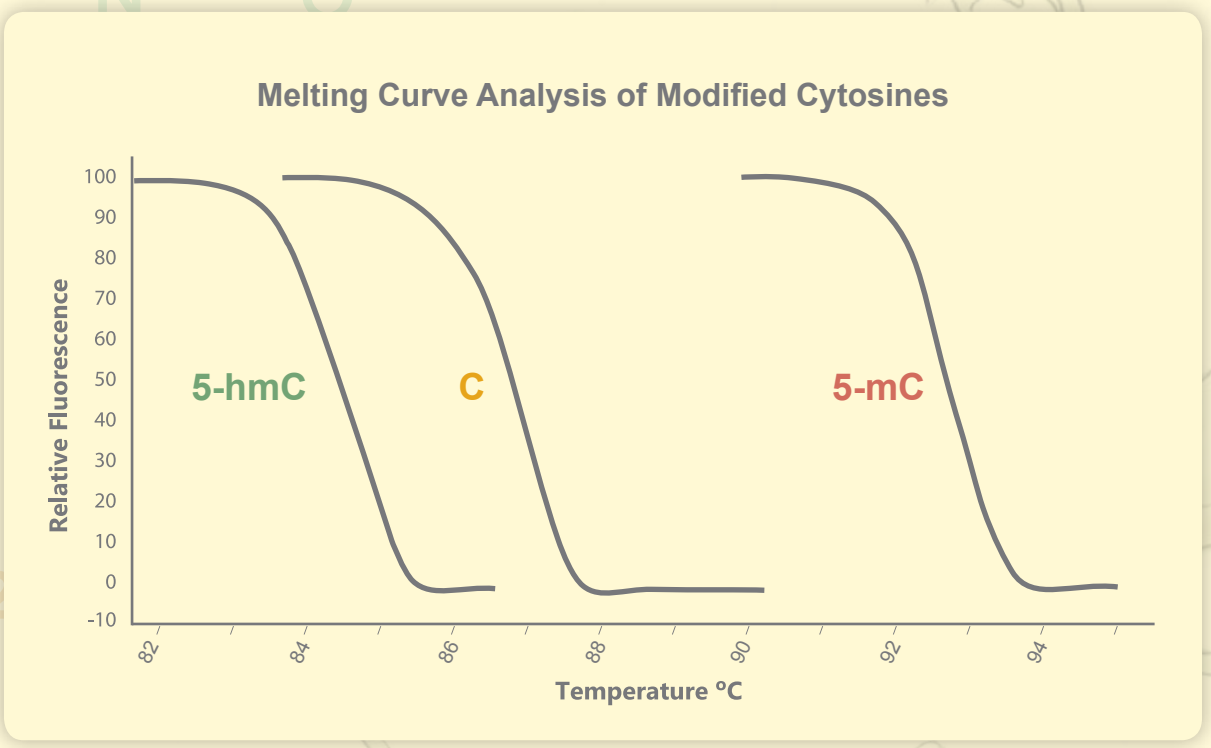
Catalog 2013-14

ZYMO RESEARCH

The Beauty of Science is to Make Things Simple

The Genetic Code... and Beyond!



ABOUT THE COVER

The Genetic Code... and Beyond!

There is a dimension beyond the primary code - one necessary for both genetic functionality and inheritability, rendering life into Life's Blueprint. That is… Epigenetics. Melt-curve analysis of modified cytosines is depicted on the cover. Identical DNA sequences containing different modifications to cytosine, methylation (5-mC) and hydroxymethylation (5-hmC), shift the melting temperature dramatically, unveiling a hidden code above and beyond the primary one.

Want to know what Gregor Mendel didn't?

Pea plants (Pisum sativum) contain the highest levels of DNA hydroxymethylation in plants.

Melt-curve analysis performed by R.E. Leavitt and X.Y. Jia, and 5-hmC levels in P. sativum determined by N.W. Johnson and X.Y. Jia, Zymo Research Corporation.

The beauty of making science simple...

Vision

Since its inception in 1994, Zymo Research has been proudly serving the scientific community by providing innovative, high quality research tools ataffordable prices. Our vision…"The Beauty of Science is to Make Things Simple" is now truer than ever. Whether its 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.

Innovation

Although historically recognized for its innovative DNA and RNA purification technologies, Zymo Research has recently received much attention for its rapidly expanding epigenetics portfolio of products. Branding ourselves "The Epigenetics Company" it is our objective to develop and provide the most comprehensive set of research tools for DNA methylation analysis and epigenetics research available today. Thousands of peer-reviewed scientific publications from researchers around the world feature our epigenetic technologies in addition to our other products. To date, our EZ DNA Methylation™ family of products remain the most popular and cited technologies available for bisulfite treatment of DNA for methylation-specific analysis. However, we have many new technologies developed for histone, chromatin, and small RNA analysis and for the next era of DNA methylation detection and analysis.

Quality

At Zymo Research, we are commited to quality and guarantee that all of our products will meet and exceed your expectations... or your money back.

OUR COMMITMENT TO QUALITY

Zymo Research guarantees all products meet your highest satisfaction, or your money back.

CONTENTS

ZYMO RESEARCH
The Beauty of Science is to Make Things Simple
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THE Epigenetics COMPANY™

ORDERING

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Payment Method
Purchase order or Visa/Mastercard/AMEX only.

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100% Satisfaction Guaranteed.

Zymo Research is committed to the highest standard of quality and assures your satisfaction with its products.

ISO 9001:2008 Certified

Why should I care about epigenetics?

The field of epigenetics transcends genetics, genomics, and molecular biology, and is poised to become the vanguard of biological science research. As factors influencing heredity continue to be discovered, scientists are using epigenetics to decipher the roles of DNA, RNA, proteins, and environment in inheritance.

The most common epigenetic modification in higher organisms is DNA methylation. This modification involves the addition of a methyl group to the 5-carbon position of cytosine in the DNA molecule, hence the term 5-methylcytosine (5-mC). DNA methylation plays a significant role in cell differentiation, determination and maintenance of cell fate, which in turn influence development and the aging process.

DNA methylation profiles can change as a result of dietary and environmental factors. Irregularities in propagation and maintenance of 5-mC can have a substantial impact on health and disease. For example, nutrient deficiencies in mice have resulted in measurable methylation differences and health problems in their offspring. The study of DNA methylation will help unravel the complexities of genetic regulation, cellular differentiation, embryology, aging, cancer, and other diseases.

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1 Epigenetic Tools

Epigenetic regulation of cellular processes involves the modification of DNA and the proteins associated with DNA. Epigenetic modification generally results in changes to the structure of chromatin, which is the complex of DNA and proteins, such as histones, that compact and organize DNA in cells. Epigenetic 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.

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. Epigenetic regulation can be mediated by DNA methylation and hydroxymethylation, histone modification, chromatin remodeling, and small and large non-coding RNAs. 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. As the field of epigenetics has grown, Zymo Research has grown with it.

Through epigenetics, the classic works of Charles Darwin, Gregor Mendel, Jean-Baptiste Lamarck, and others are now seen in different ways. As more factors influencing heredity are discovered, today’s scientists are using epigenetics to decipher the roles of DNA, RNA, proteins, and environment in inheritance. The future of epigenetics should reveal a better understanding of the complexities of cellular differentiation, embryology, the regulation of gene expression, aging, cancer, and many other human diseases.

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 kits for the study of DNA methylation. They are considered by most as the “gold standard” and are the highest quality, most trusted, and most cited methods. Furthermore, our innovative products also 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 DNA methylation analysis. Zymo Research now offers genome-wide and whole-genome epigenetic services for DNA methylation – just send us your samples, and we will send you back publication-ready figures...Genome-wide epigenetic studies are now accessible to every laboratory!

Zymo Research offers the most comprehensive products and services to investigate all areas of epigenetics, including DNA hydryoxymethylation, chromatin immunoprecipitation and chromatin remodeling, and small and large non-coding RNAs.

EPIGENETIC TOOLS

DNA METHYLATION

Bisulfite Treatment of DNA

Methylated DNA Standards

Global 5-mC Quantification

5-mC Antibodies & Enrichment

Region-Specific 5-mC Analysis

Genome-wide 5-mC Analysis

DNA HYDROXYMETHYLATION

Region-specific 5-hmC Analysis

Global 5-hmC Quantification

5-hmC Antibodies & Enrichment

Hydroxymethylated DNA Standards

Genome-wide 5-hmC Analysis

CHROMATIN ANALYSIS

Chromatin Immunoprecipitation

Nucleosome Analysis

EPIGENETIC ENZYMES AND REAGENTS

SERVICES

Tools for Navigating the DNA Methylation Landscape

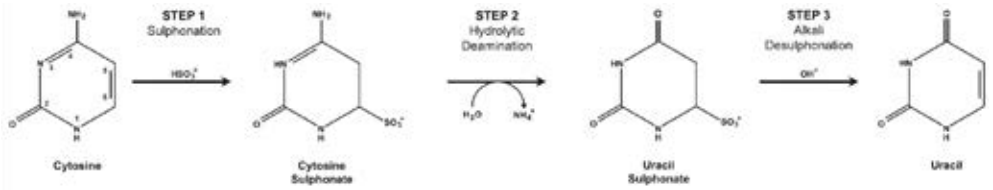
Epigenetic modifications define heritable changes in gene expression without changes to the underlying DNA sequence. Epigenetic controls allow our cells to differentiate during development and form specialized tissues, such as heart or lung, regardless of the cells possessing the same DNA sequence. Abnormal epigenetic regulation leads to a wide range of developmental and neurological disorders.

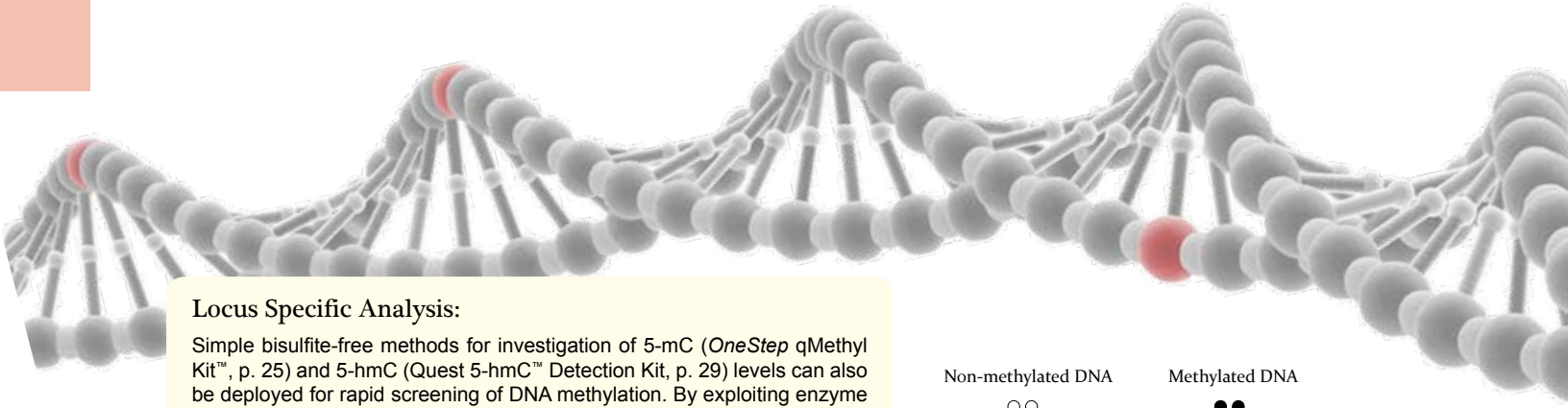
One well-studied epigenetic modification of DNA is the *methylation* of cytosine in CG context (**5-mC**). DNA methylation is typically associated with the silencing of gene expression. The levels and patterns of DNA methylation in humans has been shown to change significantly as we age, illustrating that lifestyle choices and the environment can influence our epigenetic makeup.

Another more recently discovered epigenetic DNA modification is the *hydroxymethylatio*n of cytosine (**5-hmC**). While its exact function is still largely unknown, the human brain contains substantially elevated levels of 5-hmC relative to other tissues. Understanding the function and regulation of 5-hmC is already proving an exciting and rapidly expanding area of scientific research.

Bisulfite Treatment:

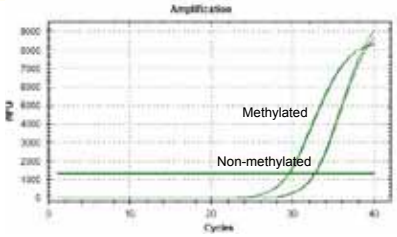
The gold standard for the analysis of DNA methylation, bisulfite treatment converts unmodified cytosine to uracil while methylated cytosines are protected from this conversion (EZ DNA Methylation™ Kits, pp. 13-17). Sequence analysis post-treatment provides site specific information on DNA across the genome. This can be accomplished by PCR, hybridization, MSP, and Next-Gen sequencing.

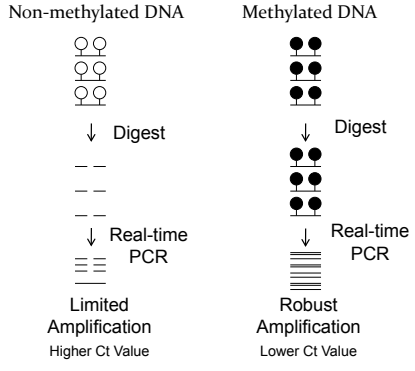




Locus Specific Analysis:

Simple bisulfite-free methods for investigation of 5-mC (*OneStep* qMethyl Kit™, p. 25) and 5-hmC (Quest 5-hmC™ Detection Kit, p. 29) levels can also be deployed for rapid screening of DNA methylation. By exploiting enzyme sensitivities to different epigenetic DNA modifications, differentially modified loci can be quickly and easily distinguished. These methods interrogate a gene's methylation content via quantitative PCR using primers designed for pre-validated gene loci or regions of interest.





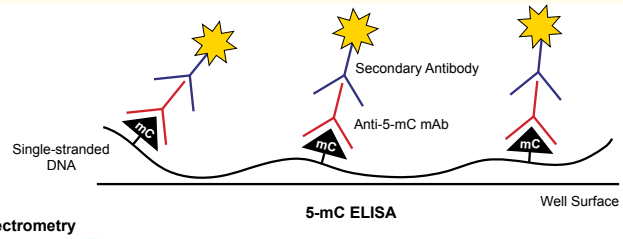
Schematic Overview of 5-hmC DNA Enrichment Kit Workflow

Methylated DNA Enrichment:

Specific enrichment of methylated DNA (Methylated-DNA IP Kit, p. 24) and hydroxymethylated DNA (Quest 5-hmC™ Enrichment Kit, p. 31) 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.

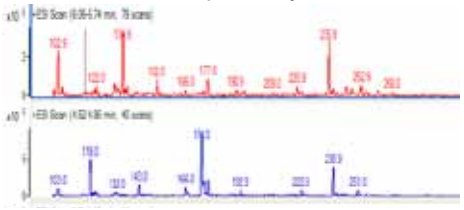
Global Quantification:

For understanding complicated changes in the epigenome, the simplest place to start is to determine global changes in DNA modification. Overall levels of 5-mC and 5-hmC in DNA samples can be rapidly and accurately determined with specifically designed ELISAs (5-mC DNA ELISA Kit, p. 24 and Quest 5-hmC™ DNA ELISA Kit, p. 30). Enzymatic methods breaking down DNA to individual nucleosides are also available for analysis of epigenetic DNA modification using mass spectrometry or HPLC (p. 39).



