/RNA Binding	No DNA/RNA Binding	50-200 µl	50-100 µl	5 min.	10 min.	2 min.	10 min.	≥ 6 µl	≥ 15 µl	15 min.	20 min.	15 min.	20 min.
Elution Volume	≥ 10 µl	≥15 µl	≥15 µl	≥15 µl	≥ 6 µl	≥ 15 µl	50-200 µl	50-100 µl	50-200 µl	50-100 µl	5 min.	10 min.	2 min.	10 min.	≥ 6 µl	≥ 15 µl	15 min.	20 min.	15 min.	20 min.
Processing Time	5 min.	20 min.	5 min.	20 min.	2 min.	10 min.	5 min.	10 min.	5 min.	10 min.	5 min.	10 min.	2 min.	10 min.	5 min.	10 min.	5 min.	10 min.	5 min.	10 min.
Applications																				
PCR Clean-up	•	•	•	•																
Enzyme Removal	•	•	•	•	•	•														
dNTP/Dye Removal	•	•	•	•	•	•														
Probe Purification					•	•														
High Molecular Weight DNA Clean-up	•	•	•	•																
Sequencing DNA Clean-up					•	•														
Dye Terminator Removal					•	•														
Removal of Polyphenolic Inhibitors											•	•								
DNA From Agarose Gel Slices															•	•				
Large DNA From Agarose Gel Slices																			•	
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Plasmid DNA Purification

Product Chart

Specifications	Zymo-PURE™ Plasmid Miniprep Kit	Zymo-PURE™ Plasmid Midiprep Kit	Zymo-PURE™ Plasmid Maxiprep Kit	Zymo-PURE™ Plasmid Gigaprep Kit	Zymo-PURE-EndoZero™ Plasmid Maxiprep Kit	Zymo-PURE-EndoZero™ Plasmid Gigaprep Kit	Zymo-PURE-Express™ Plasmid Midiprep Kit
Format	Spin-Column	Spin-Column	Spin-Column	Spin-Column	Spin-Column	Spin-Column	Spin-Column
Elution Volume	≥ 100 µl	≥ 200 µl	≥ 2 ml	≥ 200 µl	≥ 2 ml	≥ 200 µl	≥ 200 µl
Processing Time	18 min.	18 min.	50 min.	20 min.	50 min.	2.5 L	15 min.
Culture Input	50 ml	150 ml	2.5 L	150 ml	2.5 L	25 ml	25 ml
DNA Yield	up to 300 µg	up to 1.2 mg	up to 10 mg	up to 1.2 mg	up to 10 mg	up to 1.2 mg	up to 1.2 mg
Endotoxins	≤ 0.9 EU/µg	≤ 0.9 EU/µg	≤ 0.9 EU/µg	≤ 0.025 EU/µg	≤ 0.025 EU/µg	≤ 0.9 EU/µg	≤ 0.9 EU/µg
Applications							
For Use In Transfection	•	•	•	•	•	•	•
For Use in Highly Sensitive Applications				•	•		
Pellet-free (Direct From Culture)							•
Plasmid Recovery From *E. coli*	•	•	•	•	•	•	•
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Product Chart

Specifications	Zyppy® Plasmid Miniprep Kit	Zyppy® -96 Plasmid Miniprep Kit	Zyppy® -96 Plasmid MagBead Miniprep	Zyppy® Plasmid Midiprep Kit	Zyppy® Plasmid Maxiprep Kit	ZR Plasmid Miniprep™ -Classic	ZR BAC DNA Miniprep Kit	Zymoprep™ Yeast Plasmid Miniprep I	Zymoprep™ Yeast Plasmid Miniprep II
Format	Spin-Column	96-Well	Magnetic Beads	Spin-Column	Spin-Column	Spin-Column	Isopropanol Precipitation	Spin-Column	Spin-Column
Elution Volume	≥ 30 µl	≥ 30 µl	≥ 30 µl	≥ 150 µl	≥ 2 ml	≥ 30 µl	≥ 35 µl	≥ 10 µl	≥ 10 µl
Processing Time	8 min.	45 min.	1 hr.	15 min.	30 min.	15 min.	15 min.	15 min.	25 min.
Culture Input	600 µl - 3 ml	750 µl	750 µl	6 - 35 ml	up to 150 ml	up to 5 ml	0.5 - 1 ml	500 µl - 5 ml	0.1-1.5 ml
DNA Yield	up to25 µg	up to 10 µg	up to 10 µg	up to 120 µg	up to 500 µg	20 - 100 µg	0.01-0.3 ng	up to 10µg	0.01-0.3 ng
Endotoxins	< 50 EU/µg	< 50 EU/µg	< 50 EU/µg	< 50 EU/µg	< 50 EU/µg	< 50 EU/µg	-	-	-
Applications									
For Use In Transfection	•	•	•	•	•	•	•	•	•
Pellet-free (Direct From Culture)	•	•	•	•	•				
Plasmid Recovery From E. coli	•	•	•	•	•	•			
Large Plasmid Recovery From *E. coli*								•	
Plasmid Recovery From Yeast							•		•
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Product Charts

Genomic DNA Purification

Product Chart

	Quick-DNA™ Microprep Plus	Quick-DNA™ MiniPrep Plus	Quick-DNA™ MidiPrep Plus	Quick-DNA™ 96 Plus Kit	Quick-DNA™ Microprep	Quick-DNA™ Miniprep	Quick-DNA™ 96 Kit	Quick-DNA™ Urine Kit	Quick-DNA™ Serum & Plasma Kit	Quick-DNA™ FFPE Kit	Pinpoint® Slide DNA Isolation System	YeaStar™ Genomic DNA Kit	Quick-DNA™ Viral Kit	Quick-DNA™ Viral 96 Kit
Specifications														
Format	Spin-Column	Spin-Column	Spin-Column	96-Well	Spin Column	Spin-Column	96-Well	Spin-Column	Spin-Column	Spin-Column	Spin-Column	Spin-Column	Spin-Column	96-Well
Binding Capacity	5 µg	25 µg	125 µg	5 µg	5 µg	25 µg	5 µg	5 µg	≤100ng	25 µg	5 µg	25 µg	5 µg	5 µg
Elution Volume	≥ 10 µl	≥ 50 µl	≥ 150 µl	≥ 15 µl	≥ 10 µl	≥ 50 µl	≥ 30 µl	≥ 10 µl	≥ 35 µl	≥ 30 µl	≥ 10 µl	≥ 60 µl	≥ 6 µl	≥ 10 µl
Processing Time	15 min.	15 min.	30 min.	45 min.	15 min.	15 min.	30 min.	15 min.	varies	1 hr.	5 hr.	30 min.	15 min.	25 min.
Applications/Samples														
Cultured Cells	•	•	•	•	•	•	•						•	•
Buccal Cells/Swabs/Saliva	•	•	•	•	•	•	•							
Whole Blood	•	•	•	•	•	•	•						•	•
Semen	•	•	•	•	•	•	•							
Fresh/Frozen Soft Tissue	•	•	•	•	•	•	•							
Fresh/Frozen Solid Tissue	•	•	•	•						•				
Tail Snips/Ear Punches	•	•	•	•										
Hair and Feathers	•	•	•	•										
Glass Slide										•	•			
FFPE Tissue Sections										•	•			
Tissue Sections											•			
Mitochondria	•	•	•	•	•	•	•							
Viral DNA	•	•	•	•									•	•
Plasma/Serum -Cell Free DNA									•				•	•
Urine -Cell Free & Cellular DNA								•						
Urine Sediment	•	•	•	•				•						
Cerebrospinal Fluid									•					
Amniotic Fluid									•					
Microbes previously lysed with enzymes or mechanical methods	•	•	•	•	•	•	•							
Fungi Susceptible to Yeast Lytic Enzyme												•		
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Product Chart

Specifications	Quick-DNA™ Fecal/Soil Microbe Microprep Kit	Quick-DNA™ Fecal/Soil Microbe Miniprep Kit	Quick-DNA™ Fecal/Soil Microbe Midiprep Kit	Quick-DNA™ Fecal/Soil Microbe 96 Kit	Quick-DNA™ Fungal/Bacterial Microprep Kit	Quick-DNA™ Fungal/Bacterial Miniprep Kit	Quick-DNA™ Fungal/Bacterial Midiprep Kit	Quick-DNA™ Fungal/Bacterial 96 Kit
ZR BashingBead™ Lysis	•	•	•	•	•	•	•	•
Format	Spin-Column	Spin-Column	96-Well	Spin-Column	Spin-Column	Spin-Column	96-Well	
Binding Capacity	5 µg	25 µg	125 µg	5 µg	5 µg	25 µg	125 µg	5µg
Elution Volume	≥ 10 µl	≥ 25 µl	≥ 150 µl	≥ 50 µl	≥ 10 µl	≥ 25 µl	≥ 150 µl	≥ 50 µl
Removal of Humic, Fulvic, and Polyphenolic Substances	•	•	•	•				
Processing Time	15 min.	15 min.	25 min.	50 min.	10 min.	10 min.	20 min.	40 min.
Applications								
Environmental Sources								
Soil	•	•	•	•				
Sediment	•	•	•	•				
Sludge	•	•	•	•				
Feces	•	•	•	•				
Microorganisms								
Bacteria	•	•	•	•	•	•	•	•
Fungi	•	•	•	•	•	•	•	•
Algae	•	•	•	•	•	•	•	•
Protists	•	•	•	•	•	•	•	•
Tough-to-Lyse Tissues								
Soft Tissues	some	some	some	some	some	some	some	some
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Environmental DNA Purification