5-mC ELISA

Mass Spectrometry



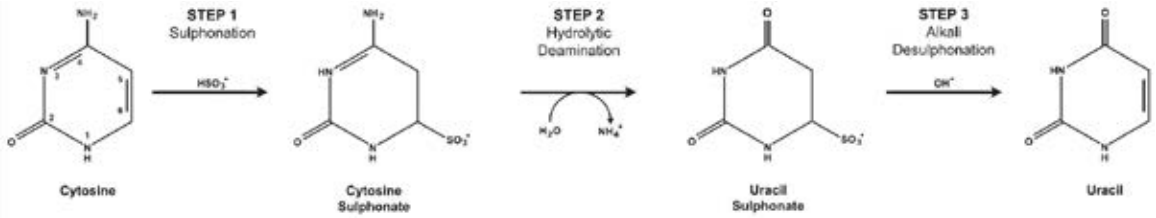
Genome-wide Analysis:

Investigation of one or several genes may not be sufficient to provide answers to gene expression and their effects. Assessment of changes in methylation across the genome elucidates interactions across gene elements and mechanisms of development, aging, and cancer. Next-Gen sequencing technologies allow high-throughput data analysis and insight into these changes (p. 44-47).

Product Guide: Bisulfite Treatment of DNA

What is Bisulfite Treatment?

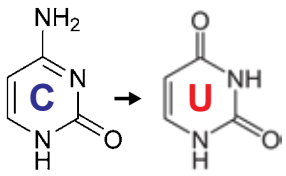
The most common epigenetic modification in higher organisms is DNA methylation. This modification involves the addition of a methyl group to the 5-carbon position of cytosine in the DNA molecule. Sodium bisulfite can deaminate (C)ytosine into (U)racil, but does not affect 5-methylcytosine. Bisulfite treatment (conversion) is the "gold standard" for downstream applications to assess DNA methylation status. Most commonly used methods for local and base-pair methylation resolution rely upon pre-treatment of DNA with bisulfite, which allows for the most specific, nucleotide-level snapshot of methylation status.



Compatible with Illumina's Infinium® Workflows

High Speed

	EZ DNA Methylation™			EZ DNA Methylation-Gold™		
Format	Spin Column	96-Well	MagBead	Spin Column	96-Well	MagBead
Elution Volume	≥ 10 µl	≥ 15 µl	≥ 25 µl	≥ 10 µl	≥ 15 µl	≥ 25 µl
Automatable			✓			✓
Conversion Eficiency	> 99%			> 99%		
Processing Time	12 - 16 hr.			3 hr.		
Input	500 pg - 2 µg of DNA			500 pg - 2 µg of DNA		
Includes Methylated Control DNA with Primers						
PAGE NO.	13	13	13	14	14	14



The Importance of Conversion Efficiency

Conversion efficiency of cytosine to uracil is an increasingly important factor when selecting bisulfite conversion products. For applications such as bisulfite PCR, a conversion efficiency of 99% may be more than sufficient for the average researcher. More sensitive or broader scale applications, however, such as Reduced Representation Bisulfite Sequencing (*RRBS*) and pyrosequencing often require even greater stringency (>99.5%) as even 0.5% differences in conversion efficiency may be detected. This makes it imperative to choose conversion technologies that have been proven to consistently yield the highest possible efficiency.

Convenient, Pre-made Conversion Reagent | *Input Cells & Tissues Directly!* | *First-time Users*

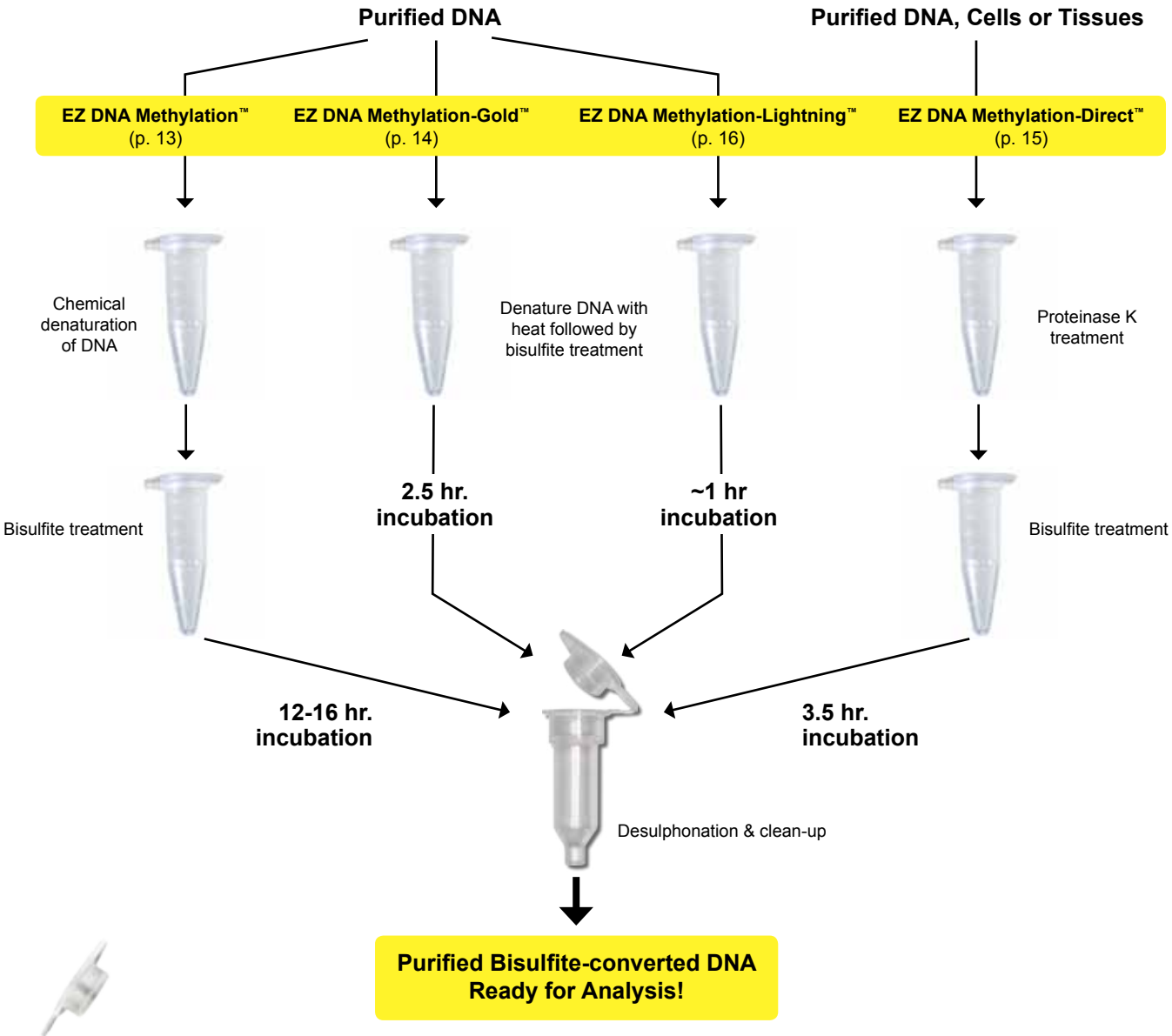
EZ DNA Methylation-Lightning™ Kits			**EZ DNA Methylation-Direct™ Kits**			**EZ DNA Methylation-Startup™ Kits**
Spin Column	96-Well	MagBead	Spin Column	96-Well	MagBead	Spin Column
≥ 10 µl	≥ 15 µl	≥ 25 µl	≥ 10 µl	≥ 15 µl	≥ 25 µl	≥ 10 µl
		✓			✓	
> 99.5%			> 99.5%			> 99.5%
1.5 hr.			4 hr.			4 hr.
100 pg - 2 µg of DNA			DNA (≥ 50 pg), cells (≥ 10), blood, tissue, FFPE			
						✓
16	16	16	15	15	15	17

Did you know?

The EZ DNA Methylation™ Kits are the most-cited kits for bisulfite treatment of DNA for methylation analysis.

Technology Overview: EZ DNA Methylation™

The EZ DNA Methylation™ family of kits from Zymo Research remain the most popular and cited technologies available for bisulfite conversion and DNA methylation detection. They have been cited by countless researchers at academic institutions and in the biotechnology industry. The EZ DNA Methylation™ kits have been specifically engineered for complete conversion of as little as 50 pg DNA in as fast as 1.5 hours reliably with high DNA recoveries (figure below). Kits are available in single column, 96-well plate and magnetic bead formats.



Innovators of the Low Elution Desulphonation Column

A core technology of Zymo Research's bisulfite DNA conversion kits is the *Fast-Spin* Zymo-Spin™ IC column. Developed and manufactured exclusively by Zymo Research, its innovative design makes it ideal for rapid in-column desulphonation and high-yield elution of bisulfite-treated DNA. These unique columns allow purification of up to 5 µg of DNA in ≥ 6 µl eluate with no buffer retention or carryover.

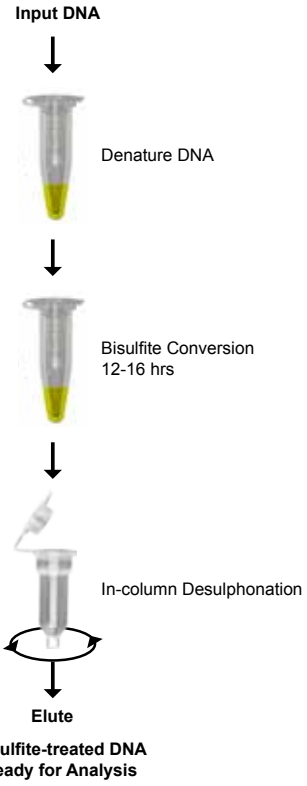
EZ DNA Methylation™ Kits

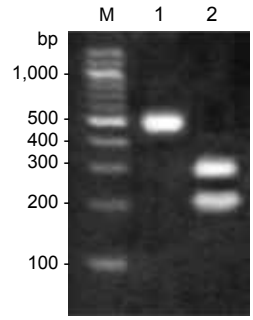
Highlights

- Desulphonation and recovery of bisulfite-treated DNA with spin column, 96-well plate, and magnetic bead format.
- Recovered DNA is ideal for downstream analyses including PCR, endonuclease digestion, sequencing, microarrays, etc.

Description

The EZ DNA Methylation™ Kits feature simplified procedures that streamline bisulfite treatment of DNA. The kits are based on the three-step reaction that takes place between cytosine and sodium bisulfite where cytosine is converted into uracil. The innovative desulphonation technologies eliminate otherwise cumbersome precipitations. The kits are designed to reduce template degradation, minimize 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.





Conversion of non-methylated cytosine. A 459 bp PCR product amplified from either DNA converted with the EZ DNA Methylation™ Kit (lane 1) or from untreated DNA (lane 2) was digested with EcoR I. The cytosine at the EcoR I site was converted to uracil during treatment, preventing cleavage of the DNA by the endonuclease.

Product	*Cat. No.*	*Size*
EZ DNA Methylation™ Kit	D5001 D5002	50 rxns. 200 rxns.
EZ-96 DNA Methylation™ Kit (shallow-well)	D5003	2 x 96 rxns.
EZ-96 DNA Methylation™ Kit (deep-well)	D5004	2 x 96 rxns.
EZ-96 DNA Methylation™ MagPrep	D5040 D5041	4 x 96 rxns. 8 x 96 rxns.

Use

Bisulfite Treatment..... ✓
Rapid Column/Plate/Bead Desulphonation..... ✓

Specifications

Input..... Purified DNA
Conversion Efficiency..... > 99%
DNA Recovery..... > 80%
Processing Time..... 12 - 16 hr.

EZ DNA Methylation™ Kit
Format..... Spin Column
Elution Volume..... ≥ 10 µl

EZ-96 DNA Methylation™ Kit
Format..... 96-Well
Elution Volume..... ≥ 15 µl

EZ-96 DNA Methylation™ MagPrep
Format..... Magnetic Beads
Elution Volume..... 25 µl
Automation Ready!

Available Formats

Zymo-Spin™ IC D5001, D5002 (p. 160)

Silicon-A™ Plate D5003 (p. 162)

Zymo-Spin™ I-96 D5004 (p. 162)

MagBinding Beads D5040, D5041 (p. 167)

EZ DNA Methylation-Gold™ Kits

Use

Bisulfite Treatment..... ✓
Rapid Column/Plate/Bead Desulphonation..... ✓

Specifications

Input..... Purified DNA
Conversion Efficiency..... > 99%
DNA Recovery..... > 75%
Processing Time..... 3 hr.

EZ DNA Methylation-Gold™ Kit
Format..... Spin Column
Elution Volume.....≥10 µl

EZ-96 DNA Methylation-Gold™ Kit
Format.....96-Well
Elution Volume.....≥15 µl

EZ-96 DNA Methylation-Gold™ MagPrep
Format.....Magnetic Beads
Elution Volume..... 25 µl
Automation Ready!

Available Formats

Zymo-Spin™ IC D5005, D5006 (p. 160)

Silicon-A™ Plate D5007 (p. 162)

Zymo-Spin™ I-96 D5008 (p. 162)

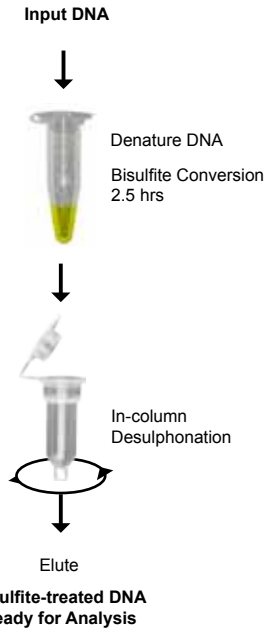
MagBinding Beads D5042, D5043 (p. 167)

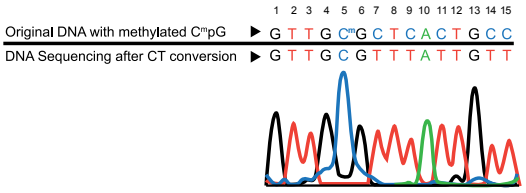
Highlights

- A coupled heat denaturation/conversion reaction step streamlines the conversion of non-methylated cytosines into uracil.
- Desulphonation and recovery of bisulfite-treated DNA with a spin column, 96-well plate, or magnetic beads.
- Recovered DNA is ideal for downstream analyses including PCR, endonuclease digestion, sequencing, microarrays, etc.

Description

The EZ DNA Methylation-Gold™ Kits are refinements of our popular EZ DNA Methylation™ kits (see previous page). These products consolidate 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.





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.

Product	*Cat. No.*	*Size*
EZ DNA Methylation-Gold™ Kit	D5005 D5006	50 rxns. 200 rxns.
EZ-96 DNA Methylation-Gold™ Kit (shallow-well)	D5007	2 x 96 rxns.
EZ-96 DNA Methylation-Gold™ Kit (deep-well)	D5008	2 x 96 rxns.
EZ-96 DNA Methylation-Gold™ MagPrep	D5042 D5043	4 x 96 rxns. 8 x 96 rxns.

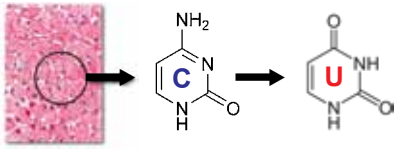
EZ DNA Methylation-Direct™ Kits

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.

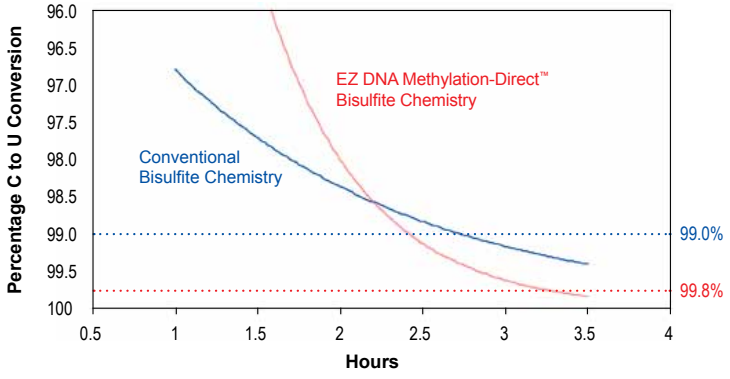
Description

The EZ DNA Methylation-Direct™ Kits are a further refinement of our popular EZ DNA Methylation™ and EZ DNA Methylation-Gold™ kits (see previous pages). These products feature 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. Like the EZ DNA Methylation-Gold™ kits, DNA denaturation and bisulfite conversion processes are combined into a single step. Recovered bisulfite-converted DNA is ideal for PCR amplification for downstream analyses including restriction endonuclease digestion, sequencing, microarrays, etc.



EZ DNA Methylation-Direct™ Kit can be used for DNA Methylation detection *directly* from blood, cells, and tissue.

EZ DNA Methylation-Direct™ Bisulfite Chemistry Significantly Improves C to U Conversion Kinetics



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. These data show 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*
EZ DNA Methylation-Direct™ Kit	D5020 D5021	50 rxns. 200 rxns.
EZ-96 DNA Methylation-Direct™ Kit (shallow-well)	D5022	2 x 96 rxns.
EZ-96 DNA Methylation-Direct™ Kit (deep-well)	D5023	2 x 96 rxns.
EZ-96 DNA Methylation-Direct™ MagPrep	D5044 D5045	4 x 96 rxns. 8 x 96 rxns.

Use

Bisulfite Treatment..... ✓
Rapid Column/Plate/Bead Desulphonation..... ✓

Specifications

Input: DNA, Cells, Blood, Tissue, FFPE
Conversion Efficiency..... > 99.5%
DNA Recovery..... > 80%
Processing Time..... 4 hr.

EZ DNA Methylation-Direct™ Kit
Format..... Spin Column
Elution Volume..... ≥ 10 µl

EZ-96 DNA Methylation-Direct™ Kit
Format..... 96-Well
Elution Volume..... ≥ 15 µl

EZ-96 DNA Methylation-Direct™ MagPrep
Format..... Magnetic Beads
Elution Volume..... 25 µl
Automation Ready!

Available Formats

Zymo-Spin™ IC D5020, D5021 (p. 160)

Silicon-A™ Plate D5022 (p. 162)

Zymo-Spin™ I-96 D5023 (p. 162)

MagBinding Beads D5044, D5045 (p. 167)

EZ DNA Methylation-Lightning™ Kits

Use

Rapid Bisulfite Treatment..... ✓
Rapid Column/Plate/Bead Desulphonation..... ✓

Specifications

Input..... Purified DNA
Conversion Efficiency.....>99.5%
DNA Recovery.....>80%

Processing Time..... 1.5 hr.

EZ DNA Methylation -Lightning™ Kit
Format..... Spin Column
Elution Volume.....≥10 µl

EZ-96 DNA Methylation -Lightning™ Kit
Format.....96-Well
Elution Volume.....≥15 µl

EZ-96 DNA Methylation -Lightning™ MagPrep
Format..... Magnetic Beads
Elution Volume.....25 µl
Automation Ready!

Available Formats

Zymo-Spin™ IC D5030, D5031 (p. 160)

Silicon-A™ Plate D5032 (p. 162)

Zymo-Spin™ I-96 D5033 (p. 162)

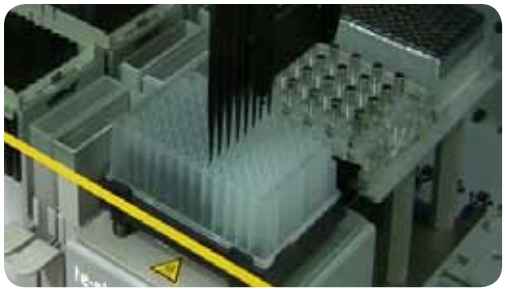
MagBinding Beads D5046, D5047 (p. 167)

Highlights

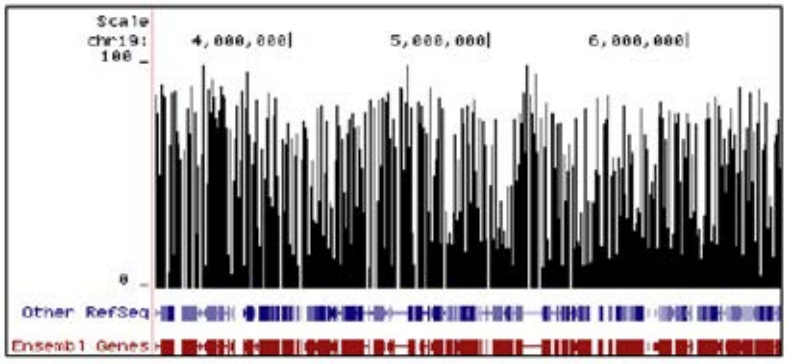
- Fastest method for complete bisulfite conversion of DNA for methylation analysis.
- Ready-to-use conversion reagent is added directly to DNA.
- High-yield, converted DNA is ideal for PCR, MSP, array, bisulfite and Next-Gen sequencing.

Description

The EZ DNA Methylation-Lightning™ Kits feature rapid and reliable bisulfite treatment and conversion of DNA for methylation analysis. Key to the fast workflow is the ready-to-use Lightning Conversion Reagent. No preparation is necessary, simply add this unique reagent to a DNA sample, wait about an hour, and let the reaction proceed to completion. DNA denaturation and bisulfite conversion processes are combined with added heat to facilitate rapid denaturation. Desulphonation and clean-up of the converted DNA is performed using unique low-elution technologies. High yield, converted DNA is ideal for PCR, array, bisulfite and Next-Gen sequencing, etc.



Fully Automatable!



Methylation Plot From Reduced Representation Bisulfite Sequencing (RRBS). Data shows the relative percentage of methylation at individual CpG sites in mouse DNA. Methylation percentage is shown across a ~3 Mb region of mouse chromosome 19. Bisulfite sequencing libraries were prepared using mouse genomic DNA prepped with the Genomic DNA Clean & Concentrator™ (p. 59) and bisulfite converted using EZ DNA Methylation™ technology prior to Next-Gen sequencing.

Product	*Cat. No.*	*Size*
EZ DNA Methylation-Lightning™ Kit	D5030 D5031	50 rxns. 200 rxns.
EZ-96 DNA Methylation-Lightning™ Kit (shallow-well)	D5032	2 x 96 rxns.
EZ-96 DNA Methylation-Lightning™ Kit (deep-well)	D5033	2 x 96 rxns.
EZ-96 DNA Methylation-Lightning™ MagPrep	D5046 D5047	4 x 96 rxns. 8 x 96 rxns.

EZ DNA Methylation-Startup™ Kit

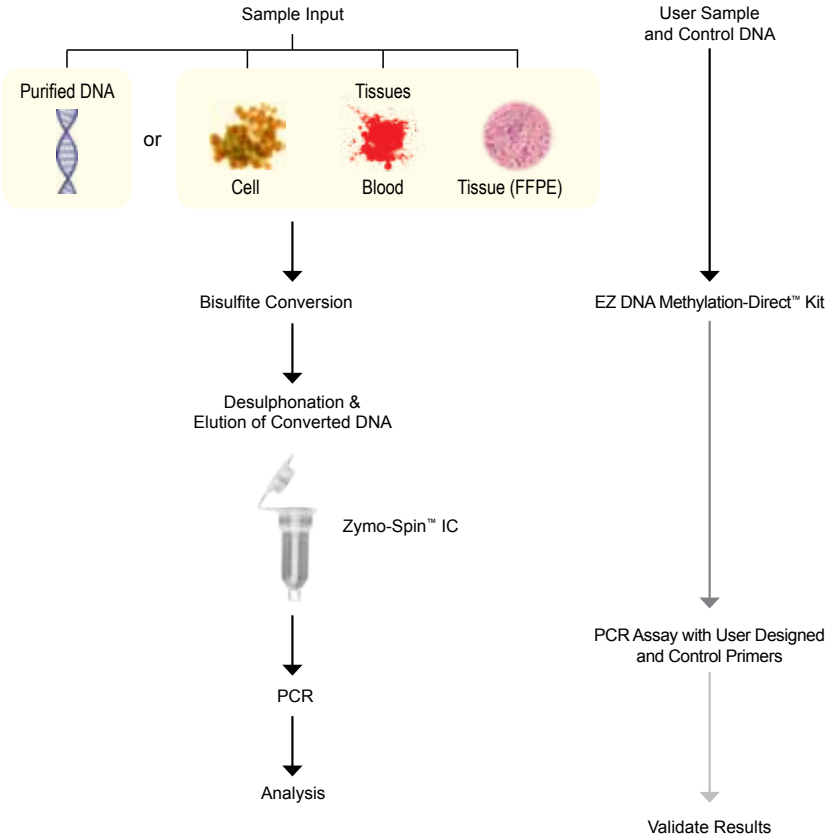
Highlights

- A complete system for DNA methylation detection: DNA bisulfite treatment, robust hot-start PCR, and a universally methylated human control DNA standard with primers.
- Designed for the first time user requiring a consolidated product to perform DNA methylation analysis.

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. 15). A fully methylated Universal Methylated Human DNA Standard (p. 21) is provided together with a special primer set for PCR to assess conversion efficiency. Finally, a unique Zymo*Taq*™ DNA Polymerase (p. 37) is included for robust amplification of bisulfite-treated DNA.

Workflow of the EZ DNA Methylation-Startup™ Kit



Product	*Cat. No.*	*Size*
EZ DNA Methylation-Startup™ Kit	D5024	50 rxns.

Use

Bisulfite Treatment..... ✓
Rapid Column Desulphonation.... ✓
Amplification of Bisulfite-converted DNA..... ✓

Specifications

Input: DNA, Cells, Blood, Tissue, FFPE
Conversion Efficiency..... > 99.5%
Format..... Spin Column
Elution Volume..... ≥ 10 µl
Conversion Efficiency..... > 99.5%
DNA Recovery..... > 80%
Bisulfite Conversion Time..... 4 hr.

Includes:

Universal Methylated Human DNA Standard (D5011)

EZ DNA Methylation -Direct™ Kit (D5020)

Zymo*Taq*™ DNA Polymerase (E2003)

Available Format

Zymo-Spin™ IC D5024 (p. 160)

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?

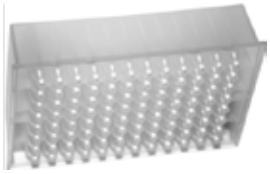
1) If sampling solid tissue, then it is most likely that too much sample was processed, resulting in incomplete DNA conversion.
2) If sampling FFPE tissue, then it is probable that the DNA was extensively damaged and/or cross-linked resulting in incomplete DNA conversion.
3) If debris is not removed 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. 37).

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
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.

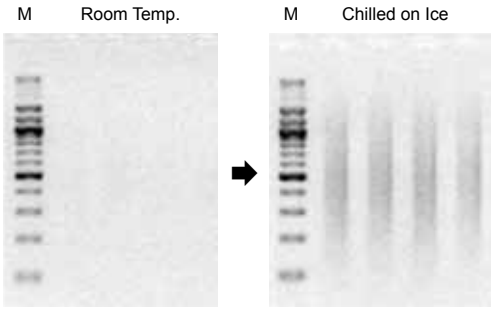
Tips for Bisulfite-treated DNA

Visualizing Bisulfite-treated DNA

Bisulfite-treated DNA can be visualized in agarose/EtBr gels following electrophoresis using a standard UV-light source. However, cooling the gel on ice for 5-10 minutes prior to visualization is necessary for fluorescence of intercalating dyes.

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 original base-pairing no longer exists. Instead, it is single stranded with limited non-specific base-pairing at room temperature. The absorption coefficient at 260 nm resembles that of RNA. Use a value of 40 µg/ml for A260 = 1.0 when determining the concentration of the recovered bisulfite-treated DNA.



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.

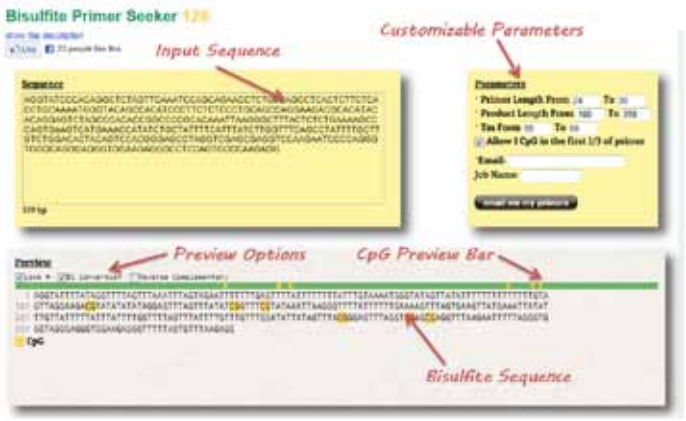
Template:		5' - GACCGTTCCAGGTCCAGCAGTGCGCT - 3'
Bisulfite Converted:		5' - GATCGTTTTAGGTTTAGTAGTGCGTT - 3'
Primers:	Reverse:	3' - ATCATCACRCAA - 5'
	Forward:	5' - GATYGTTTTAGGT - 3'

R = G/A
Y = C/T

Only the reverse primer binds to the converted DNA, the forward primer will bind 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. 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. Bisulfite Primer Seeker (see image below) is a useful resource when designing primers for bisulfite 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. 37) is strongly recommended for the amplification of bisulfite-treated DNA.