Product Chart

	Quick-DNA™ Plant/Seed DNA Microprep Kit	Quick-DNA™ Plant/Seed DNA Miniprep Kit	Quick-DNA™ Plant/Seed 96 Kit	Quick-DNA™ Tissue & Insect Microprep Kit	Quick-DNA™ Tissue & Insect DNA Miniprep Kit	Quick-DNA™ Tissue & Insect DNA Midiprep Kit	Quick-DNA™ Tissue & Insect 96 Kit
Specifications							
ZR BashingBead™ Lysis	•	•	•	•	•	•	•
Format	Spin-Column	Spin-Column	96-Well	Spin-Column	Spin-Column	Spin-Column	96-Well
Binding Capacity	5 µg	25 µg	5 µg	5 µg	25 µg	125 µg	5 µg
Elution Volume	≥ 10 µl	≥ 25 µl	≥ 25 µl	≥ 10 µl	≥ 25 µl	≥ 150 µl	≥ 50 µl
Removal of Humic, Fulvic, and Polyphenolic Substances	•	•	•				
Processing Time	15 min.	15 min.	50 min.	10 min.	10 min.	20 min.	40 min.
Applications							
Tough-to-Lyse Tissues							
Soft Tissues				•	•	•	•
Solid Tissues (Food)				•	•	•	•
Tough-to-Lyse Tissues				•	•	•	•
Tough-to-Lyse Organisms				•	•	•	•
Insects/Arthropods				•	•	•	•
Plant Material	•	•	•				
Seeds	•	•	•				
Fruit	•	•	•				
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DNA/RNA Co-Purification

Product Chart

Specifications	Quick-DNA/RNA™ Miniprep Kit	ssDNA/RNA Clean & Concentrator™	Quick-DNA/RNA™ Viral Kit	Quick-DNA/RNA™ Viral 96 Kit
Format	Spin-Column	Spin-Column	Spin-Column	96-Well
Binding Capacity	25 µg DNA 25 µg RNA	10 µg	25 µg	10 µg
Elution Volume	≥ 50 µl DNA ≥ 25 µl RNA	≥ 6 µl	≥ 35 µl	≥ 10 µl
Processing Time	15 min.	10 min.	5 min.	15 min.
Applications				
Parallel Purification	•			
Co-Purification		•	•	•
Fresh/Frozen Soft Tissue	•			
Fresh/Frozen Solid Tissue	limited			
Bacteria	limited			
Yeast	limited			
Buffy Coat	•			
Cultured Cells	•			
Small RNA	•	•		
Probe Purification		•		
Whole Blood (≤ 50 µl)			•	•
Plasma/Serum			•	•
Virus			•	•
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RNA Clean-up

Product Chart

Specifications	RNA Clean & Concentrator™ -5	RNA Clean & Concentrator™ -25	RNA Clean & Concentrator™ -100	ZR-96 RNA Clean & Concentrator™	Zymoclean™ Gel RNA Recovery Kit	ZR small-RNA™ PAGE Recovery Kit	OneStep™ PCR Inhibitor Removal	OneStep™ -96 PCR Inhibitor Removal
Format	Spin-Column	Spin-Column	Spin-Column	96-Well	Spin-Column	Spin-Column	Spin-Column	96-Well
Binding Capacity	10 µg	50 µg	250 µg	25 µg	5 µg	5 µg	No DNA/RNA Binding	
Elution Volume	≥ 6 µl	≥ 25 µl	≥ 100 µl	≥ 10 µl	≥ 6 µl	≥ 6 µl	50 - 200 µl	50 - 100 µl
Processing Time	5 min.	5 min.	10 min.	20 min.	30 min.	45 min.	5 min.	10 min.
Applications								
RNA Clean-up	•	•	•	•				
DNA-free RNA	•	•	•	•				
Enzyme Removal	•	•	•	•				
Nucleotide/Dye Removal	•	•	•	•				
Small-RNA/Probe Purification	•	•	•	•				
RNA From Agarose Gel Slices					•			
RNA From Polyacrylamide Gel Slices						•		
Removal of Polyphenolic RT Inhibitors							•	•
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Product Chart

Specifications	Direct-zol™ RNA Microprep Kit	Direct-zol™ RNA Miniprep Kit	Direct-zol™ RNA Miniprep Plus Kit	Direct-zol™ 96 RNA Kit	Direct-zol™ 96 MagBead RNA Kit	Quick-RNA™ Microprep Kit	Quick-RNA™ Miniprep Plus Kit	Quick-RNA™ Miniprep Kit	Quick-RNA™ Midiprep Kit	Quick-RNA™ 96 Kit
Format	Spin-Column	Spin-Column	Spin-Column	96-Well	96-Well	Spin-Column	Spin-Column	Spin-Column	Spin-Column	96-Well
Binding Capacity	10 µg	50 µg	100 µg	10 µg	100 µg	10 µg	100 µg	100 µg	250 µg	10 µg
Elution Volume	≥ 6 µl	≥ 25 µl	≥ 50 µl	≥ 10 µl	≥ 50 µl	≥ 6 µl	≥ 50 µl	≥ 50 µl	≥ 200 µl	≥ 25 µl
Processing Time	10 min.	10 min.	10 min.	30 min.	2 hr.	10 min.	10 min.	10 min.	10 min.	30 min.
Features										
Isolation from TRIzol®, TRI Reagent®, etc.	•	•	•	•	•					
Non-Organic RNA Extraction						•	•	•	•	•
Viral Inactivation	•	•	•	•	•			•		
Small RNA Purification (miRNA)	•	•	•	•	•	•	•	•	•	•
DNA/RNA Shield™ Compatible	•	•	•	•	•	•	•	•	•	•
Applications										
Fresh/Frozen Soft Tissue	•	•	•	•	•	•	•	•	•	•
Cultured Cells	•	•	•	•	•	•	•	•	•	•
Buccal Cells/Swabs	•	•	•	•	•	•	•	•	•	•
Buffy Coat	•	•	•	•	•	•	•	•	•	•
Whole Blood	•	•	•	•	•	•		•		
Plasma/Serum	•	•	•	•	•	•		•		
Virus	•	•	•	•	•	•		•		
Biological Fluids						•	•	•	•	•
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RNA Isolation

Product Chart

Specifications	Quick-RNA™ Viral Kit		Quick-RNA™ Viral 96 Kit	ZR Urine RNA Isolation Kit™	Pinpoint® Slide RNA Isolation System I Kit	Pinpoint™ Slide RNA Isolation System II Kit	YeaStar™ RNA Kit
Format	Spin-Column	96-Well	Spin-Column	Spin-Column	Spin-Column	Spin-Column	Spin-Column
Binding Capacity	10 µg	10 µg	10 µg	10 µg	10 µg	10 µg	5 µg
Elution Volume	≥ 6 µl	≥ 10 µl	≥ 10 µl	≥ 10 µl	≥ 10 µl	≥ 10 µl	≥ 60 µl
Processing Time	6 min.	15 min.	15 min.	1.5 hr.	5 hr.	30 min.	
Applications							
Frozen Tissue Sections				•			
Fixed Tissue Sections					•		
Buccal Cells/Swabs	•	•					
Plasma/Serum	•	•					
Urine			•				
Virus	•	•					
Microvesicles			•				
Exosomes			•				
Fungi Susceptible to Yeast Lytic Enzyme						•	
Page Number	112	112	114	114	114	114	163

Product Chart

Specifications	Quick-RNA™ Fecal/Soil Microbe Microprep Kit	Quick-RNA™ Fungal/Bacterial Microprep Kit	Quick-RNA™ Fungal/Bacterial Miniprep Kit	Quick-RNA™ Tissue & Insect Microprep Kit	Quick-RNA™ Plant RNA Miniprep Kit
Format	Spin-Column	Spin-Column	Spin-Column	Spin-Column	Spin-Column
Binding Capacity	10 µg	10 µg	50 µg	10 µg	50 µg
Elution Volume	≥ 6 µl	≥ 6 µl	≥ 25 µl	≥ 6 µl	≥ 25 µl
Removal of Polyphenolic RT Inhibitors	•				•
Processing Time	20 min.	15 min.	15 min.	15 min.	15 min.
Applications					
Soil	•				
Sediment	•				
Sludge	•				
Feces	•				
Bacteria	•	•	•		
Fungi	•	•	•		
Algae	•	•	•		
Protists	•	•	•		
Food		•	•	•	
Soft Tissues				•	
Tough-to-Lyse Tissues				•	
Tough-to-Lyse Organisms				•	
Insects/Arthropods				•	
Plant Material					•
Seeds					•
Fruit					•
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Product Charts

Sample Collection & Storage

Product Chart

	DNA/RNA Shield™ Blood Collection Tube	DNA/RNA Shield™ Fecal Collection Tube	DNA/RNA Shield™ -Lysis Tube (Microbe)	DNA/RNA Shield™ -Lysis Tube (Tissue)	DNA/RNA Shield™ Swab & Collection Tube	Urine Conditioning Buffer™ (UCB™)	DNA/RNA Shield™ Reagent	DNA/RNA Shield™ Reagent (2X concentrate)
Specifications								
Format	Evacuated Blood Tube	Fecal Collection Tube with Scoop	Lysis Tube	Lysis Tube	Collection Tube & Sterile Swab	Bulk Reagent	Bulk Reagent	Bulk Reagent
Bottle or Tube Size	10 ml	15 ml tube	2 ml (0.5 & 0.1 mm beads)	2 ml (2.0 & 0.1 mm beads)	12 x 80 mm screwcap tube	140 ml	50 or 250 ml	50 or 250 ml
Tube Fill	6 ml	9 ml	1 ml	1 ml	1 ml	N/A	N/A	N/A
Uses								
Blood Samples	•						•	•
Fecal Samples		•	•	•	•		•	•
Swab Samples			•	•	•		•	•
Environmental Samples			•	•	•		•	•
Pathogen Samples			•	•	•		•	•
Tissue & Insect Samples				•			•	•
Urine Samples						•		
Applications								
Microbiomic Analysis	•	•	•	•	•	•	•	•
Gene Expression Analysis	•	•	•	•	•	•	•	•
Pathogen Detection	•	•	•	•	•	•	•	•
miRNA Analysis	•	•	•	•	•	•	•	•
Page Number	126	126	127	127	125	129	128	128