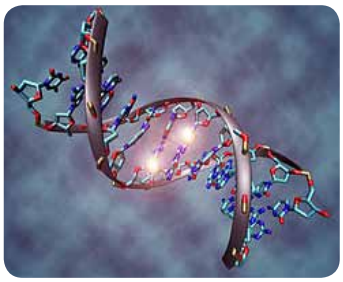
Bisulfite Primer Seeker is an easy-to-use and versatile tool for bisulfite primer design.
www.zymoresearch.com/tools/bisulfite-primer-seeker



Human Methylated & Non-methylated DNA Sets

Use

Control for Bisulfite Conversion... ✓
DNA Methylation Quantitation... ✓



Specifications

Format..... Human Male Genomic DNA
Concentration.....250ng/µl

Specifications

Human Methylated and Non-methylated DNA Standard
Format.....Male Genomic DNA
Concentration.....250ng/µl

Bisulfite-converted Human Methylated and Non-methylated DNA Standard
Format.....Male Genomic DNA
Concentration.....20ng/µl

Highlights

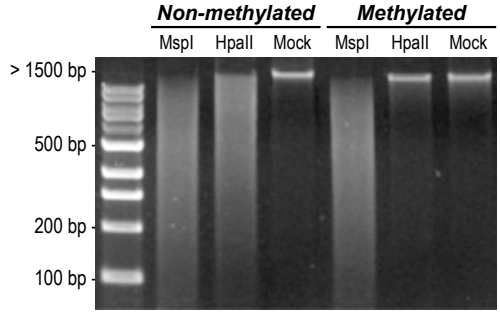
- Purified, non-methylated and methylated human DNA for use as negative and positive control in methylation detection applications.
- Each standard is provided with primer set to amplify a fragment of DNA after bisulfite conversion.

Description

The Human Methylated & Non-methylated DNA Set consists of two control DNAs (a methylated human DNA standard and a non-methylated human DNA standard) together with a set of specifically designed primers that can be used in conjunction with the EZ DNA Methylation™ family of products (pp. 10-11) 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 DNA derived from HCT116 DKO cells has a low level of DNA methylation (< 5%) and therefore can be used as a negative control for DNA methylation analysis (see below). The methylated human DNA standard is purified HCT116 DKO DNA that has been enzymatically methylated at all cytosine positions comprising CG dinucleotides by CpG Methylase (p. 35) and can be used as a positive control for DNA methylation analysis.

The Bisulfite-converted Human Methylated & Non-methylated DNA Set is designed for use as a control for bisulfite mediated conversion of DNA and especially downstream analyses including PCR, MSP, and other amplification based assays. This DNA is identical to the Human Methylated & Non-methylated DNA Set, but has been bisulfite-converted using Zymo Research's advanced conversion technologies. The primer set included with the set has been designed and validated to amplify a segment of the bisulfite-converted DNA.



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.

Product	*Cat. No.*	*Size*
Human Methylated & Non-methylated DNA Set	D5014	1 set
Human Methylated & Non-methylated (WGA) DNA Set	D5013	1 set
Bisulfite-converted Human Methylated & Non-Methylated (WGA) DNA Set	D5009	1 set

Universal Methylated DNA Standards

Highlights

- DNA completely methylated at CpG dinucleotides by CpG Methylase.
- Each standard is provided with primer set to amplify a fragment of DNA after bisulfite conversion.

Description

The Universal Methylated DNA Standards are designed for use as controls to assess the efficiency of bisulfite-mediated conversion of DNA in combination with the EZ DNA Methylation™ family of products (pp. 10-11). The control DNAs have been enzymatically modified *in vitro* with CpG Methylase (p. 35), resulting in methylation at all cytosines in the dinucleotide sequence 5′...CpG...3′. The methylated cytosines remain unconverted following bisulfite treatment, whereas non-methylated cytosines are converted into uracils and detected as thymines following PCR. Each primer set has been specifically designed to amplify a fragment of the supplied DNA following bisulfite treatment.

Product	*Cat. No.*	*Size*
Universal Methylated DNA Standard	D5010	1 set (20 rxns.)
Universal Methylated Human DNA Standard	D5011	1 set (20 rxns.)
Universal Methylated Mouse DNA Standard	D5012	1 set (20 rxns.)
Bisulfite-converted Universal Methylated Human DNA Standard	D5015	1 set (50 rxns.)

Use

Control for Bisulfite Conversion... ✓
DNA Methylation Quantitation..... ✓

Specifications

Universal Methylated DNA Standard
Format..... Linearized Plasmid
Concentration..... 5 pg/µl

Universal Methylated Human DNA Standard
Format..... Male Genomic DNA
Concentration..... 250 ng/µl

Universal Methylated Mouse DNA Standard
Format..... Male Genomic DNA
Concentration..... 250 ng/µl

Bisulfite-converted Universal Methylated Human DNA Standard
Format.....Bisulfite-converted Male Genomic DNA
Concentration..... 20 ng/µl

E. coli Non-methylated Genomic DNA

Description

This non-methylated genomic DNA is from a Dam⁻ and Dcm⁻ strain (ER2925) of *E. coli*. It is useful 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*
E. coli Non-methylated Genomic DNA	D5016	5 µg / 20 µl

Use

Control for Bisulfite Conversion... ✓
DNA Methylation Quantitation..... ✓

Specifications

Format..... *E. coli* Genomic DNA
Concentration..... 250 ng/µl

Methylated & Non-methylated pUC19 DNA Set

Description

The Methylated & Non-methylated pUC19 DNA Set consists of control DNAs and a set of specifically designed primers that can be used to assess bisulfite conversion efficiency 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. 35).

Product	*Cat. No.*	*Size*
Methylated & Non-methylated pUC19 DNA Set	D5017	1 set

Use

Control for Bisulfite Conversion... ✓
DNA Methylation Quantitation..... ✓

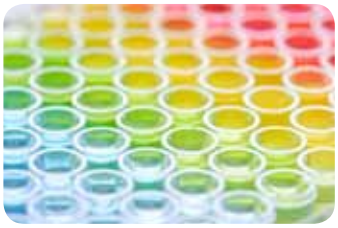
Specifications

Format..... Linearized Plasmid
Concentration..... 1 ng/µl

5-mC DNA ELISA Kit

Use

Global 5-mC Detection and Quantitation. ..... ✓



Specifications

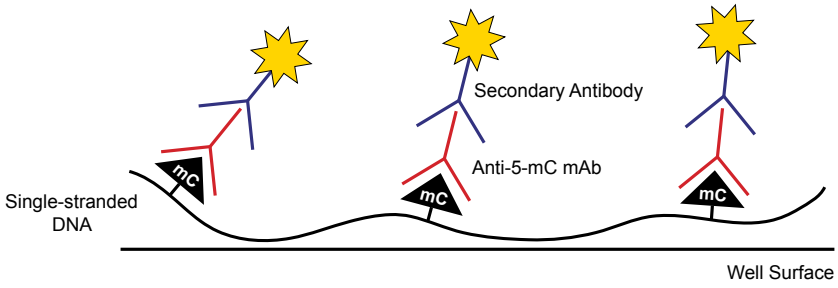
DNA Input..... 10-200 ng
Detection..... ≥0.5% 5-mC per 100 ng
Assay Time..... 3-4 hr.

Highlights

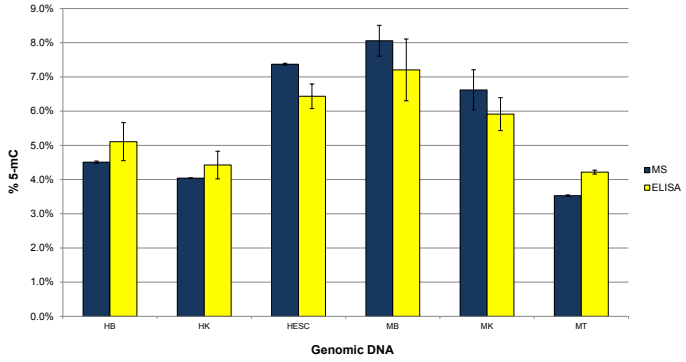
- For high-throughput, detection of global 5-methylcytosine (5-mC) in DNA.
- The streamlined workflow can be completed in less than 3 hours.

Description

The 5-mC DNA ELISA Kit is a convenient and powerful tool that allows the researcher to accurately quantitate 5-mC in any DNA sample in less than 3 hours. The kit features a unique Anti-5-Methylcytosine monoclonal antibody (see following page) 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. Percent 5-mC in a DNA sample can be accurately quantified from a standard curve generated with specially designed controls included with the kit. Also, the fast, streamlined workflow is ideal for high-throughput analyses.



The 5-mC DNA ELISA Kit utilizes the indirect ELISA technique in its workflow. Denatured, single-stranded DNA samples are coated on the well surfaces in 5-mC Coating Buffer. Anti-5-Methylcytosine monoclonal antibody (Anti-5-mC mAb) and the HRP-conjugated Secondary Antibody are prepared in 5-mC ELISA Buffer and added to the wells. Detection of 5-mC occurs after addition of the HRP Developer.



The 5-mC DNA ELISA Kit can quantify 5-mC in numerous DNA samples with close correlation to LC-MS/MSMRM analysis. 100 ng of genomic DNA from human brain (HB), human kidney (HK), human embryonic stem cell (HESC), mouse brain (MB), mouse kidney (MK), mouse testes (MT) was analyzed.

Product	*Cat. No.*	*Size*
5-mC DNA ELISA Kit	D5325 D5326	1 x 96 rxns. 2 x 96 rxns.

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

Highlights

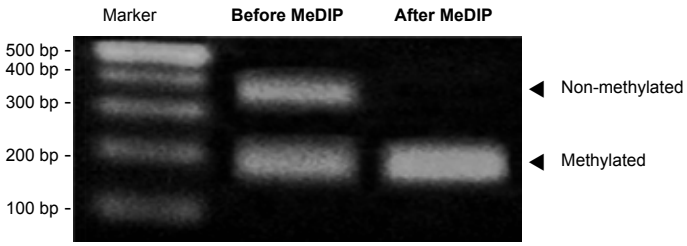
- Specifically binds to 5-methylcytosine in ssDNA context.
- No detectable cross reactivity with non-methylated cytosine.

Description

The mouse Anti-5-Methylcytosine Monoclonal Antibody (Clone 10G4) has been developed to facilitate differentiation between methylated and non-methylated cytosines in DNA. Specificity of this clone is to 5-methylcytosines in single-stranded DNA with no detectable cross reactivity to non-methylated cytosines. The antibody has proven to be a valuable tool in the characterization of DNA methylation and has been successfully used for immunoprecipitation-based assays such as Methylated DNA Immunoprecipitation (MeDIP), see the following page.

Application		Recommended Dilution
ELISA	Yes	≥ 1:4,000
Immunoblotting	Yes	≥ 1:5,000
Immunofluorescence	Yes	N/A*
Immunoprecipitation (IP) of Methylated DNA	Yes	2 - 4 µg per IP

*N/A = Data Not Available



Methylated DNA is efficiently enriched using the 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.

Product	*Cat. No.*	*Size*
Anti-5-Methylcytosine Antibody (clone 10G4)	A3001-15	15 µg/15 µl
	A3001-30	30 µg/30 µl
	A3001-50	50 µg/50 µl
	A3001-200	200 µg/200 µl

Use

Immunoprecipitation of Methylated DNA..... ✓
ELISA..... ✓
Immunoblotting..... ✓
Immunofluorescence..... ✓

Specifications

Isotype.....IgG1
Concentration..... 1 mg/ml
Buffer.....PBS (pH 7.4)
0.01% Thimerosal
Short Term Storage..... 4°C
Long Term Storage..... - 80°C

Methylated-DNA IP Kit

Use

Immunoprecipitation of Methylated DNA..... ✓
Purification of Methylated DNA..... ✓

Specifications

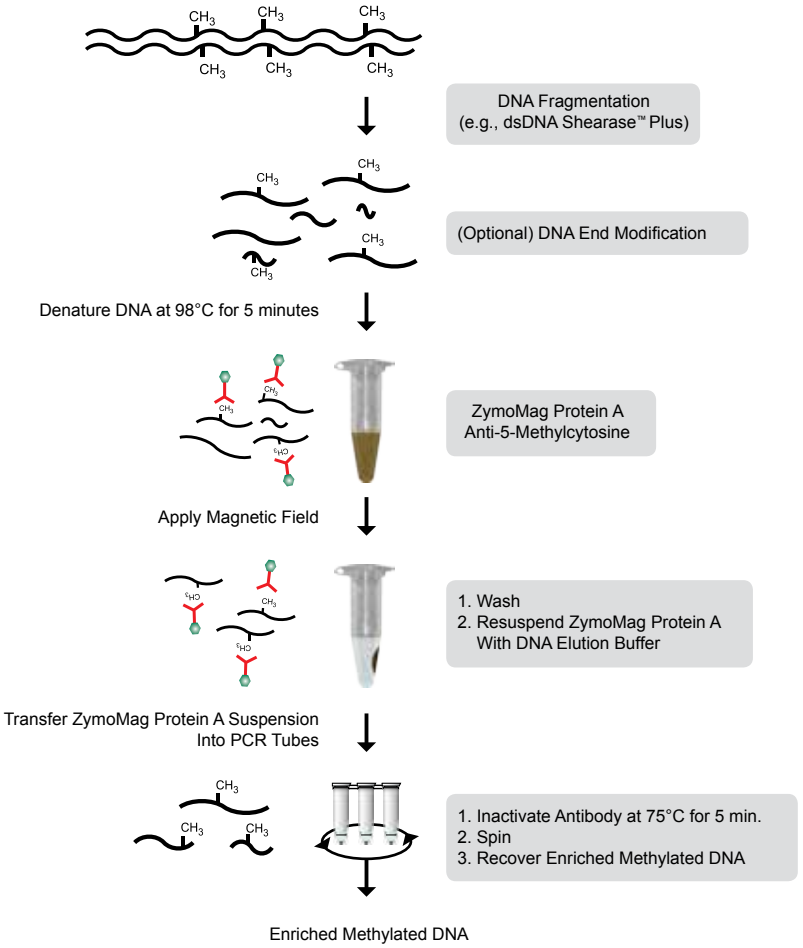
Format..... Magnetic Beads
Optimal DNA Input..... 50 - 500 ng
Elution Volume..... 10 µl
Enrichment Factor..... > 100 fold
Processing Time..... 4 hr.

Highlights

- Methylated DNA enrichment for large-scale DNA methylation analysis.
- 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 features immunoprecipitation technology for the enrichment of 5-methylcytosine-containing DNA from any pool of fragmented genomic DNA for use in genome-wide methylation analysis. The kit features a highly specific Anti-5-Methylcytosine Monoclonal Antibody (p. 23) for the capture and separation of methylated DNA from nonmethylated DNA in only a few hours (see figure below). Typically, over a hundred-fold enrichment of methylated DNA vs. non-methylated DNA can be achieved with the use of this kit. 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. The product is provided with control DNA and primers.



Product	*Cat. No.*	*Size*
Methylated-DNA IP Kit	D5101	10 Rxns

OneStep qMethyl™ Kits

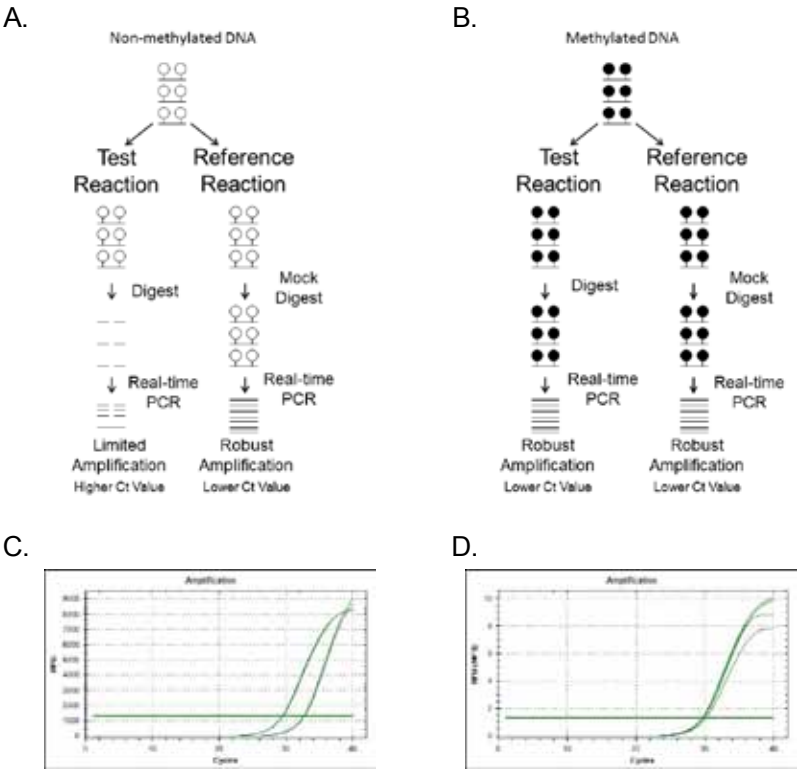
Highlights

- 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 from Zymo Research 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*
OneStep qMethyl™ Kit	D5310	44 tests
OneStep qMethyl™-Lite	D5311	44 tests

Use

Bisulfite-free DNA Methylation Analysis..... ✓

Rapid Screening of Multiple Loci or Single Locus Across Multiple Samples..... ✓

Specifications

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

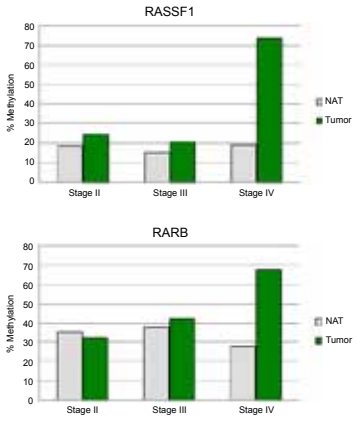
OneStep qMethyl™ Arrays

Use

Gene Specific, Real-Time Methylation Detection..... ✓

Specifications

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



***RASSF1* and *RARB* tumor suppressors are found to be involved in most cancers.** Using genomic DNA extracted (ZR Genomic DNA™ Tissue MiniPrep, p.79) from breast cancer tissue through various stages of cancer progression, different percentages of methylation could be detected using the *OneStep* qMethyl™ technology. Green bars indicate tumor samples and grey bars indicate normal adjacent tumor (NAT) samples.

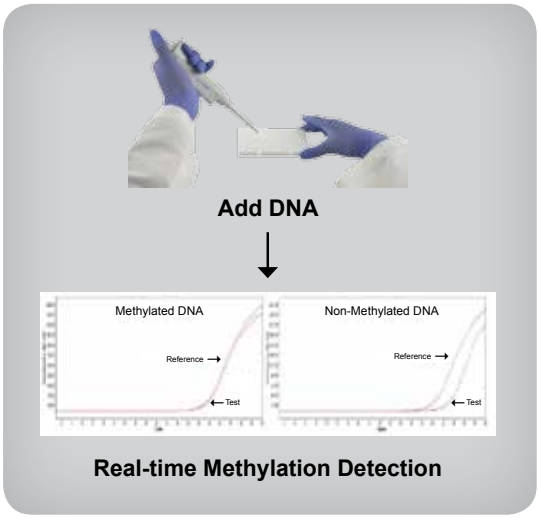
Highlights

- Just add your DNA and go! No primer design, no overnight digestions, no reaction cleanup.
- Premade 96-well assays ideal for rapid high-throughput screening of methylation status.
- Straightforward bisulfite-free procedure.

Description

The *OneStep* qMethyl™ Array is a pre-designed assay which combines methylation sensitive restriction enzyme digestion and real-time quantitative PCR into one step for bisulfite-free methylation analysis of specific loci. *OneStep* qMethyl™ Array comes in a real-time PCR plate that contains the necessary reagents and primers prealiquoted into the wells. Simply add a DNA sample and perform real-time PCR. Single locus arrays are currently available for the five human tumor suppressor genes *RASSF1*, *RARB*, *CDKN2A*, *MGMT*, and *CCND2*.

***OneStep* qMethyl™ Array**
Bisulfite-free DNA Methylation Quantitation



Processing time: ~4 hrs

Product	*Format*	*Cat. No.*	*Size*
OneStep qMethyl™ Array – *RASSF1*	Roche BioRad ABI	D5312-1-A D5312-1-B D5312-1-C	44 tests
OneStep qMethyl™ Array – *RARB*	Roche BioRad ABI	D5312-2-A D5312-2-B D5312-2-C	44 tests
OneStep qMethyl™Array – *CDKN2A*	Roche BioRad ABI	D5312-3-A D5312-3-B D5312-3-C	44 tests
OneStep qMethyl™ Array – *MGMT*	Roche BioRad ABI	D5312-4-A D5312-4-B D5312-4-C	44 tests
OneStep qMethyl™ Array – *CCND2*	Roche BioRad ABI	D5312-5-A D5312-5-B D5312-5-C	44 tests

OneStep qMethyl™ Panel (Human Pluripotent Stem Cell Panel I)

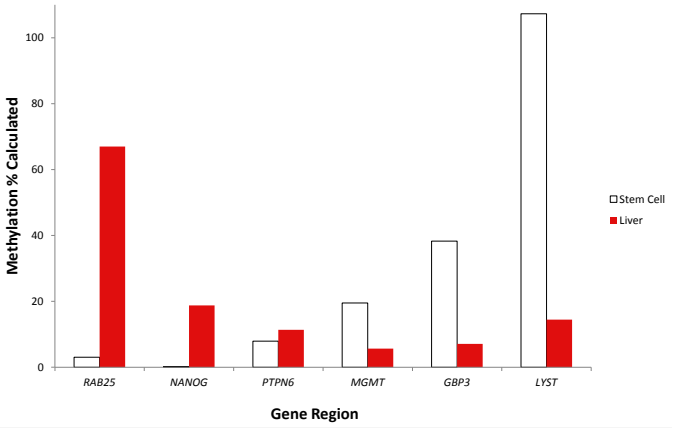
Highlights

- Premade, convenient 96-well assay for bisulfite-free methylation percent quantitation of specific DNA regions.
- Ideal for rapid, high-throughput quantification of DNA methylation in *RAB25, NANOG, PTPN6, MGMT, GBP3,* and *LYST* gene regions in human stem cells or for indicating pluripotency in stem cell lines.

Description

Pluripotency is the ability of embryonic stem cells to differentiate into multiple cell types. Pluripotent cells have epigenetic signatures that reflect their ability to generate multiple cell types. Different methylation patterns in gene regions vary between pluripotent and differentiated cells as a result of processes such as development, carcinogenesis, genomic imprinting disorders, and cell reprogramming. In human pluripotent cells, gene promoter regions in the *RAB25*, *NANOG*, and *PTPN6* genes have been shown to maintain low levels of DNA methylation compared to differentiated cell types. Conversely, gene promoter regions of *MGMT*, *GBP3*, and *LYST* have been shown to maintain high levels of methylation in pluripotent cells compared to differentiated cell types.

The *OneStep* qMethyl™ Panel (Human Pluripotent Stem Cell Panel I) from Zymo Research provides a simple, straightforward, and bisulfite-free procedure for rapid, DNA methylation assessment of *RAB25*, *NANOG*, *PTPN6*, *MGMT*, *GBP3*, and *LYST* in any cell type. The reagents in the plate are already premixed and optimized for robust amplification and detection. Simply add DNA into the appropriate well and then quantitate via real-time PCR.



Unique pluripotent stem cell methylation signature. Human differentiated DNA (red bars) and human stem cell DNA (white bars) show different DNA methylation percentages for *RAB25, NANOG, PTPN6, MGMT, GBP3, and LYST*.

Cell Population	*RAB25*	*NANOG*	*PTPN6*	*MGMT*	*GBP3*	*LYST*
Differentiated	+	+	+	-	-	-
Pluripotent	-	-	-	+	+	+

Product	***Format***	***Cat. No.***	***Size***
OneStep qMethyl™ Panel - Human Pluripotent Stem Cell Panel I	*Roche	D5313-1-A	1 x 96 well
	*BioRad	D5313-1-B	1 x 96 well
	*ABI	D5313-1-C	1 x 96 well
	Tube Format	D5313-1-D	44 tests

*Pre-aliquoted in the designated 96-Well PCR plate format.

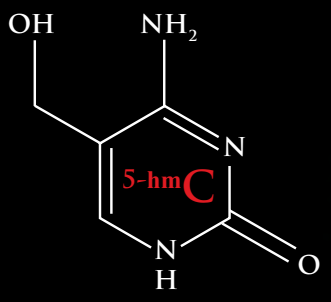
Use

Stem Cell Pluripotency Screening..... ✓

Specifications

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

Decode the Mystery of the Sixth Base

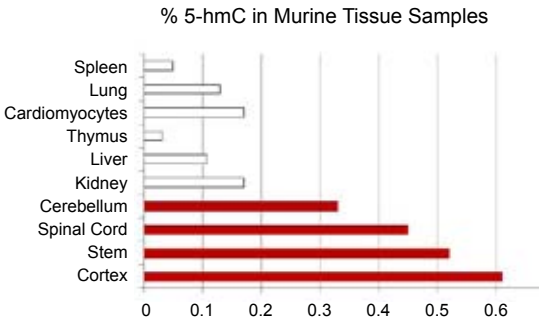


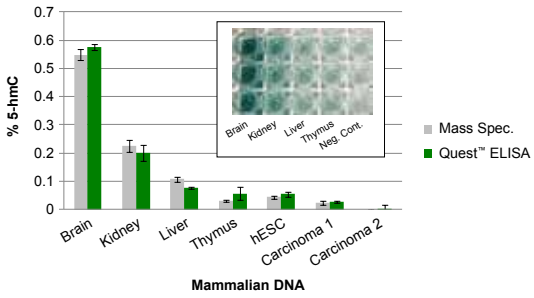
5-Hydroxymethylcytosine

Heralded as the 'sixth base', **5-hydroxymethylcytosine (5-hmC)** in DNA represents the newest frontier in the study of heritable epigenetic markers. Its physiological role has yet to be defined, but its putative role in transcriptional regulation has been implicated as well as its involvement in oxidative demethylation, cell and tissue differentiation, and more.

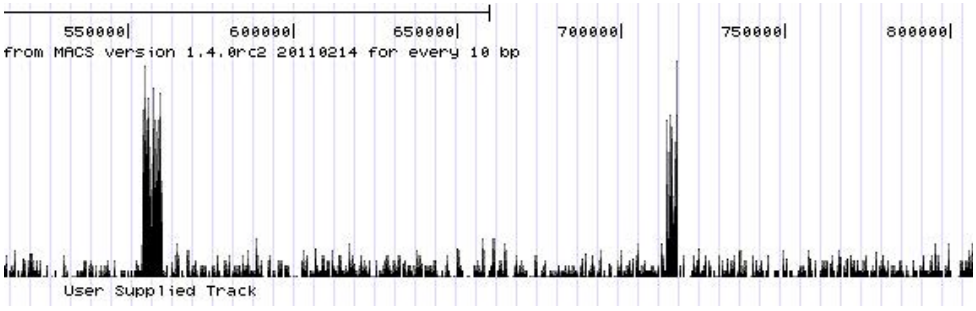
Got 5-hmC on the brain?

Here's why you should ... 5-hmC levels are highest in brain tissue. While this epigenetic mark can be found in nearly all mammalian tissues, its highest levels are consistently observed in the brain and the greater central nervous system.





5-hmC Quantification. Percent 5-hmC in mammalian DNA samples can be determined by mass spectrometry or Quest 5-hmC™ ELISA Kit (p. 30). Inlaid image represents relative amounts of 5-hmC in triplicate genomic DNA samples.



Enrichment of 5-hmC from human brain DNA followed by Next-Gen sequencing show the distribution of 5-hmC in genome-wide context. The distribution of 5-hmC is readily discernible by the two prominent peaks in the region shown above. *The physiological significance of 5-hmC is under intense investigation.*

Quest 5-hmC™ Detection Kits

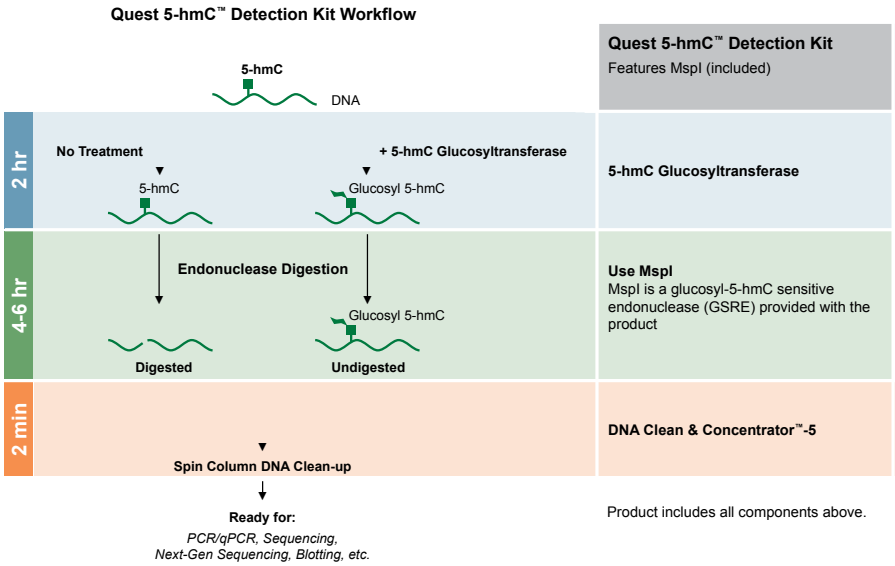
Highlights

- Method to distinguish 5-hydroxymethylcytosine in sequence- and locus-specific context within DNA.
- Convenient and reliable single tube reaction format.
- DNA is eluted in water or low salt buffer and is suitable for analysis by a variety of downstream applications.

Description

The Quest 5-hmC™ Detection Kit from Zymo Research allows for sequence specific detection of 5-hydroxymethylcytosine (5-hmC) within DNA using a simple and efficient reaction setup. Utilizing a robust and highly specific 5-hmC Glucosyltransferase enzyme, 5-hmC in DNA is specifically tagged with a glucose moiety yielding a modified base, glucosyl-5-hydroxymethylcytosine (g5-hmC).

After glucosylation of 5-hmC, digestion of DNA with g5-hmC sensitive restriction endonucleases (GSREs) allow differentiation of 5-methylcytosine from 5-hmC according to the context of a GSRE's recognition sequence. GSREs can efficiently digest DNA when cytosine, 5-methylcytosine, or 5-hydroxymethylcytosine is within their recognition sequence. However, if 5-hmC is glucosylated (i.e., g5-hmC), GSREs can no longer digest the DNA. Therefore, by exploiting this sensitivity to g5-hmC, effective detection of 5-hmC can be achieved by a number of downstream applications (e.g. qPCR, Next-Gen sequencing, Southern blotting, microarray, etc.).