Product Chart

Specifications				
Size	10 preps.	200 ng	2,000 ng	
Storage Solution	10 mM Tris-HCL and 0.1 mM EDTA, pH 8.0			
Impurity Level	< 0.01% foreign microbial DNA			
Source				
A Mixture of Ten Inactivated Microorganisms (Bacterial and Fungal)	•			
A Mixture of Genomic DNA from Ten Microbial Strains		•	•	
Applications				
Assess Bias Within Collection, Storage, and Extraction Protocol	•			
Assessing Bias Within Library Preparation and 16S Sequencing		•		
Assessing Bias Within Library Preparation and Shotgun Sequencing			•	
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ZymoBIOMICS® Microbial Community Standards

ZymoBIOMICS® Microbial Community DNA Standards

ZymoBIOMICS® Microbial Community Standards

ZymoBIOMICS® Microbial Community DNA Standards

Microbiomics

Product Chart

Specifications	ZymoBIOMICS® DNA Microprep Kit	ZymoBIOMICS® DNA Miniprep Kit	ZymoBIOMICS® 96 DNA Kit	ZymoBIOMICS® 96 MagBead DNA Kit	ZymoBIOMICS® RNA Miniprep Kit	ZymoBIOMICS® DNA/RNA Miniprep Kit
Format	Spin-Column	Spin-Column	96-Well	96-Well	Spin-Column	Spin-Column
Binding Capacity	5 µg	25 µg	5 µg	5-20 µg	100 µg	100 µg
Elution Volume	≥10 µl	≥ 100 µl	≥ 10 µl	50-200 µl	≥ 10 µl	≥ 10 µl
Processing Time	20 min.	20 min.	45 min.	90 min.	20 min.	20 min.
Features						
Mixed Beads For Accurate Lysis From Diverse Microbial Communities	•	•	•	•	•	•
Low Bioburden	•	•	•	•	•	•
PCR Inhibitor Removal Technology	•	•	•	•	•	•
Applications						
Fecal	•	•	•	•	•	•
Soil	•	•	•	•	•	•
Water	•	•	•	•	•	•
Biofilm	•	•	•	•	•	•
Swabs	•	•	•	•	•	•
Biological Fluids	•	•	•	•	•	•
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A1003-5	Kanamycin Sulfate	5 ml	174
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A1004-25	Tetracycline Hydrochloride	5 x 5 ml	174
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A3001-15	Anti-5-Methylcytosine (clone 10G4)	15 µg/15 µl	25
A3001-30	Anti-5-Methylcytosine (clone 10G4)	30 µg/30 µl	25
A3001-50	Anti-5-Methylcytosine (clone 10G4)	50 µg/50 µl	25
A3001-200	Anti-5-Methylcytosine (clone 10G4)	200 µg/200 µl	25
A4001-25	Anti-5-Hydroxymethylcytosine Polyclonal Antibody	25 µg/25 µl	31
A4001-50	Anti-5-Hydroxymethylcytosine Polyclonal Antibody	50 µg/50 µl	31
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C1001-500	Collection Tubes (2 ml)	500 pack	185
C1001-1000	Collection Tubes (2 ml)	1,000 pack	185
C1002-25	Zymo-Spin™ IC-XL	25 pack	180
C1002-50	Zymo-Spin™ IC-XL	50 pack	180
C1003-50	Zymo-Spin™ I Columns	50 pack	180
C1003-250	Zymo-Spin™ I Columns	250 pack	180
C1004-50	Zymo-Spin™ IC Columns	50 pack	180
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C1005-250	Zymo-Spin™ III Columns	250 pack	181
C1006-50	Zymo-Spin™ IIIC Columns	50 pack	181
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C1006-50-G	Zymo-Spin™ IIICG Columns	50 pack	181
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C1006-250-F	Spin-Away™ Filters	250 pack	Online
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C1007-250	Zymo-Spin™ IV Columns	250 pack	182
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C1016-25	Zymo-Spin™ V Columns with Reservoir	25 pack	183
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C1021-25	Zymo-Spin™ V-E Columns with Zymo Midi Filter™	25 pack	183
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C1026-50	2.0 mL V-bottom Amber Tube, with caps	50 pack	186
C1026-500	2.0 mL V-bottom Amber Tube, with caps	500 pack	186
C1027-50	2.0 mL U-bottom Clear Tube, with caps	50 pack	185
C1027-500	2.0 mL U-bottom Clear Tube, with caps	500 pack	185
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C1028-500	2.0 mL U-bottom Amber Tube, with caps	500 pack	186
C1036-5	ZymoPURE™ Syringe Filter and Plunger Set	5 pack	184
C1038-1	ZymoPURE™ Giga Filter	1 pack	184
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C1102-50	Zymo-Spin™ IIC-XL Columns	50 pack	181
C2001	Silicon-A™ Plate	2 plates	188
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C2002	Collection Plate	2 plates	189
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C2004-SW	Zymo-Spin™ I-96 Plate (shallow-well)	2 plates	188
C2005	96-Well PCR / Conversion Plate with Cover Foil	2 plates/foils	189
C2006	Zymo-Spin™ IB-96 Plate (shallow-Well)	2 plates	188
C2007-2	96-Well Plate Cover Foil	2 foils	190
C2007-6	96-Well Plate Cover Foil	6 foils	190
C2007-8	96-Well Plate Cover Foil	8 foils	Online
C2007-12	96-Well Plate Cover Foil	12 foils	Online
C2007-24	96-Well Plate Cover Foil	24 foils	Online
C2008	96-Well PCR / Conversion Plate	2 plates	189
C2009	Silicon-A™-HRC Plate	2 plates	188
C2010	Zymo-Spin™ I-96-XL Plate	2 plates	189
C2011-2	Air Permeable Sealing Cover	2 pack	Online
C2011-4	Air Permeable Sealing Cover	4 pack	Online
C2011-8	Air Permeable Sealing Cover	8 pack	Online
C2020	96-Well ELISA Plate (12 x 8-well strips)	1 Plate	Online
D1000	dNTP Mix [10 mM]	500 µl	40
D1000-1	dNTP Mix [10 mM]	100 µl	40
D1005	dATP [100 mM]	250 µl	40
D1010	dTTP [100 mM]	250 µl	40
D1015	dGTP [100 mM]	250 µl	40
D1020	dCTP [100 mM]	250 µl	40
D1030	5-Methylcytosine dNTP Mix [10 mM]	250 µl	40
D1035	5-Methyl dCTP [10 mM]	100 µl	40
D1040	5-Hydroxymethylcytosine dNTP Mix [10 mM]	250 µl	40
D1045	5-Hydroxymethyl dCTP [100 mM]	100 µl	40
D2001	Zymoprep™ Yeast Plasmid Miniprep I	100 preps.	157
D2001-1-15	Solution 1, Digestion Buffer	15 ml	Online
D2001-2-15	Solution 2, Lysis Buffer	15 ml	Online
D2001-3-15	Solution 3, Neutralizing Buffer	15 ml	Online
D2002	YeaStar™ Genomic DNA Kit	40 preps.	158
D2002-1	YD Digestion Buffer	4.8 ml	Online
D2002-2	YD Lysis Buffer	4.8 ml	Online
D2004	Zymoprep™ Yeast Plasmid Miniprep II	50 preps.	157

Cat. No.	Description	Size	Page
D2004-1-10	Solution 1, Digestion Buffer	10 ml	Online
D2004-2-10	Solution 2, Lysis Buffer	10 ml	Online
D2004-3-20	Solution 3, Neutralizing Buffer	20 ml	Online
D3001	Pinpoint® Slide DNA Isolation System	50 preps.	73
D3001-1	Pinpoint® Solution	1 ml	Online
D3001-2-20	Proteinase K with Storage Buffer	20 mg	170
D3001-3	Pinpoint® Extraction Buffer	2.5 ml	Online
D3001-4	Pinpoint® Binding Buffer	6 ml	Online
D3001-5	Pinpoint® Wash Buffer	2.4 ml	Online
D3004-1-100	Genomic Lysis Buffer	100 ml	Online
D3004-1-150	Genomic Lysis Buffer	150 ml	Online
D3004-1-200	Genomic Lysis Buffer	2 x 100 ml	Online
D3004-1-250	Genomic Lysis Buffer	250 ml	Online
D3004-1-1000	Genomic Lysis Buffer	1000 ml	Online
D3004-2-50	g-DNA Wash Buffer	50 ml	Online
D3004-2-100	g-DNA Wash Buffer	100 ml	Online
D3004-2-200	g-DNA Wash Buffer	200 ml	Online
D3004-2-250	g-DNA Wash Buffer	250 ml	Online
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D3004-4-1	DNA Elution Buffer	1 ml	Online
D3004-4-4	DNA Elution Buffer	4 ml	Online
D3004-4-10	DNA Elution Buffer	10 ml	Online
D3004-4-16	DNA Elution Buffer	16 ml	Online
D3004-4-50	DNA Elution Buffer	50 ml	Online
D3004-5-15	DNA Pre-wash Buffer	15 ml	Online
D3004-5-30	DNA Pre-wash Buffer	30 ml	Online
D3004-5-50	DNA Pre-wash Buffer	50 ml	Online
D3004-5-250	DNA Pre-wash Buffer	250 ml	Online
D3010	*Quick*-DNA™ 96 Kit	2 x 96 preps.	71
D3011	*Quick*-DNA™ 96 Kit	4 x 96 preps.	71
D3012	*Quick*-DNA™ 96 Kit	10 x 96 preps.	71
D3015	*Quick*-DNA™ Viral Kit	50 preps.	76
D3015-1-50	Viral DNA Buffer	50 ml	Online
D3016	*Quick*-DNA™ Viral Kit	200 preps.	76
D3016-1-100	Viral DNA Buffer	100 ml	Online
D3017	*Quick*-DNA™ Viral 96 Kit	2 x 96 preps.	76
D3018	*Quick*-DNA™ Viral 96 Kit	4 x 96 preps.	76
D3020	*Quick*-DNA™ Microprep Kit	50 preps.	71
D3021	*Quick*-DNA™ Microprep Kit	200 preps.	71