Product includes all components above.

Product	*Cat. No.*	*Size*
Quest 5-hmC™ Detection Kit (Includes MspI GSRE)	D5410 D5411	25 preps. 50 preps.
Quest 5-hmC™ Detection-Lite Kit (GSRE not included)	D5415 D5416	25 preps. 50 preps.

Use

Sequence Specific 5-hmC Detection..... ✓

Compatible GSRE

Enzyme	Recognition Sequence
MspI*	CCGG
Csp6I	GTAC
HaeIII	GGCC
TaqαI	TCGA
MboI	GATC
McrBC	$R^mC(N_{40\text{-}3000})R^mC$

*included

Available Format

Zymo-Spin™ IC D5410, D5411, D5415, 5416 (p.160)

Quest 5-hmC™ DNA ELISA Kit

Use

Global 5-hmC Detection and Quantitation..... ✓

Specifications

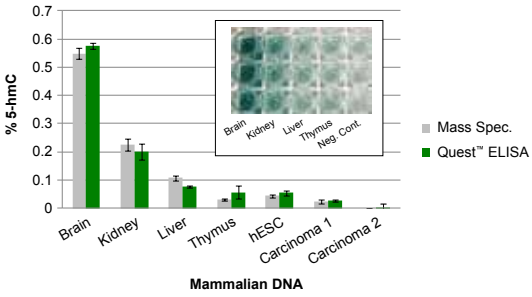
DNA Input.....25-200 ng
Detection..... ≥ 0.02% 5-hmC per 100 ng
Assay Time.....3-4 hr.

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

The Quest 5-hmC™ DNA ELISA Kit is both sensitive and specific 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/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*
Quest 5-hmC™ DNA ELISA Kit	D5425 D5426	1 x 96 rxns. 2 x 96 rxns.

Anti-5-hmC Polyclonal Antibody

Use

Immunoprecipitation..... ✓
ELISA..... ✓
Immunoblotting..... ✓
Immunofluorescence..... ✓

Specifications

Source.....Rabbit
Isotype..... IgG1
Concentration..... 1 mg/ml
Buffer..... PBS at pH 7.5.
Storage..... -20 °C

Highlights

- Low cross reactivity with cytosine and 5-methylcytosine versus other available antibodies.
- High sensitivity to low masses of 5-hydroxymethylcytosine DNA.

Description

The rabbit Anti-5-hmC polyclonal antibody has been developed in order to robustly distinguish between hydroxymethylated DNA and methylated or unmodified DNA. Specificity of the antibody is enhanced such that crossreactivity with unmodified and methylated templates is suppressed to near-background levels. The antibody has been extensively tested and validated in ELISA and immunoprecipitation-based enrichment assays, and is suitable for use in further applications including immunohistochemical labeling and chromatographic blotting.

Product	*Cat. No.*	*Size*
Anti-5-Hydroxymethylcytosine Polyclonal Antibody	A4001-25 A4001-50 A4001-200	25 µg/25 µl 50 µg/50 µl 200 µg/200 µl

Quest 5-hmC™ Enrichment Kit

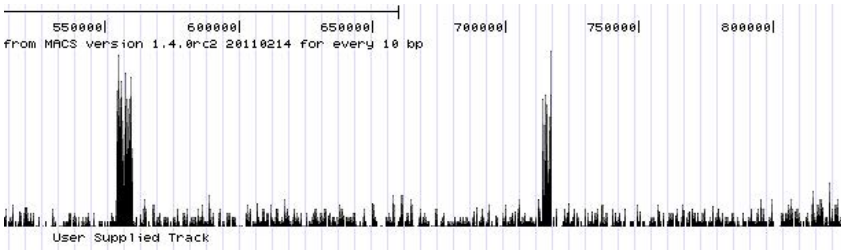
Highlights

- Clean and uniform enrichment of 5-hmC DNA by J-Binding Protein (JBP).
- Simple three-step workflow.
- Enriched DNA is ideal for PCR, qPCR, Next-Gen sequencing, arrays, and more.

Description

While the importance of DNA methylation in epigenetic regulation is well established, the biological role of hydroxymethylation remains elusive. The "sixth base", 5-hydroxymethylcytosine (5-hmC), has been detected in the DNA of embryonic stem cells and other cell types. Brain tissue DNA contains the highest levels of 5-hmC. Recent work suggests that 5-hmC may function in gene regulation and may be involved as an intermediate in active demethylation of 5-methylcytosine (5-mC). The Quest 5-hmC™ DNA Enrichment Kit features J-Binding Protein (JBP) for the specific enrichment of 5-hmC containing DNA. The consolidated workflow makes the procedure reliable for robust analysis of multiple samples. Simply glucosylate the input DNA, add JBP Capture MagBeads, then wash and elute the enriched 5-hmC DNA.

Schematic Overview of The Quest 5-hmC™ DNA Enrichment Kit Workflow



Enrichment of 5-hmC from human brain DNA followed by Next-Gen sequencing show the distribution of 5-hmC in genome-wide context. The distribution of 5-hmC is readily discernible by the two prominent peaks in the region shown above. This enrichment procedure is featured in an Epigenetic Service offered by Zymo Research (p. 45).

Use

5-hmC DNA Enrichment..... ✓

Specifications

DNA Input..... 5-4,000 ng
Processing Time..... ~3 hr.

Product	*Cat. No.*	*Size*
Quest 5-hmC™ DNA Enrichment Kit	D5420 D5421	25 rxns. 50 rxns.

Matched DNA Sets

Use

Control for Bisulfite Conversion... ✓
DNA Methylation Quantitation... ✓

Specifications

Human Matched DNA Set
Source..... Human Male
Concentration.....250ng/µl

Mouse 5-hmC & 5-mC DNA Set
Source..... Swiss Webster mice
Concentration.....250ng/µl

Highlights

- Matched DNA set of genomic DNA from multiple organs.
- 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-methylcytosine (5-mC) and 5-hydroxymethylcytosine (5-hmC) as both modified cytosines are present at physiologically relevant levels and loci.

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

Human Matched DNA Set

	Brain	Spleen
^{5m}C %	6.93%	6.75%
^{5hm}C %	1.89%	.018%

Mouse 5-hmC & 5-mC DNA Set

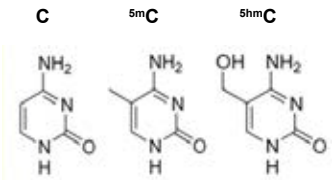
	Brain	Spleen	Liver	Thymus
^{5m}C %	8.06	6.62	7.13	7.54
^{5hm}C %	0.548	0.225	0.107	0.030

Product	*Cat. No.*	*Size*
Human Matched DNA Set	D5018	1 set
Mouse 5-hmC & 5-mC DNA Set	D5019	1 set

5-mC & 5-hmC DNA Standard Set

Use

Cytosine modification studies
(i.e., 5-mC & 5-hmC)..... ✓



Specifications

DNA Amount.....2µg each
DNA Concentrations...50ng/µl each

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 is a set of three DNA standards that are linear dsDNA, 897 bp, and have the same sequence. The only difference is that each contains either 100% unmodified cytosines, 5-methylcytosines, or 5-hydroxymethylcytosines (see figure to the left). 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*
5-mC & 5-hmC DNA Standard Set	D5405	1 set

ChIP DNA Clean & Concentrator™ Kits

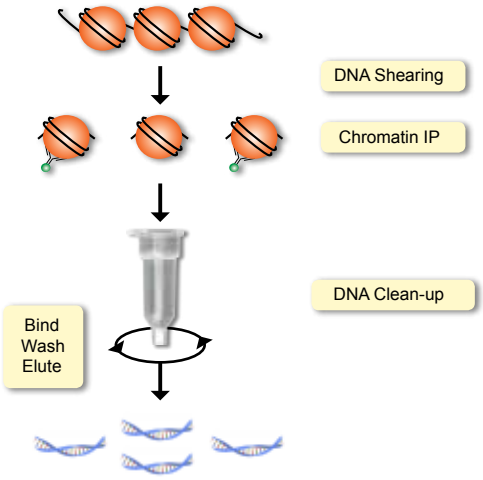
Highlights

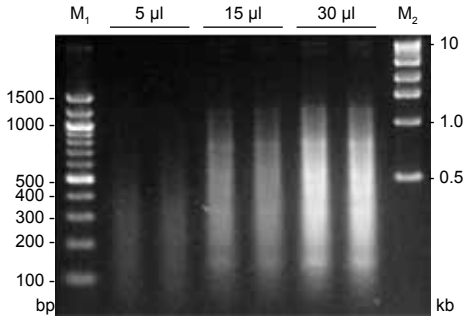
- Two (2) minute DNA clean-up from any step in a standard ChIP protocol.
- DNA is ideal for PCR, arrays, DNA quantification, Southern blot analysis, sequencing, and other molecular applications.

Description

The ChIP DNA Clean & Concentrator™ and ZR-96 ChIP DNA Clean & Concentrator™ provide hassle-free methods for the rapid purification and concentration of high quality DNA from any step in a standard chromatin immunoprecipitation (ChIP) protocol. This includes samples that have undergone reverse cross-linking, Proteinase K or RNase A digestion, mechanical or nuclease-mediated DNA shearing, and samples eluted from chromatin-antibody-bead complexes. The specially formulated ChIP DNA Binding Buffer promotes DNA adsorption to the column in the presence of detergents, antibodies, and proteinases that are often used for ChIP. It can also be used for the removal of TES, 0.1M $NaHCO_3$ and 1% SDS from DNA eluted from chromatin-antibody-bead complexes.

Overview of ChIP DNA Clean & Concentrator™ Procedure





Agarose gel electrophoresis of DNA isolated from cell lysates. High quality DNA can be efficiently recovered from *Saccharomyces cerevisiae* cell lysates using the ChIP DNA Clean & Concentrator™. Duplicate purifications were performed with 5, 15, and 30 µl cell lysate and an equal volume of eluted DNA was loaded into each lane. The size marker M^1 and M_2 are 100 bp and 1 kb ladders, respectively (Zymo Research).

Product	*Cat. No.*	*Size*
ChIP DNA Clean & Concentrator™ (uncapped)	D5201	50 preps.
ChIP DNA Clean & Concentrator™ (capped)	D5205	50 preps.
ZR-96 ChIP DNA Clean & Concentrator™	D5206 D5207	2 x 96 preps. 4 x 96 preps.

Use

DNA Purification from any ChIP... ✓

Protein, Salt, and Detergent Removal..... ✓

Specifications

DNA Size Limits.....50 bp - 23 kb
DNA Recovery
50 bp - 10 kb..... 70 - 90%
> 10 kb..... 70%
Detergent Tolerance:
≤ 5% Triton X-100,≤ 5% Tween-20,
≤ 5% Sarkosyl, ≤ 1% SDS,
and others.
Binding Capacity.....5 µg/prep.

ChIP DNA Clean & Concentrator™
Format.....Spin Column
Elution Volume.....≥6 µl
Processing Time.....2 min.

ZR-96 ChIP DNA Clean & Concentrator™
Format..... 96-Well
Elution Volume.....≥10 µl
Processing Time.....15 min.

Available Formats

Zymo-Spin™ I D5201 (p. 160)

Zymo-Spin™ IC D5205 (p. 160)

Zymo-Spin™ I-96 D5206, D5207 (p. 162)

EZ Nucleosomal DNA Prep Kit

Use

Mammalian Cells..... ✓
Yeast..... ✓
Nuclei..... ✓

Specifications

Enzyme Concentration..... 0.1 U/µl
Storage..... -20°C
Inactivation..... 5X MN Stop Buffer
Standard Reaction Time.... 45 min.

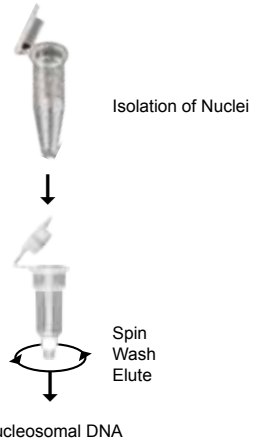
Highlights

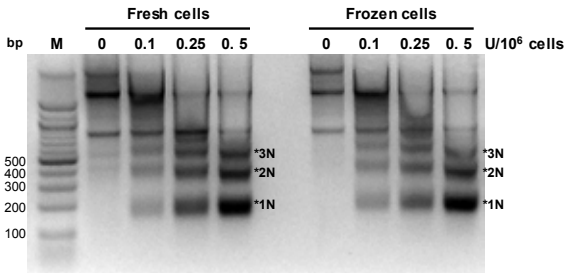
- For the isolation of nucleosome-associated DNA from fresh or frozen cells.
- Ideal for use in nucleosome mapping studies.
- Contains a newly developed enzyme - Atlantis dsDNase that replaces conventional micrococcal nuclease for nucleosomal DNA preparation.
- Atlantis dsDNase digestion yields homogenous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

Description

The EZ Nucleosomal DNA Prep Kit is a streamlined procedure for the isolation of nucleosome-associated DNA. The kit includes reagents/procedures for cell nuclei isolation, intact nuclei enzymatic digestion, and nucleosomal DNA purification. This kit includes two different enzymes for nucleosomal DNA preparation: Atlantis dsDNase and Micrococcal Nuclease (see p.150 and 152).

Atlantis dsDNase is a double-strand DNA specific endonuclease that cleaves phosphodiester bonds in DNA to yield oligonucleotides with 5'-phosphate and 3'-hydroxyl termini. Atlantis dsDNase digestion yields very homogeneous populations of core nucleosomes and purification of the nucleosome-associated DNA is performed using Zymo Research's proven *Fast-Spin* column technology. The result is pure nucleosomal DNA ready for analysis in less than 45 minutes!





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

Featured Technology

Atlantis dsDNase (p. 150)
Micrococcal Nuclease (p. 152)

Available Format

Zymo-Spin™ IIC D5220 (p. 160)

Product	*Cat. No.*	*Size*
EZ Nucleosomal DNA Prep Kit	D5220	20 preps.

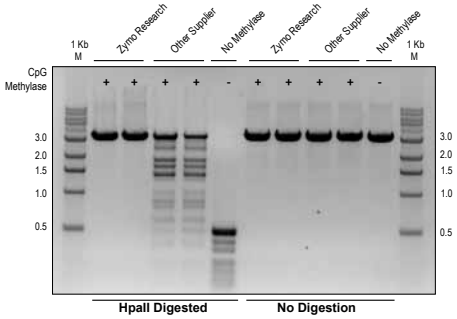
CpG Methylase (M.SssI)

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

The CpG Methylase from Zymo Research completely methylates all cytosines (C^5) in double-stranded, non-methylated and hemimethylated DNA having the 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.



Methylase activities of CpG Methylase from Zymo Research versus that of another supplier were tested for complete methylation of a linearized plasmid DNA. Completion of CpG methylation was assessed by resistance to digestion with a methylation-specific endonuclease (HpaII). The CpG Methylase from Zymo Research completely methylated the CpG sites in the DNA whereas that of the other supplier did not. Samples were assayed in duplicate.