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D3024	*Quick*-DNA™ Miniprep Kit (capped)	50 preps.	71
D3025	*Quick*-DNA™ Miniprep Kit (capped)	200 preps.	71
D3061	*Quick*-DNA™ Urine Kit	50 preps.	74
D3067	*Quick*-DNA™ FFPE Kit	50 preps.	72
D4001	Zymoclean™ Gel DNA Recovery Kit (uncapped columns)	50 preps.	92
D4001-1-50	ADB (Agarose Dissolving Buffer)	50 ml	Online
D4001-1-100	ADB (Agarose Dissolving Buffer)	100 ml	Online
D4002	Zymoclean™ Gel DNA Recovery Kit (uncapped columns)	200 preps.	92
D4003	DNA Clean & Concentrator®-5 (uncapped columns)	50 preps.	84
D4003-1-L	DNA Binding Buffer	50 ml	Online
D4003-1-25	DNA Binding Buffer	25 ml	Online
D4003-2-6	DNA Wash Buffer	6 ml	Online
D4003-2-24	DNA Wash Buffer	24 ml	Online
D4003-2-48	DNA Wash Buffer	48 ml	Online
D4004	DNA Clean & Concentrator®-5 (uncapped columns)	200 preps.	84
D4004-1-L	DNA Binding Buffer	100 ml	Online
D4005	DNA Clean & Concentrator®-25 (uncapped columns)	50 preps.	84
D4006	DNA Clean & Concentrator®-25 (uncapped columns)	200 preps.	84
D4007	Zymoclean™ Gel DNA Recovery Kit (capped)	50 preps.	92
D4008	Zymoclean™ Gel DNA Recovery Kit (capped columns)	200 preps.	92
D4010	Genomic DNA Clean & Concentrator®-10	25 preps.	88
D4011	Genomic DNA Clean & Concentrator®-10	100 preps.	88
D4013	DNA Clean & Concentrator®-5 (capped columns)	50 preps.	84
D4014	DNA Clean & Concentrator®-5 (capped columns)	200 preps.	84
D4015	ZR Plasmid Miniprep™-*Classic*	100 preps.	67
D4016	ZR Plasmid Miniprep™-*Classic*	400 preps.	67
D4017	ZR-96 DNA Clean-up Kit™	2 x 96 preps.	85
D4018	ZR-96 DNA Clean-up Kit™	4 x 96 preps.	85
D4019	Zyppy® Plasmid Miniprep Kit	100 preps.	66
D4020	Zyppy® Plasmid Miniprep Kit	400 preps.	66
D4021	ZR-96 Zymoclean™ Gel DNA Recovery Kit	2 x 96 preps.	92
D4022	ZR-96 Zymoclean™ Gel DNA Recovery Kit	4 x 96 preps.	92
D4023	ZR-96 DNA Clean & Concentrator®-5	2 x 96 preps.	84
D4024	ZR-96 DNA Clean & Concentrator®-5	4 x 96 preps.	84
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D4027-1-80	Buffer P1	80 ml	Online
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D4027-4-12	Plasmid Wash Buffer (concentrate)	12 ml	Online
D4027-4-24	Plasmid Wash Buffer (concentrate)	24 ml	Online
D4027-4-48	Plasmid Wash Buffer (concentrate)	48 ml	Online
D4029	DNA Clean & Concentrator®-100	25 preps.	85
D4030	DNA Clean & Concentrator®-100	50 preps.	85
D4031	DNA Clean & Concentrator®-500	10 preps.	85
D4032	DNA Clean & Concentrator®-500	20 preps.	85
D4033	DNA Clean & Concentrator®-25 (capped columns)	50 preps.	84
D4034	DNA Clean & Concentrator®-25 (capped columns)	200 preps.	84
D4036	Zyppy® Plasmid Miniprep Kit	50 preps.	66
D4036-1-6	7X Lysis Buffer	6 ml	Online
D4036-1-12	7X Lysis Buffer	12 ml	Online
D4036-1-30	7X Lysis Buffer	30 ml	Online
D4036-1-48	7X Lysis Buffer	48 ml	Online
D4036-1-60	7X Lysis Buffer	60 ml	Online
D4036-2-20	Neutralization Buffer	20 ml	Online
D4036-2-40	Neutralization Buffer	40 ml	Online
D4036-2-160	Neutralization Buffer	160 ml	Online
D4036-2-200	Neutralization Buffer	200 ml	Online
D4036-3-6	Endo-Wash Buffer	6 ml	Online
D4036-3-15	Endo-Wash Buffer	15 ml	Online
D4036-3-30	Endo-Wash Buffer	30 ml	Online
D4036-3-60	Endo-Wash Buffer	60 ml	Online
D4036-3-120	Endo-Wash Buffer	120 ml	Online

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D4036-4-24	Zyppy® Wash Buffer	24 ml	Online
D4036-4-48	Zyppy® Wash Buffer	48 ml	Online
D4036-5-5	Zyppy® Elution Buffer	5 ml	Online
D4036-5-10	Zyppy® Elution Buffer	10 ml	Online
D4036-5-20	Zyppy® Elution Buffer	20 ml	Online
D4036-5-30	Zyppy® Elution Buffer	30 ml	Online
D4036-5-60	Zyppy® Elution Buffer	60 ml	Online
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D4037	Zyppy® Plasmid Miniprep Kit	800 preps.	66
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D4041-1-48	Deep Blue Lysis Buffer	48 ml	Online
D4041-4-100	Neutralization/Clearing Buffer	100 ml	Online
D4041-4-200	Neutralization/Clearing Buffer	200 ml	Online
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D4043	Zyppy® 96 Plasmid Miniprep Kit	8 x 96 preps.	66
D4045	Zymoclean™ Large Fragment DNA Recovery Kit	25 preps.	93
D4046	Zymoclean™ Large Fragment DNA Recovery Kit	100 preps.	93
D4048	ZR BAC DNA Miniprep Kit	25 preps.	67
D4049	ZR BAC DNA Miniprep Kit	100 preps.	67
D4050	ZR DNA Sequencing Clean-up Kit™	50 preps.	90
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D4050-1-55	Sequencing Binding Buffer	55 ml	Online
D4050-1-500	Sequencing Binding Buffer	500 ml	Online
D4050-2-20	Sequencing Wash Buffer	20 ml	Online
D4050-2-70	Sequencing Wash Buffer	70 ml	Online
D4050-2-500	Sequencing Wash Buffer	500 ml	Online
D4051	ZR DNA Sequencing Clean-up Kit™	200 preps.	90
D4052	ZR-96 DNA Sequencing Clean-up Kit™	2 x 96 preps.	90
D4053	ZR-96 DNA Sequencing Clean-up Kit™	4 x 96 preps.	90
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D4060-1-40	Oligo Binding Buffer	40 ml	Online
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D4065	Genomic DNA Clean & Concentrator®-25	100 preps.	88
D4066	ZR-96 Genomic DNA Clean & Concentrator®-5	2 x 96 preps.	89
D4067	ZR-96 Genomic DNA Clean & Concentrator®-5	4 x 96 preps.	89
D4068	*Quick*-DNA™ Miniprep Plus Kit	50 preps.	70
D4069	*Quick*-DNA™ Miniprep Plus Kit	200 preps.	70
D4070	*Quick*-DNA™ 96 Plus Kit	2 x 96 preps.	70
D4071	*Quick*-DNA™ 96 Plus Kit	4 x 96 preps.	70
D4074	*Quick*-DNA™ Microprep Plus Kit	50 preps.	70
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D4100	Zyppy®96 Plasmid MagBead Miniprep Kit	2 x 96 preps.	66
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D4100-1-20	MagClearing Beads	20 ml	Online
D4100-1-40	MagClearing Beads	40 ml	Online
D4100-2-6	MagBinding Beads	6 ml	186
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D4100-2-16	MagBinding Beads	16 ml	186
D4100-2-24	MagBinding Beads	24 ml	186
D4101	Zyppy® 96 Plasmid MagBead Miniprep Kit	4 x 96 preps.	66
D4102	Zyppy® 96 Plasmid MagBead Miniprep Kit	8 x 96 preps.	66
D4200	ZymoPURE™ Plasmid Midiprep Kit	25 preps.	61
D4201	ZymoPURE™ Plasmid Midiprep Kit	50 preps.	61
D4202	ZymoPURE™ Plasmid Maxiprep Kit	10 preps.	61
D4203	ZymoPURE™ Plasmid Maxiprep Kit	20 preps.	61
D4204	ZymoPURE™ Plasmid Gigaprep Kit	5 preps.	61
D4205	ZymoPURE-EndoZero™ Plasmid Maxiprep Kit	10 preps.	62
D4207	ZymoPURE-EndoZero™ Plasmid Gigaprep Kit	5 preps.	62
D4208T	ZymoPURE™ Plasmid Miniprep Kit	10 preps.	61
D4209	ZymoPURE™ Plasmid Miniprep Kit	50 preps.	61
D4210	ZymoPURE™ Plasmid Miniprep Kit	100 preps.	61
D4211	ZymoPURE™ Plasmid Miniprep Kit	400 preps.	61
D4212	ZymoPURE™ Plasmid Miniprep Kit	800 preps.	61
D4213	ZymoPURE-Express™ Plasmid Midiprep Kit	25 preps.	63
D4300	ZymoBIOMICS® DNA Miniprep Kit	50 preps.	138

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D4301	ZymoBIOMICS® DNA Microprep Kit	50 preps.	138
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D4304	ZymoBIOMICS® DNA Miniprep Kit	50 preps.	138
D4305	ZymoBIOMICS® DNA Microprep Kit	50 preps.	138
D4306	ZymoBIOMICS® 96 MagBead DNA Kit	2 x 96 preps.	141
D4307	ZymoBIOMICS® 96 DNA Kit	2 x 96 preps.	138
D4308	ZymoBIOMICS® 96 MagBead DNA Kit	2 x 96 preps.	141
D4309	ZymoBIOMICS® 96 DNA Kit	2 x 96 preps.	138
D5001	EZ DNA Methylation™ Kit	50 rxns.	15
D5001-1	CT Conversion Reagent (10 conversions)	1 tube	Online
D5001-1-50	CT Conversion Reagent (5 x 10 conversions)	5 tubes	Online
D5001-2	M-Dilution Buffer	1.3 ml	Online
D5001-3	M-Binding Buffer	20 ml	Online
D5001-4	M-Wash Buffer	6 ml	Online
D5001-5	M-Desulphonation Buffer	10 ml	Online
D5001-6	M-Elution Buffer	1 ml	Online
D5002	EZ DNA Methylation™ Kit	200 rxns.	15
D5002-2	M-Dilution Buffer	5.2 ml	Online
D5002-3	M-Binding Buffer	80 ml	Online
D5002-4	M-Wash Buffer	24 ml	Online
D5002-5	M-Desulphonation Buffer	40 ml	Online
D5002-6	M-Elution Buffer	4 ml	Online
D5003	EZ-96 DNA Methylation™ Kit (shallow-well)	2 x 96 rxns.	15
D5003-1	CT Conversion Reagent (96 conversions)	1 bottle	Online
D5004	EZ-96 DNA Methylation™ Kit (deep-well)	2 x 96 rxns.	15
D5005	EZ DNA Methylation-Gold® Kit	50 rxns.	15
D5005-2	M-Dilution Buffer	1.5 ml	Online
D5005-3	M-Binding Buffer	30 ml	Online
D5005-6	M-Dissolving Buffer	500 µl	Online
D5006	EZ DNA Methylation-Gold® Kit	200 rxns.	15
D5006-2	M-Dilution Buffer	7 ml	Online
D5006-3	M-Binding Buffer	125 ml	Online
D5006-6	M-Dissolving Buffer	1.2 ml	Online
D5007	EZ-96 DNA Methylation-Gold® Kit (shallow-well)	2 x 96 rxns.	15
D5007-4	M-Wash Buffer	36 ml	Online
D5007-6	M-Elution Buffer	8 ml	Online
D5008	EZ-96 DNA Methylation-Gold® Kit (deep-well)	2 x 96 rxns.	15
D5011	Universal Methylated Human DNA Standard	1 set	23

Cat. No.	Description	Size	Page
D5012	Universal Methylated Mouse DNA Standard	1 set	23
D5013	Human WGA Methylated & Non-methylated DNA Set	1 set	23
D5013-1	Human WGA Non-methylated DNA	5 µg / 20 µl	Online
D5014	Human Methylated & Non-methylated DNA Set	1 set	23
D5014-1	Human HCT116 DKO Non-methylated DNA	5 µg / 20 µl	Online
D5014-2	Human HCT116 DKO Methylated DNA	5 µg / 20 µl	Online
D5015	Bisulfite-Converted Universal Methylated Human DNA Standard	1 set	23
D5016	*E. coli* Non-methylated Genomic DNA	5 µg / 20 µl	23
D5017	Methylated & Non-methylated pUC19 DNA Set	1 set	23
D5018	Human Matched DNA Set	1 set	21
D5018-1	Human Brain DNA	5 µg	Online
D5018-2	Human Spleen DNA	5 µg	Online
D5019	Mouse 5hmC & 5mC DNA Set	1 set	21
D5019-1	Mouse Brain DNA	5 µg	Online
D5019-2	Mouse Kidney DNA	5 µg	Online
D5019-3	Mouse Liver DNA	5 µg	Online
D5019-4	Mouse Thymus DNA	5 µg	Online
D5020	EZ DNA Methlyation-Direct™ Kit	50 rxns.	14
D5020-7	M-Solubilization Buffer	4.5 ml	Online
D5020-8	M-Reaction Buffer	1 ml	Online
D5020-9	M-Digestion Buffer (2X)	4 ml	Online
D5021	EZ DNA Methlyation-Direct™ Kit	200 rxns.	14
D5021-7	M-Solubilization Buffer	18 ml	Online
D5021-8	M-Reaction Buffer	4 ml	Online
D5021-9	M-Digestion Buffer (2X)	15 ml	Online
D5022	EZ-96 DNA Methylation-Direct™ Kit (shallow-well)	2 x 96 rxns.	14
D5023	EZ-96 DNA Methylation-Direct™ Kit (deep-well)	2 x 96 rxns.	14
D5024	EZ DNA Methylation -Startup™ Kit	50 rxns.	12
D5030	EZ DNA Methylation-Lightning® Kit	50 rxns.	13
D5030-1	Lightning Conversion Reagent	1.5 ml	Online
D5030-5	L-Desulphonation Buffer	10 ml	Online
D5031	EZ DNA Methlyation-Lightning® Kit	200 rxns.	13
D5031-5	L-Desulphonation Buffer	40 ml	Online
D5032	EZ-96 DNA Methylation-Lightning® Kit	2 x 96 rxns.	13
D5032-1	Lightning Conversion Reagent, 1 bottle	15 ml	Online
D5033	EZ-96 DNA Methylation-Lightning® Kit (deep-well)	2 x 96 rxns.	13
D5040	EZ-96 DNA Methylation™ Magprep	4 x 96 rxns.	15
D5040-3	M-Binding Buffer	250 ml	Online

Cat. No.	Description	Size	Page
D5040-4	M-Wash Buffer	72 ml	Online
D5040-5	M-Desulphonation Buffer	80 ml	Online
D5041	EZ-96 DNA Methylation™ Magprep	8 x 96 rxns.	15
D5041-6	M-Elution Buffer	40 ml	Online
D5042	EZ-96 DNA Methylation-Gold® Magprep	4 x 96 rxns.	15
D5043	EZ-96 DNA Methylation-Gold® Magprep	8 x 96 rxns.	15
D5044	EZ-96 DNA Methylation-Direct™ Magprep	4 x 96 rxns.	14
D5045	EZ-96 DNA Methylation-Direct™ Magprep	8 x 96 rxns.	14
D5046	EZ-96 DNA Methylation-Lightning® MagPrep	4 x 96 rxns.	13
D5046-5	L-Desulphonation Buffer	80 ml	Online
D5047	EZ-96 DNA Methylation-Lightning® MagPrep	8 x 96 rxns.	13
D5101	Methylated-DNA IP Kit	10 rxns.	25
D5101-2	Methylated/Non-methylated Control DNA & Primer Set	1 Set	Online
D5101-3-20	MIP Buffer	20 ml	Online
D5101-4-1	DNA Denaturing Buffer	1 ml	Online
D5101-5-6	IP DNA Binding Buffer	6 ml	Online
D5201	ChIP DNA Clean & Concentrator® (uncapped)	50 preps.	35
D5201-1-50	ChIP DNA Binding Buffer	50 ml	Online
D5201-1-100	ChIP DNA Binding Buffer	100 ml	Online
D5205	ChIP DNA Clean & Concentrator® (capped)	50 preps.	35
D5206	ZR-96 ChIP DNA Clean & Concentrator®	2 x 96 rxns.	35
D5207	ZR-96 ChIP DNA Clean & Concentrator®	4 x 96 preps.	35
D5209	Zymo-Spin™ ChIP Kit	10 preps.	34
D5210	Zymo-Spin™ ChIP Kit	25 preps.	34
D5210-1-30	Chromatin Shearing Buffer	30 ml	Online
D5210-2-30	Chromatin Dilution Buffer	30 ml	Online
D5210-3-30	Chromatin Wash Buffer I	30 ml	Online
D5210-4-30	Chromatin Wash Buffer II	30 ml	Online
D5210-5-30	Chromatin Wash Buffer III	30 ml	Online
D5210-6-10	5X Chromatin Elution Buffer	10 ml	Online
D5210-7-1	5M NaCl	1 ml	Online
D5220	EZ Nucleosomal DNA Prep Kit	20 preps.	35
D5220-1	Micrococcal Nuclease	10 U / 100 µl	170
D5220-2	Nuclei Prep Buffer	50 ml	Online
D5220-3	MN Digestion Buffer	50 ml	Online
D5220-4	5X MN Stop Buffer	6 ml	Online
D5310	*OneStep*™ qMethyl™ Kit	1 x 96 well	26
D5310-1	2X Test Reaction PreMix	0.5 ml	Online
D5310-2	2X Reference Reaction PreMix	0.5 ml	Online