Product	*Cat. No.*	*Size*
CpG Methylase (M. SssI)	E2010	200 U
	E2011	400 U

Use

In vitro Methylation of DNA..... ✓

CpGpCpG

Specifications

Enzyme Concentration..... 4 U/µl
Storage.....-20°C
Inactivation..... 65°C for 20 min.
Standard Reaction Time..... 2 hr.

Unit Definition

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.

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

Zymo Research's GpC Methylase completely methylates all cytosines (C^5) 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*
GpC Methylase (M. CviPI)	E2014	200 U
	E2015	1,000 U

Use

In vitro Methylation of DNA..... ✓

GpCpGpC

Specifications

Enzyme Concentration..... 4 U/µl
Storage.....-20°C
Inactivation..... 65°C for 20 min.
Standard Reaction Time..... 2 hr.

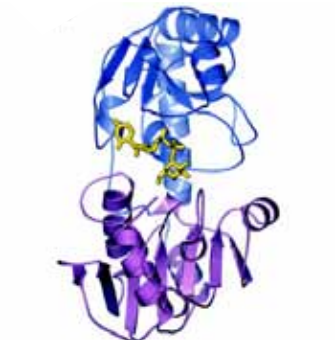
Unit Definition

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.

5-hmC Glucosyltransferase

Use

5-hmC Detection..... ✓
5-hmC Enrichment..... ✓



Specifications

Enzyme Concentration..... 2 U/µl
Storage..... -20°C
Standard Reaction Time..... 2 hr.

Unit Definition

One unit (U) is defined as the amount of enzyme needed to protect 1µg of 5-hmC DNA Standard (D5405-3, p32) from Csp6I digestion.

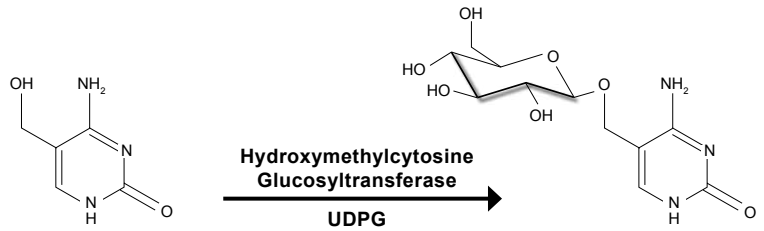
Highlights

- 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

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.

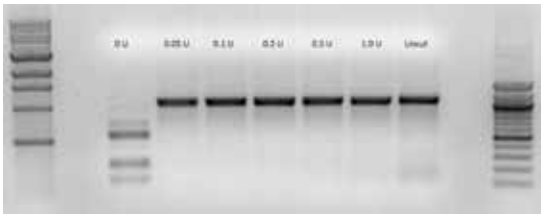
Glucosylation of 5-hydroxymethylcytosine by 5-hmC Glucosyltransferase can be used for sequence specific and locus specific (Quest 5-hmC™ Detection Kit, p. 29), as well as global quantification and enrichment (Quest 5-hmC™ Enrichment Kit, p. 30) of 5-hydroxymethylcytosine.



5hmC
5-Hydroxymethylcytosine

Glucosyl-5hmC
Glucosyl-5-hydroxymethylcytosine

5-hmC Glucosyltransferase transfers a glucose moeity from uridine diphosphoglucose (UDPG) onto pre-existing 5-hydroxymethylcytosines within DNA.



Recombinant 5-hmc Glucosyltransferase from Zymo Research demonstrates high activity and specificity. An 897-bp 5-hmC amplicon with two glucosyl-sensitive Csp6I sites was incubated with the indicated amount (U) of 5-hmc Glucosyltransferase for one hour at 37°C. Following glucosylation, 10 U of Csp6I was added to the reaction and incubated for an additional hour. Amplicons were purified using the DCC™-5 (p. 53) and visualized with agarose gel electrophoresis. All reactions that included 5-hmc Glucosyltransferase demonstrated complete protection from Csp6I digestion by comparison with an uncut template.

Product	*Cat. No.*	*Size*
5-hmC Glucosyltransferase	E2026 E2027	100 units 200 units

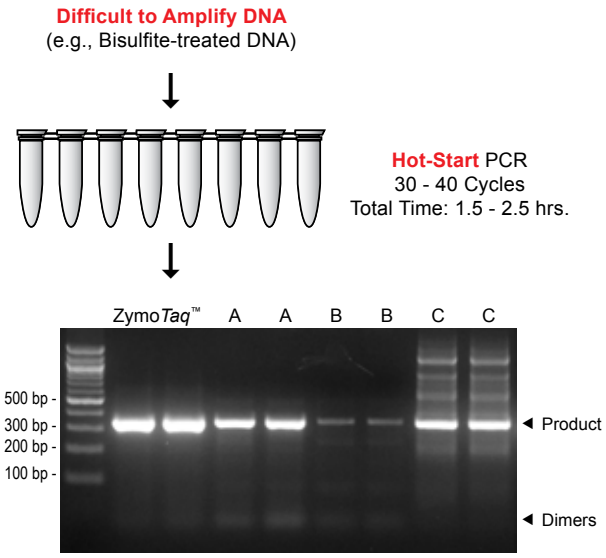
Zymo*Taq*™ DNA Polymerase

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 also 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*
Zymo*Taq*™ DNA Polymerase	E2001 E2002	50 rxns. 200 rxns.
Zymo*Taq*™ PreMix	E2003 E2004	50 rxns. 200 rxns.

Use

Amplification of Bisulfite-converted & CpG Rich DNA..... ✓
Amplification of DNA..... ✓
TA cloning ..... ✓

Specifications

Provided as a PreMix or as Part of a Set

Enzyme Concentration

Zymo*Taq*™ DNA Polymerase... 5 U/µl
Zymo*Taq*™ PreMix (2X)..... 4 U/50 µl

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.

Quest*Taq*™ PreMix

Use

Non-biased Amplification of 5-mC, 5-hmC, g5-hmC DNA..... ✓

Enzyme Concentration

2 U/10 µl

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.

qPCR Thermocycler Compatibility

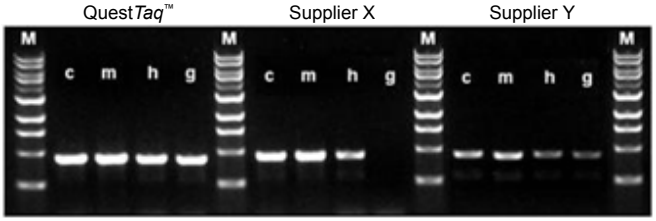
Real-time PCR instruments that don't require a passive reference dye [e.g., LightCycler® 480 (Roche), CFX96™ (Bio-Rad), etc.]

Highlights

- Premixed reagents for one-tube PCR or real-time PCR analysis.
- Ideal for robust, non-biased amplification of 5-mC, 5-hmC, and g5-hmC modified DNA.
- Ideal for real-time, quantitative, and end-point analyses.
- 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, $MgCl_2$, 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-methylcytosine (5-mC), 5-hydroxymethylcytosine (5-hmC), and glucosyl-5-hydroxymethylctosine (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*™ polymerase 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 or 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.

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

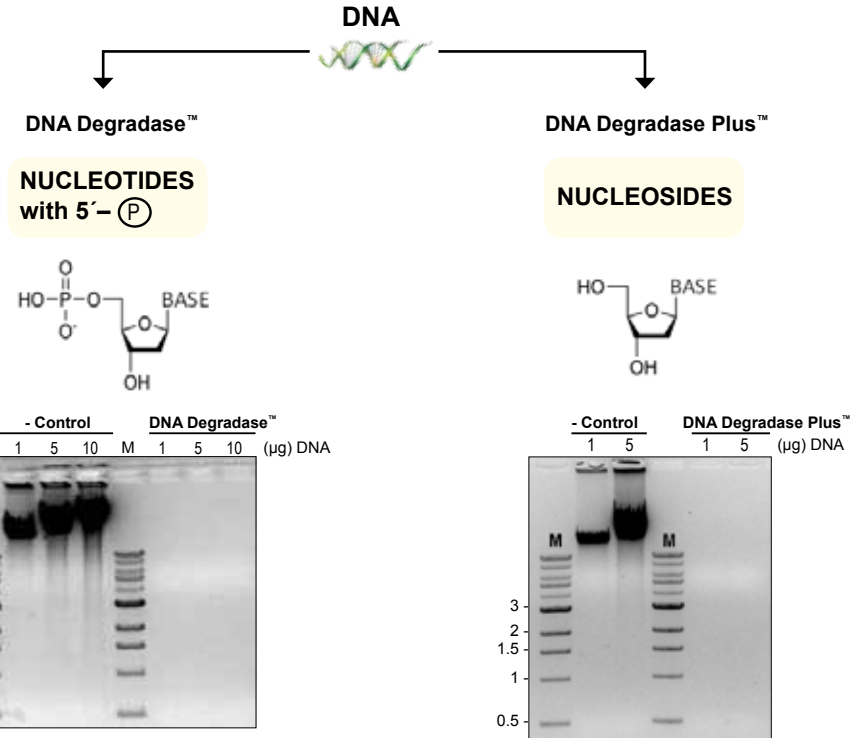
DNA Degradase™ & DNA Degradase Plus™

Highlights

- 1 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™) component for quantitative analysis (e.g., whole-genome methylation analysis by HPLC, TLC, etc.)

Description

DNA Degradase™ and DNA Degradase Plus™ from Zymo Research are nuclease mixes that quickly and efficiently degrade DNA to its individual nucleotide or nucleoside components, respectively. DNA Degradase™ is ideal for whole-genome DNA methylation analysis by a number of downstream applications (i.e., HPLC, TLC, etc.). Digestion with the enzyme is performed via a one-step procedure that is faster and simpler than other available methods.



DNA Degradase™ efficiently degrades DNA: 1 µg, 5 µg, and 10 µg of λ DNA incubated with 1 µl (10 U) of DNA Degradase™ in 25 µl reaction volume and incubated at 37°C for 1 hour. "M" is a 1 kb DNA ladder (Zymo Research).

DNA Degradase Plus™ efficiently degrades DNA: 1 or 5 µg of λ DNA incubated with 5 U of DNA Degradase Plus™ in 25 µl reaction volume at 37°C for 1 hour. "M" is a 1 kb DNA ladder (Zymo Research).

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

Use

Complete digestion of DNA into individual nucleotide/nucleoside components..... ✓

Specifications

DNA Degradase™

Enzyme Concentration..... 10 U/µl
Storage..... -20°C
Inactivation..... 70°C for 20 min.
Standard Reaction Time..... 1 hr.

DNA Degradase Plus™

Enzyme Concentration..... 5 U/µl
Storage..... -20°C
Inactivation..... 70°C for 20 min.
Standard Reaction Time..... 1 hr.

Unit Definition

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.

dsDNA Shearase™ Plus

Use

DNA Fragmentation.....✓

Specifications

Enzyme Concentration..... 1 U/µl
Storage..... -20°C
Inactivation..... 65°C for 5 min.
Standard Reaction Time..... 20 min.

Unit Definition

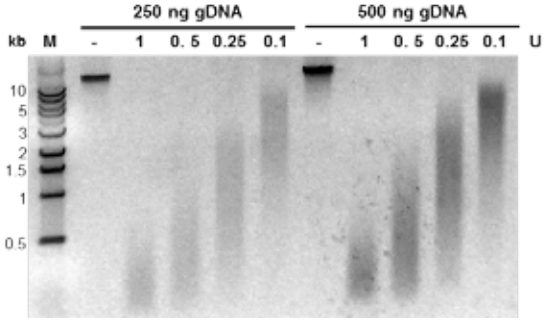
One unit (U) is defined as the amount of enzyme required to convert 250 ng human DNA into DNA fragments in the range of 100-500 bp in 20 minutes at 42°C in a total reaction volume of 10 µl.

Highlights

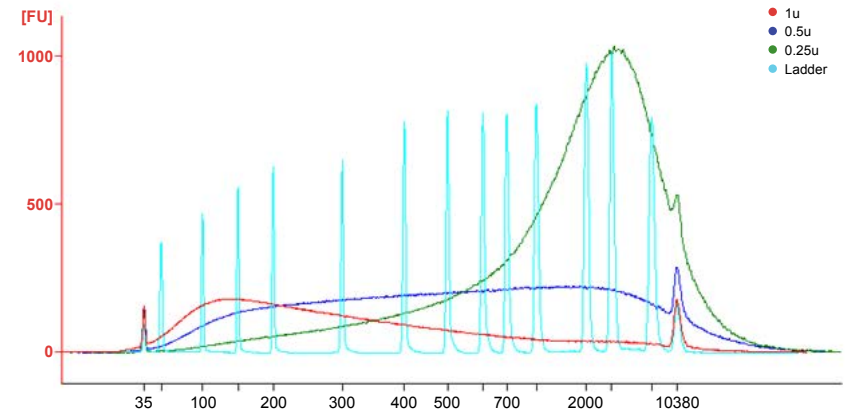
- The simplest method for generating random-ended dsDNA fragments.
- Fragment size is conveniently controlled by adjusting the enzyme concentration.
- dsDNA Shearase™ Plus-generated fragments are ideal for library construction, Next-Gen sequencing, and methylated DNA immunoprecipitation (MeDIP).

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 dsDNA Shearase™ Plus does not introduce any detectable bias in the sequencing library preparation. This enzyme is compatible with low volume inputs thus minimizing sample loss. Digested DNA is easily purified in ≥ 6 µl with recommended DNA Clean & Concentrator™ technology (pg. 53) making it ideal for use in end modification (linker & adapter) procedures and other applications.



Fragmentation of HCT116 Cell DNA Using dsDNA Shearase™ Plus. 250 ng or 500 ng of HCT116 cell gDNA was incubated with 1, 0.5, 0.25, or 0.1 U dsDNA Shearase™ Plus for 20 min at 42°C. Fragmented DNA was purified with the DNA Clean & Concentrator™ and subsequently resolved in a 1% agarose gel.



Distribution of HCT116 cell DNA fragments produced by dsDNA Shearase™ Plus separated using an Agilent Bioanalyzer 2100.

Product	*Cat. No.*	*Size*
dsDNA Shearase™ Plus	E2018-50 E2018-200	50 U 200 U
dsDNA Shearase™ Plus with DNA Clean & Concentrator™-5	E2019-50 E2019-200	50 U + 50 preps. 200 U + 200 preps.

dNTPs

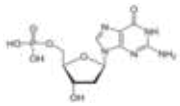
Highlights

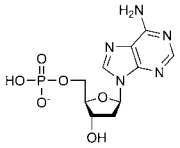
- Ready to use dNTP Mix (dATP, dTTP, dGTP, dCTP) of ultra high purity; >99% trisphosphate by HPLC
- Readily incorporated into PCR amplicons with Zymo*Taq*™, Quest*Taq*™ or other DNA polymerases
- Free of endo-, exodeoxyribonuclease, ribonuclease, phosphatase and nicking activities

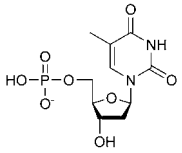
Description

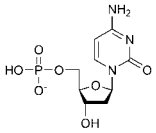
dNTP Mix and dATP, dTTP, dGTP, dCTP from Zymo Research are of ultra high purity and can be used to generate DNA by PCR using Zymo*Taq*™ or other DNA polymerases.