Cat. No.	Description	Size	Page
D5311	*OneStep*™ qMethyl™-Lite	1 x 96 well	26
D5311-1	2X Test Reaction-Lite PreMix	0.5 ml	Online
D5311-2	2X Reference Reaction-Lite PreMix	0.5 ml	Online
D5325	5-mC DNA ELISA Kit	1 x 96 rxns.	24
D5325-1-15	5-mC Coating Buffer	15 ml	Online
D5325-1-30	5-mC Coating Buffer	30 ml	Online
D5325-2-250	5-mC ELISA Buffer	250 ml	Online
D5325-3-15	Secondary Antibody	15 µl	Online
D5325-3-30	Secondary Antibody	30 µl	Online
D5325-5-1	Negative Control	50 µl	Online
D5325-5-2	Positive Control	50 µl	Online
D5326	5-mC DNA ELISA Kit	2 x 96 rxns.	24
D5405	5-Methylcytosine & 5-Hydroxymethylcytosine DNA Standard Set	1 set	21
D5405-1	Cytosine DNA Standard	2 µg	Online
D5405-2	5-Methylcytosine DNA Standard	2 µg	Online
D5405-3	5-Hydroxymethylcytosine DNA Standard	2 µg	Online
D5410	Quest 5-hmC Detection Kit™	25 preps.	31
D5411	Quest 5-hmC Detection Kit™	50 preps.	31
D5415	Quest 5-hmC Detection Kit™ -Lite	25 preps.	31
D5416	Quest 5-hmC Detection Kit™ -Lite	50 preps.	31
D5425	Quest 5-hmC™ DNA ELISA Kit	1 x 96 rxns.	30
D5425-1-15	Coating Buffer	15 ml	Online
D5425-1-30	Coating Buffer	30 ml	Online
D5425-2-30	10X ELISA Buffer	30 ml	Online
D5425-2-60	10X ELISA Buffer	60 ml	Online
D5425-3-100	Anti-DNA HRP Antibody	100 µl	Online
D5425-3-200	Anti-DNA HRP Antibody	200 µl	Online
D5425-4-15	HRP Developer	15 ml	Online
D5425-4-30	HRP Developer	30 ml	Online
D5425-5-1	Control A	4 µg	Online
D5425-5-2	Control B	4 µg	Online
D5425-5-3	Control C	4 µg	Online
D5425-5-4	Control D	4 µg	Online
D5425-5-5	Control E	4 µg	Online
D5425-5-C	Control DNA Set	5 x 40 µl	Online
D5426	Quest 5-hmC™ DNA ELISA Kit	2 x 96 rxns.	30
D5450	RRHP™ 5-hmC Library Prep Kit	12 preps.	32
D5451	RRHP™ 5-hmC Library Prep Kit	25 preps.	32
D5455	Pico Methyl-Seq™ Library Prep Kit	10 preps.	27
D5456	Pico Methyl-Seq™ Library Prep Kit	25 preps.	27
D5457	Mirror-Seq™ 5-hmC Library Prep Kit	Inquire	33
D5458	Mirror-Seq™ 5-hmC Library Prep Kit	Inquire	33
D6001-3-40	Lysis Solution	40 ml	Online

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Cat. No.	Description	Size	Page
D6001-3-150	Lysis Solution	150 ml	Online
D6005	*Quick*-DNA™ Fungal/Bacterial Miniprep Kit	50 preps.	80
D6006	*Quick*-DNA™ Fungal/Bacterial 96 Kit	2 x 96 preps.	80
D6007	*Quick*-DNA™ Fungal/Bacterial Microprep Kit	50 preps.	80
D6010	*Quick*-DNA™ Fecal/Soil Microbe Miniprep Kit	50 preps.	79
D6010-FM-A	ZR BashingBead™ Lysis Rack Module	2 X 96 preps.	Online
D6010-FM-B	ZR BashingBead™ Lysis Rack Module	2 X 96 preps.	Online
D6011	*Quick*-DNA™ Fecal/Soil Microbe 96 Kit	2 X 96 preps.	79
D6012	*Quick*-DNA™ Fecal/Soil Microbe Microprep Kit	50 preps.	79
D6015	*Quick*-DNA™ Tissue/Insect Microprep Kit	50 preps	81
D6016	*Quick*-DNA™ Tissue/Insect Miniprep Kit	50 preps	81
D6017	*Quick*-DNA™ Tissue/Insect 96 Kit	2 x 96 preps.	81
D6020	*Quick*-DNA™ Plant/Seed Miniprep Kit	50 preps.	82
D6021	*Quick*-DNA™ Plant/Seed 96 Kit	2 x 96 preps.	82
D6022	*Quick*-DNA™ Plant/Seed Microprep Kit	50 preps.	82
D6030	*OneStep*™ PCR Inhibitor Removal Kit	50 preps.	91
D6035	*OneStep*™-96 PCR Inhibitor Removal Kit	2 x 96 preps.	91
D6035-1-30	Prep Solution	30 ml	Online
D6105	*Quick*-DNA™ Fungal/Bacterial Midiprep Kit	25 preps.	80
D6110	*Quick*-DNA™ Fecal/Soil Microbe Midiprep Kit	25 preps.	79
D6202-2-100	Soil/Fecal DNA Binding Buffer	100 ml	Online
D6202-3-50	Soil/Fecal DNA Wash Buffer	50 ml	Online
D6300	ZymoBIOMICS® Microbial Community Standard	10 preps.	134
D6305	ZymoBIOMICS® Microbial Community DNA Standard	200 ng	135
D6306	ZymoBIOMICS® Microbial Community DNA Standard	2,000 ng	135
D7001	*Quick*-DNA/RNA™ Miniprep Kit	50 preps.	95
D7001-1-50	DNA/RNA Lysis Buffer	50 ml	Online
D7001-2-12	DNA Prep Buffer	12 ml	Online
D7001-2-25	DNA Prep Buffer	25 ml	Online
D7003	*Quick*-DNA/RNA™ Miniprep Plus Kit	50 preps.	95
D7010	ssDNA/RNA Clean & Concentrator™	20 preps.	96
D7010-1-10	DNA/RNA Binding Buffer	10 ml	Online
D7010-1-25	DNA/RNA Binding Buffer	25 ml	Online

Cat. No.	Description	Size	Page
D7010-1-50	DNA/RNA Binding Buffer	50 ml	Online
D7010-2-10	DNA/RNA Prep Buffer	10 ml	Online
D7010-2-25	DNA/RNA Prep Buffer	25 ml	Online
D7010-3-6	DNA/RNA Wash Buffer (concentrate)	6 ml	Online
D7010-3-12	DNA/RNA Wash Buffer (concentrate)	12 ml	Online
D7010-3-24	DNA/RNA Wash Buffer (concentrate)	24 ml	Online
D7011	ssDNA/RNA Clean & Concentrator™	50 preps.	96
D7020	*Quick*-DNA/RNA™ Viral Kit	25 preps.	97
D7020-1-25	Viral DNA/RNA Buffer	25 ml	Online
D7020-1-100	Viral DNA/RNA Buffer	100 ml	Online
D7021	*Quick*-DNA/RNA™ Viral Kit	100 preps.	97
D7022	Quick-DNA/RNA™ Viral 96 Kit	2 x 96 preps.	97
D7023	Quick-DNA/RNA™ Viral 96 Kit	4 x 96 preps.	97
E1004	Zymolyase with Storage Buffer	1,000 U	156, 171
E1005	Zymolyase with Storage Buffer	2,000 U	156, 171
E1006	R-Zymolyase with Storage Buffer	1,000 U	156, 171
E1008-8	RNase A	8 mg	171
E1008-24	RNase A	24 mg	171
E1010	DNase I Set	250 U	169
E2001	Zymo*Taq*™ DNA Polymerase	50 rxns.	36, 171
E2002	Zymo*Taq*™ DNA Polymerase	200 rxns.	36, 171
E2003	Zymo*Taq*™ PreMix	50 rxns.	36, 171
E2004	Zymo*Taq*™ PreMix	200 rxns.	36, 171
E2005	Femto™ Human DNA Quantification Kit	100 rxns	98
E2006	Femto™ Bacterial DNA Quantification Kit	100 rxns	98
E2007	Femto™ Fungal DNA Quantification Kit	100 rxns	98
E2010	CpG Methylase (M. SssI)	200 U	38, 168
E2010-2	10X CpG Reaction Buffer	1 ml	Online
E2010-3	20X SAM (S-adenosylmethionine)	200 µl	Online
E2011	CpG Methylase (M. SssI)	400 U	38,168
E2014	GpC Methylase (M. CviPI)	200 U	38, 168
E2014-2	10X GpC Reaction Buffer	1 ml	Online
E2015	GpC Methylase (M. CviPI)	1,000 U	38, 168
E2016	DNA Degradase™	500 U	37, 169
E2017	DNA Degradase™	2,000 U	37, 169
E2018-50	dsDNA Shearase™ Plus	50 U	39, 169
E2018-200	dsDNA Shearase™ Plus	200 U	39, 169
E2019-50	dsDNA Shearase™ Plus + DCC®-5	50 U + 50 preps.	39
E2019-200	dsDNA Shearase™ Plus + DCC®-5	200 U + 200 preps.	39

Cat. No.	Description	Size	Page
E2020	DNA Degradase Plus™	250 U	37, 169
E2021	DNA Degradase Plus™	1,000 U	37, 169
E2026	5-hmC Glucosyltransferase	100 U	39, 168
E2027	5-hmC Glucosyltransferase	200 U	39, 168
E2030	Atlantis dsDNase	12.5 U	168
E2030-1	Atlantis Digestion Buffer	50 ml	Online
E2050	Quest*Taq*™ PreMix	50 rxns.	37, 170
E2051	Quest*Taq*™ PreMix	200 rxns.	37, 170
E2052	Quest*Taq*™ qPCR PreMix	50 rxns.	37, 170
E2053	Quest*Taq*™ qPCR PreMix	200 rxns.	37, 170
E2054	Zymo*Taq*™ qPCR PreMix	50 rxns.	171
E2055	Zymo*Taq*™ qPCR PreMix	200 rxns.	1 71
E2056	ZymoBIOMICS™ PCR Premix	50 rxns.	142
E2057	ZymoBIOMICS™ PCR Premix	200 rxns.	142
F9001-1	5-Fluoroorotic Acid (powder)	1 g	Online
F9001-5	5-Fluoroorotic Acid (powder)	5 g	Online
F9003	100X 5-Fluoroorotic Acid (liquid)	10 ml	Online
H1001	Squisher™-Single	10 pack	192
H1001-50	Squisher™-Single	50 pack	192
H1002-5	Squisher™-8 with 96-Well Block	5 pack & 1 block	192
H1002-20	Squisher™-8 with 96-Well Block	20 pack & 2 blocks	192
H1004-2	Squisher™-96 with 96-Well Block	2 pack & 2 blocks	192
H1004-5	Squisher™-96 with 96-Well Block	5 pack & 5 blocks	192
I1001-5	Isopropyl-β-D-thiogalactopyranoside (IPTG)	5 ml	175
I1001-25	Isopropyl-β-D-thiogalactopyranoside (IPTG)	5 x 5 ml	175
M2001	ZymoMag Protein A	200 µl	Online
M3011	Dual Media Set™ (100 ml EB & 500 ml OB)	1 Set	166
M3012-100	Expansion Broth (EB)	100 ml	166
M3012-500	Expansion Broth (EB)	500 ml	166
M3013-100	Overexpression Broth (OB)	100 ml	166
M3013-500	Overexpression Broth (OB)	500 ml	166
M3015-100	ZymoBroth™	100 ml	151
M3015-500	ZymoBroth™	5 x 100 ml	151
M5001-50	ZR 50 bp DNA Marker™	50 µg / 100 µl	99
M5001-200	ZR 50 bp DNA Marker™	200 µg / 400 µl	99
M5002-50	ZR 100 bp DNA Marker™	50 µg / 100 µl	99
M5002-200	ZR 100 bp DNA Marker™	200 µg / 400 µl	99
M5003-50	ZR 1 kb DNA Marker™	50 µg / 100 µl	99
M5003-200	ZR 1 kb DNA Marker™	200 µg / 400 µl	99
M5004-50	ZR 50 bp DNA Marker™ (ready-to-load)	50 µg / 600 µl	99
M5005-50	ZR 100 bp DNA Marker™ (ready-to-load)	50 µg / 600 µl	99

Cat. No.	Description	Size	Page
M5006-50	ZR 1 kb DNA Marker™ (ready-to-load)	50 µg / 600 µl	99
P1001-2	96-Well Block	2 blocks	190
P1001-10	96-Well Block	10 blocks	190
P1002-2	96-Well Block with Cover Foil	2 blocks/foils	190
P1003-1	96-Well Mixing Block	1 block	Online
P1005	ZR-96 MagStand	1 stand	Online
P2001	His-Spin Protein Miniprep™	10 preps.	167
P2002	His-Spin Protein Miniprep™	50 preps.	167
P2003-1	Zymo-Spin™ PI Columns	50 pack	180
P2003-2	His-Affinity Gel	14 ml	167, 175
P2003-3	His-Binding Buffer	50 ml	Online
P2003-4	His-Wash Buffer	50 ml	Online
P2003-5	His-Elution Buffer	25 ml	Online
R1001-1	YR Digestion Buffer	3.2 ml	Online
R1001-2	YR Lysis Buffer	6.4 ml	Online
R1002	YeaStar™ RNA Kit	40 preps.	163
R1003	Pinpoint® Slide RNA Isolation System I	50 preps.	114
R1003-2-3	RNA Extraction Buffer	3 ml	Online
R1003-2-12	RNA Extraction Buffer	12 ml	Online
R1003-2-50	RNA Extraction Buffer	50 ml	Online
R1003-2-100	RNA Extraction Buffer	100 ml	Online
R1003-3-6	RNA Wash Buffer	6 ml	Online
R1003-3-12	RNA Wash Buffer	12 ml	Online
R1003-3-24	RNA Wash Buffer	24 ml	Online
R1003-3-48	RNA Wash Buffer	48 ml	Online
R1007	Pinpoint® Slide RNA Isolation System II	50 preps.	114
R1008	*Quick*-RNA™ FFPE Kit	50 preps.	115
R1009	*Quick*-DNA/RNA™ FFPE Kit	50 preps.	115
R1007-1	RNA Digestion Buffer	1.2 ml	Online
R1011	Zymoclean™ Gel RNA Recovery Kit	50 preps.	120
R1011-1-50	RAD Buffer (RNA Agarose Dissolving Buffer)	50 ml	Online
R1013	RNA Clean & Concentrator™-5 w/ DNase I	50 preps.	119
R1013-2-25	RNA Binding Buffer	25 ml	Online
R1013-2-50	RNA Binding Buffer	50 ml	Online
R1013-2-100	RNA Binding Buffer	100 ml	Online
R1013-2-1000	RNA Binding Buffer	1000 ml	Online
R1014	RNA Clean & Concentrator™-5 w/ DNase I	200 preps.	119
R1015	RNA Clean & Concentrator™-5	50 preps.	119
R1016	RNA Clean & Concentrator™-5	200 preps.	119
R1017	RNA Clean & Concentrator™-25	50 preps.	119
R1018	RNA Clean & Concentrator™-25	100 preps.	119

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Cat. No.	Description	Size	Page
R1019	RNA Clean & Concentrator™-100	25 preps.	119
R1020-2-12	RNA Pre-wash Buffer	12 ml	Online
R1020-2-25	RNA Pre-wash Buffer	25 ml	Online
R1020-2-50	RNA Pre-wash Buffer	50 ml	Online
R1020-2-100	RNA Pre-wash Buffer	100 ml	Online
R1021	*Quick*-RNA™ Whole-Blood Kit	100 preps.	113
R1022-1-50	Blood RNA Buffer	50 ml	Online
R1022-1-100	Blood RNA Buffer	100 ml	Online
R1022-2-50	RBC Lysis Buffer	50 ml	Online
R1022-2-100	RBC Lysis Buffer	100 ml	Online
R1034	*Quick*-RNA™ Viral Kit	50 preps.	112
R1034-1-50	Viral RNA Buffer	50 ml	Online
R1034-1-100	Viral RNA Buffer	100 ml	Online
R1034-2-6	Viral RNA Wash Buffer (concentrate)	6 ml	Online
R1034-2-24	Viral RNA Wash Buffer (concentrate)	24 ml	Online
R1034-2-48	Viral RNA Wash Buffer (concentrate)	48 ml	Online
R1035	*Quick*-RNA™ Viral Kit	200 preps.	112
R1038	ZR Urine RNA Isolation Kit™	20 preps.	114
R1038-1-20	RNA Extraction Buffer Plus	20 ml	Online
R1038-1-50	RNA Extraction Buffer Plus	50 ml	Online
R1039	ZR Urine RNA Isolation Kit™	50 preps.	114
R1040	*Quick*-RNA™ Viral 96 Kit	2 x 96 preps.	112
R1041	*Quick*-RNA™ Viral 96 Kit	4 x 96 preps.	112
R1050	*Quick*-RNA™ Microprep Kit	50 preps.	110
R1051	*Quick*-RNA™ Microprep Kit	200 preps.	110
R1052	*Quick*-RNA™ 96 Kit	2 x 96 preps.	110
R1053	*Quick*-RNA™ 96 Kit	4 x 96 preps.	110
R1054	*Quick*-RNA™ Miniprep Kit	50 preps.	110
R1055	*Quick*-RNA™ Miniprep Kit	200 preps.	110
R1056	*Quick*-RNA™ Midiprep Kit	25 preps.	110
R1057	*Quick*-RNA™ Miniprep Plus Kit	50 preps.	111
R1058	*Quick*-RNA™ Miniprep Plus Kit	200 preps.	111
R1060-1-50	RNA Lysis Buffer	50 ml	Online
R1060-1-100	RNA Lysis Buffer	100 ml	Online
R1060-2-10	RNA Prep Buffer	10 ml	Online
R1060-2-25	RNA Prep Buffer	25 ml	Online
R1070	ZR small-RNA™ PAGE Recovery Kit	20 preps.	121
R1070-1-10	RNA Recovery Buffer	10 ml	Online
R1070-2-20	RNA MAX Buffer	20 ml	Online
R1080	ZR-96 RNA Clean & Concentrator™	2 x 96 preps.	119
R1090	ZR small-RNA™ Ladder	10 µg	120

Cat. No.	Description	Size	Page
R1100-50	DNA/RNA Shield™	50 ml	128
R1100-250	DNA/RNA Shield™	250 ml	128
R1101	DNA/RNA Shield™ - Fecal Collection Tube	10 pack	126, 137
R1102	DNA/RNA Shield™ - Collection Tube	50 tubes	127
R1103	DNA/RNA Shield™ - Microbe Lysis Tube	50 tubes	127, 137
R1104	DNA/RNA Shield™ - Microbe Lysis Tube with Swab	50 tubes/ 50 swabs	127
R1106	DNA/RNA Shield™ - Swab & Collection Tube	10 pack (1 ml fill)	125, 137
R1107	DNA/RNA Shield™ - Swab & Collection Tube	50 pack (1 ml fill)	125, 137
R1108	DNA/RNA Shield™ - Swab & Collection Tube	10 pack (2 ml fill)	125, 137
R1109	DNA/RNA Shield™ - Swab & Collection Tube	50 pack (2 ml fill)	125, 137
R1151	*Quick*-DNA/RNA™ Blood Tube Kit	50 preps.	113
R1200-25	DNA/RNA Shield™ (2X concentrate)	25 ml	128
R1200-125	DNA/RNA Shield™ (2X concentrate)	125 ml	128
R1201	*Quick*-RNA™ Whole Blood Kit	50 preps.	113
R2001	ZymoBIOMICS® RNA Miniprep Kit	50 preps.	139
R2002	ZymoBIOMICS® DNA/RNA Miniprep Kit	50 preps.	140
R2010	*Quick*-RNA™ Fungal/Bacterial Microprep Kit	50 preps.	117
R2014	*Quick*-RNA™ Fungal/Bacterial Miniprep Kit	50 preps.	117
R2024	*Quick*-RNA™ Plant Miniprep Kit	50 preps.	118
R2030	*Quick*-RNA™ Tissue & Insect Microprep Kit	50 preps.	118
R2040	*Quick*-RNA™ Fecal/Soil Microbe Microprep Kit	50 preps.	117
R2040-1-50	S/F RNA Lysis Buffer	50 ml	Online
R2050	Direct-zol™ RNA Miniprep Kit	50 preps.	107
R2050-1-50	TRI Reagent®	50 ml	Online
R2050-1-200	TRI Reagent®	200 ml	Online
R2050-2-40	Direct-zol™ RNA PreWash (concentrate)	40 ml	Online
R2050-2-160	Direct-zol™ RNA PreWash (concentrate)	160 ml	Online
R2051	Direct-zol™ RNA Miniprep Kit+ TRI Reagent®	50 preps.	107
R2052	Direct-zol™ RNA Miniprep Kit	200 preps.	107
R2053	Direct-zol™ RNA Miniprep Kit + TRI Reagent®	200 preps.	107
R2054	Direct-zol™ 96 RNA Kit	2 x 96 preps.	107
R2055	Direct-zol™ 96 RNA + TRI Reagent®	2 x 96 preps.	107
R2056	Direct-zol™ 96 RNA Kit	4 x 96 preps.	107
R2057	Direct-zol™ 96 RNA Kit + TRI Reagent®	4 x 96 preps.	107
R2060	Direct-zol™ RNA Microprep Kit	50 preps.	107

Cat. No.	Description	Size	Page
R2061	Direct-zol™ RNA Microprep Kit + TRI Reagent®	50 preps.	107
R2062	Direct-zol™ RNA Microprep Kit	200 preps.	107
R2063	Direct-zol™ RNA Microprep + TRI Reagent®	200 preps.	107
R2070	Direct-zol™ RNA Miniprep Plus Kit	50 preps.	107
R2071	Direct-zol™ RNA Miniprep Plus Kit + TRI Reagent®	50 preps.	107
R2072	Direct-zol™ RNA Miniprep Plus Kit	200 preps.	107
R2073	Direct-zol™ RNA Miniprep Plus Kit + TRI Reagent®	200 preps.	107
R2100	Direct-zol™ 96 MagBead RNA Kit	2 x 96 preps.	108
R2100-1-5	Direct-zol™ Binding Buffer	5 ml	Online
R2100-1-10	Direct-zol™ Binding Buffer	10 ml	Online
R2100-1-20	Direct-zol™ Binding Buffer	20 ml	Online
R2100-2-200	Direct-zol™ MagBead PreWash	200 ml	Online
R2101	Direct-zol™ 96 MagBead RNA Kit + TRI Reagent®	2 x 96 preps.	108
R2102	Direct-zol™ 96 MagBead RNA Kit	4 x 96 preps.	108
R2103	Direct-zol™ 96 MagBead RNA Kit + TRI Reagent®	4 x 96 preps.	108
R2104	Direct-zol™ 96 MagBead RNA Kit	8 x 96 preps.	108
R2105	Direct-zol™ 96 MagBead RNA Kit + TRI Reagent®	8 x 96 preps.	108
R5001	EZ RNA Methylation™ Kit	50 preps.	16
R5001-1-1	RNA Conversion Reagent	1.5 ml	Online
R5001-3-10	RNA Desulphonation Buffer	10 ml	Online
R5001-3-40	RNA Desulphonation Buffer	40 ml	Online
R5002	EZ RNA Methylation™ Kit	200 preps.	16
S1001	Rattler™ Plating Beads, 230 g	1 bottle	152, 192
S1001-5	Rattler™ Plating Beads, 230 g	5 bottles	152, 192
S1001-B	Rattler™ Plating Beads - bulk format (non-sterile)	25 kg bag	152, 192
S5001	Vortex-Genie® 2 (120V)	1 unit	192
S5001-1	Microtube Foam Inserts	2 units	193
S5001-2	Microplate Foam Inserts	2 units	193
S5001-3	29-37 mm Tube Foam Inserts	2 units	193
S5001-4	Pop-off Cup	1 unit	193
S5001-5	Horizontal 50 ml Tube Holder	1 unit	193
S5001-6	Horizontal 15 ml Tube Holder	1 unit	193
S5001-7	Horizontal Microtube Holder	1 unit	193
S5002	Vortex-Genie® 2 (230V, Euro plug)	1 unit	192
S5009	MagStir Genie® (120V)	1 unit	193
S6001-2-120	Disruptor Genie® (120V)	1 unit	191
S6001-2-230	Disruptor Genie® (230V, Euro plug)	1 unit	191

Cat. No.	Description	Size	Page
S6002-96-3	BashingBead™ Lysis 96 Rack (0.5 & 0.1 mm)	1 rack	190
S6002-96-2	BashingBead™ Lysis 96 Rack (2 mm)	1 rack	190
S6002-96-3	BashingBead™ Lysis 96 Rack (0.1 & 0.5 mm)	1 rack	190
S6003-50	BashingBead™ Lysis Tubes (2 mm)	50 tubes	186
S6005	FastPrep®-24	1 unit	191
S6005-1	HiPrep™ Adapter (48 x 2 ml tubes)	1 unit	191
S6005-2	CoolPrep™ Adapter (24 x 2 ml tubes)	1 unit	191
S6005-3	TeenPrep™ Adapter (12 x 15 ml tubes)	1 unit	191
S6010	ZR BashingBead™ Lysis/Filtration Tubes with 0.5 mm Beads (50 ml)	25 pack	Online
S6011	ZR BashingBead™ Lysis/Filtration Tubes with 2.0 mm Beads (50 ml)	25 pack	Online
S6012-50	BashingBead™ Lysis Tubes (0.5 & 0.1 mm)	50 tubes	186
S6022	TerraLyzer™	1 unit	191
S7000	EZ-Vac™ Vacuum Manifold	1 manifold	193
T2001	Frozen-EZ Yeast Transformation II™ Kit	120 rxns.	160
T2002	Frozen-EZ Solution 1	60 ml	Online
T2003	Frozen-EZ Solution 2	6 ml	Online
T2004	Frozen-EZ Solution 3	60 ml	Online
T3001	*Mix & Go!™ E. coli* Transformation Kit	up to 20 ml	150
T3001-2-10	*Mix & Go!™* 2X Stock Wash Buffer	10 ml	Online
T3001-2-30	*Mix & Go!™* 2X Stock Wash Buffer	30 ml	Online
T3001-3-10	*Mix & Go!™* 2X Stock Competent Buffer	10 ml	Online
T3001-3-30	*Mix & Go!™* 2X Stock Competent Buffer	30 ml	Online
T3001-4-20	*Mix & Go!™* Dilution Buffer	20 ml	Online
T3001-4-60	*Mix & Go!™* Dilution Buffer	60 ml	Online
T3002	*Mix & Go!™ E. coli* Transformation Buffer Set	up to 60 ml	150
T3003	*Mix & Go!™* Competent Cells - Strain JM109	10 x 100 µl	147
T3005	*Mix & Go!™* Competent Cells - Strain JM109	96 x 50 µl	147
T3007	*Mix & Go!™* Competent Cells - Zymo 5a	10 x 100 µl	147
T3009	*Mix & Go!™* Competent Cells - Zymo 5a	96 x 50 µl	147
T3010	*Mix & Go!™* Competent Cells - Zymo 5a w/ 96-well PCR plates and Cover Foils	96 x 50 µl	147
T3011	*Mix & Go!™* Competent Cells - HB101	10 x 100 µl	147
T3013	*Mix & Go!™* Competent Cells - HB101	96 x 50 µl	147
T3015	*Mix & Go!™* Competent Cells - C600	10 x 100 µl	147

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Cat. No.	Description	Size	Page
T3017	*Mix & Go!*™ Competent Cells - TG1	10 x 100 µl	147
T3019	*Mix & Go!*™ Competent Cells - Zymo 10B	10 x 100 µl	147
T3020	*Mix & Go!*™ Competent Cells - Zymo 10B	96 x 50 µl	147
T3021	*Mix & Go!*™ Competent Cells - XJa Autolysis™	10 x 100 µl	149
T3031	*Mix & Go!*™ Competent Cells - XJa(DE3) Autolysis™	10 x 100 µl	149
T3041	*Mix & Go!*™ Competent Cells - XJb Autolysis™	10 x 100 µl	149
T3051	*Mix & Go!*™ Competent Cells - XJb(DE3) Autolysis™	10 x 100 µl	149
T5021	XJa Autolysis™, Glycerol Stock	1 tube	149
T5031	XJa(DE3) Autolysis™, Glycerol Stock	1 tube	149
T5041	XJb Autolysis™, Glycerol Stock	1 tube	149
T5051	XJb(DE3) Autolysis™, Glycerol Stock	1 tube	149
W1001-1	DNase/RNase-free Water	1 ml	Online
W1001-4	DNase/RNase-free Water	4 ml	Online
W1001-6	DNase/RNase-free Water	6 ml	Online
W1001-10	DNase/RNase-free Water	10 ml	Online
W1001-30	DNase/RNase-free Water	30 ml	Online
X1001-5	5-bromo-4-chloro-3-indolyl β-D-galactopyranoside (X-GAL)	5 ml	175
X1001-25	5-bromo-4-chloro-3-indolyl β-D-galactopyranoside (X-GAL)	5 x 5 ml	175
Y1001	α-Factor Mating Pheromone	240 µl	161
Y1002	Yeast Protein Kit™	200 preps.	163
Y1002-1-100	Y-Lysis Buffer	100 ml	Online
Y1002-1-6	Y-Lysis Buffer	6 ml	Online
Y1003-50	YPD Plus™	50 ml	159
Y1003-100	YPD Plus™	2 x 50 ml	159
Y1004-500	a-Factor Mating Pheromone	500 µl	161

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Zymo Product Patents

Direct-zol™ is patented: US Patent No: 9,051,563 B2; EP Patent No: 2,479,274 A1, 2,479,274 B1, and 3,106,518 A1.

XJ Autolysis™ is patented: US Patent No: 7,892,811 B2.

Zyppy® is patented: US Patent No: 7,754,873 B2.

TerraLyzer™ is patented: US Patent Nos: 9,150,826 B2, US 9,410,115 B2 and D668,563 S.

ZymoPURE™ is patent pending.
Additional plasmid preparation technologies are patented: US Patent Nos.: 7,858,363 B2 and 7,867,751 B2.

Zymo-Spin™ V-E and Zymo-Spin™ V-P Columns (Universal Columns) is patented: US Patent No.: D613,873 S.

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