Use
PCR..... ✓









Product	*Cat. No.*	*Size*
dNTP Mix [10 mM]	D1000 D1000-1	500 µl 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

Methylated & Hydroxymethylated Nucleotides

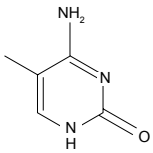
Highlights

- 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 Zymo*Taq*™, Quest*Taq*™ or other DNA polymerases.
- Free of endo-, exodeoxyribonuclease, ribonuclease, phosphatase and nicking activities.

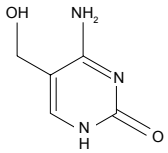
Description

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

Use
PCR..... ✓

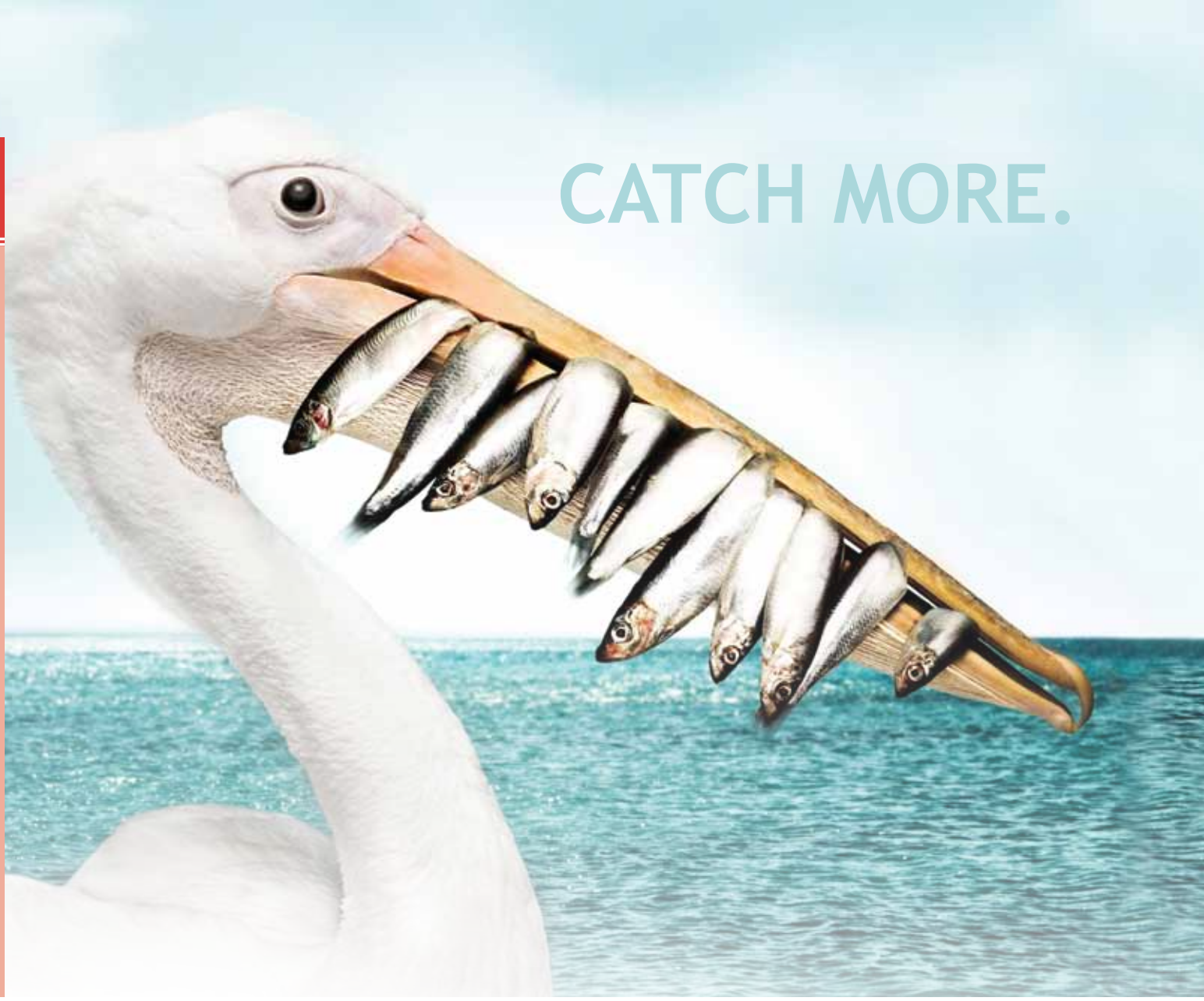


5-mC



5-hmC

Product	*Cat. No.*	*Size*
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



Catch More 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 its repertoire of genome-wide services! All Next-Gen Epigenetic Services feature state-of-the-art sample prep technologies, workflows, cutting-edge bioinformatics, and all are offered at competitive pricing. With our services, you don't have to be a bioinformatics guru; instead our bioinformatics specialists will provide you the data as a comprehensive report that can be customized to fit your needs. Since we develop most of the technologies used for our services, our bioinformatics specialists are always available to answer your questions and assist you every step of the way.

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

All our services are customizable and can be combined to suit your needs!

Please contact us at services@zymoresearch.com to inquire today.

Epigenetic Analysis

DNA Methylation
Platforms for genome-wide and targeted single-base resolution DNA methylation analysis

DNA Hydroxymethylation
Enrichment and single-base resolution platforms for detection of 5-hydroxymethylation in DNA

Nucleosome Mapping
Genome-wide nucleosome position analysis

ChIP-Seq
Genome-wide analysis of protein-DNA interactions.

Sequencing & Expression

Targeted Sequencing
Targeted DNA (inc. exome), DNA methylation/ hydroxymethylation, and RNA sequencing—including established and customized gene panels

RNA-Seq
Transcriptome-wide analysis of total RNA or small RNA (miRNA)

Large Genome Sequencing
Complete genomic sequencing of human, mouse, plant, and other large and complex genomes

Small Genome Sequencing
Sequencing of viruses (DNA & RNA), bacteria, and other microbial genomes

mtDNA Sequencing
Selective sequencing of the complete mitochondrial genome for comprehensive gene analysis

Additional Services

Mass Spectrometry
Global quantitative analysis of DNA methylation and hydroxymethylation levels

Custom Bioinformatics
Fully customizable bioinformatics solutions for the analysis of raw data from any of your Next-Gen sequencing experiments.

DNA Methylation

5-mC

Zymo Research's Epigenetic Services offer three platforms for single nucleotide resolution DNA methylation analysis in any species for which there is a reference genome. The **Methyl-MiniSeq™** platform covers ~10% of the methylome, the **Methyl-MidiSeq™** covers ~30% of the methylome, while the **Methyl-MaxiSeq™** platform profiles the entire methylome. Also available is a **Targeted Bisulfite Sequencing** service for high-depth, single-base/quantitative resolution of methylation status in multiple defined loci.

Methyl-MiniSeq™

This platform (an improved version of Reduced Representation Bisulfite Sequencing for greater coverage) can be used to detect 3-4 million unique CpG sites, allowing >85% coverage of all CpG islands and >80% of all gene promoters for a maximal amount of methylation data from less sequencing reads, reducing the overall cost. The system is conducive to biomarker discovery by providing for the identification and analysis of differentially methylated regions (DMRs) between samples.

Methyl-MidiSeq™

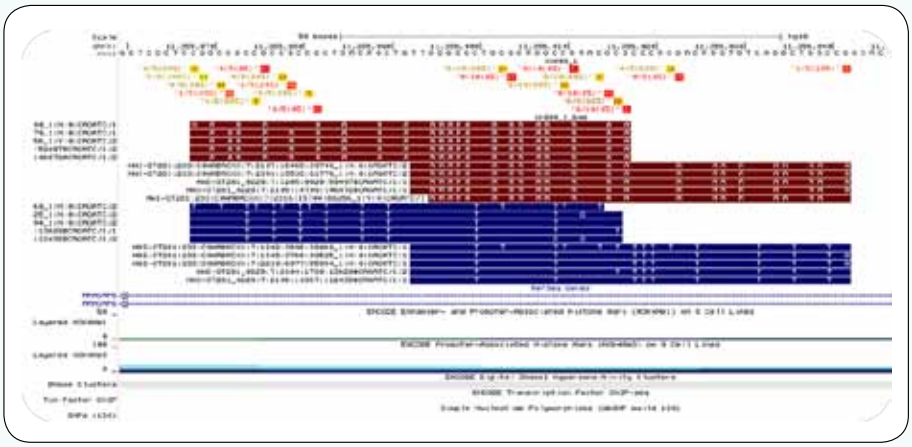
MidiSeq can be used to detect 8-9 million unique CpG sites. It extends the coverage of the Methyl-MiniSeq™ platform to include a large majority of genetic regulatory elements, gene bodies, and repeated DNA sequences. It is a good option for those researchers requiring methylome analysis outside of gene promoters and CpG islands.

Methyl-MaxiSeq™

The Methyl-MaxiSeq™ platform (whole-genome bisulfite sequencing) is for the detection of DNA methylation across the entire genome. DNA methylation information is provided in CpG context as well as in the less common CHG and CHH contexts. The platform attains an average read coverage of 15-20X per base (for the human genome). This can be modified depending on your requirements. Since whole-genome sequence is provided, SNP analysis can be performed simultaneously.

Targeted DNA Bisulfite Sequencing

Targeted Bisulfite Sequencing allows researchers to receive significant data sets for regions of interest from a large number of samples while avoiding the expense and time required for genome-wide sequencing. This is particularly well-suited for validation of putative biomarker candidates. Our Targeted Bisulfite Sequencing Service includes: Primer Design and Validation to Amplify Bisulfite-Converted DNA, Target-Specific Enrichment PCR, Adapter Addition/Sample Bar-coding, Latest Next-Gen Sequencing Technology and Bioinformatic Analysis.



UCSC genome browser tracks for CpG sites and sequencing reads from Methyl-MiniSeq™ (RRBS). For the CpG Tracks (top): *Red* indicates low methylation, whereas *Yellow* indicates high methylation. The number next to each CpG indicates the exact methylation value. For the Read Tracks, blue indicates forward or reverse strandedness. Letters A and T indicate positions of the bisulfite converted cytosines.

DNA Hydroxymethylation

5-hmC

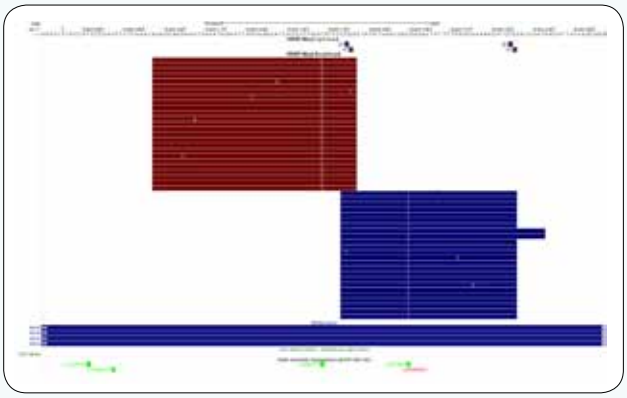
Our services for DNA hydroxymethylation analysis offer unparalleled sensitivity and coverage of 5-hydroxymethylcytosine (5-hmC). Two platforms are available: **Reduced Representation Hydroxymethylation Profiling (RRHP)** and **5-hmC-CapSeq**. Both combine unique whole-genome library preparation with Next-Gen sequencing to ensure high coverage and sensitivity.

RRHP

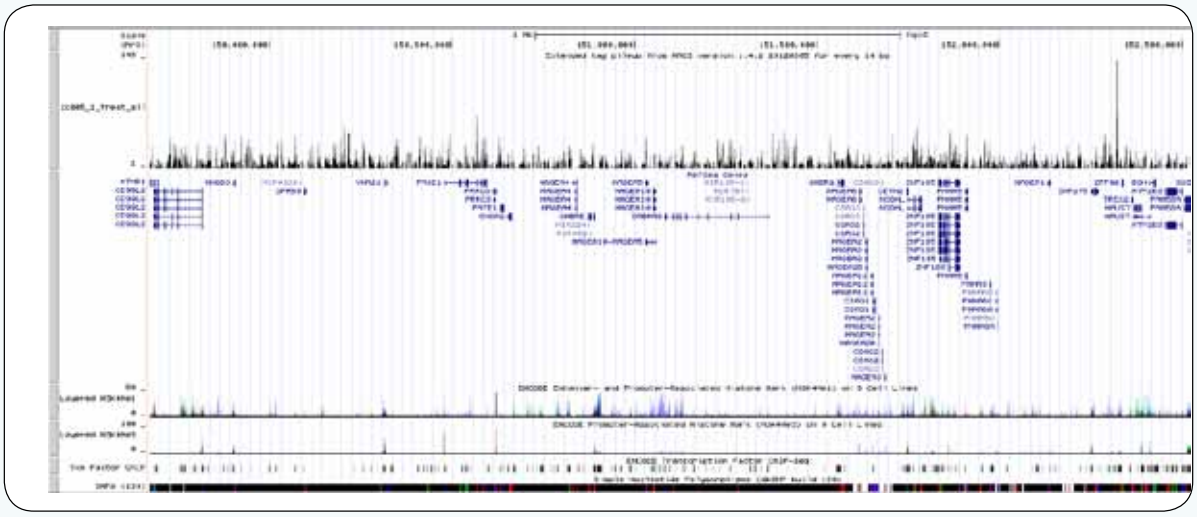
This service is for genome-wide profiling of 5-hydroxymethylcytosine in DNA at single-nucleotide resolution. RRHP also allows strand-specific determination of the location of the 5-hmC modification as well as quantification of 5-hmC levels. Data from RRHP is easily integrated with DNA methylation data from Methyl-MiniSeq™ (previous page), 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.

5-hmC-CapSeq

Features J-Binding Protein (JBP) based enrichment of hydroxymethylated DNA followed by Next-Gen sequencing. Subsequent genome-wide analysis reveals 'peaks', or regions of increased read density, that indicate the presence of 5-hmC in DNA. This platform specifically distinguishes 5-hmC from 5-mC in DNA, and exhibits high sensitivity with low background.



UCSC genome browser track for RRHP assay. Red and blue color represent the strandedness from reverse and forward direction respectively. The letter C and T in each strand indicate SNP positions.



UCSC genome browser track showing JBP-1 enriched 5-hmC peaks in human brain DNA

Epigenetic Analysis

Nucleosome Mapping

Nucleosomes are the basic packaging units of chromatin and analysis of the "chromatin landscape" is important in understanding a variety of mechanisms, including elucidating those DNA sequences that can influence nucleosome positioning.

DNase-Seq (DNase I Hypersensitive Site Sequencing) is a powerful tool for genome-wide identification of different types of regulatory regions (inc. promoters and enhancers) and DNA silencing and insulating elements. This method utilizes DNase I in the selective digestion of nucleosome-free DNA. DNA regions tightly associated in nucleosome complexes are resistant to digestion and subsequently sequenced and identified using Next-Gen sequencing.

Genome-wide Nucleosomal Mapping is a high-throughput technique using Next-Gen Sequencing in the determination of nucleosome position and organization within the genome.

ChIP-Seq

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

For the **ChIP-Seq** service from Zymo Research, you can perform the ChIP assay yourself and send us the enriched chromatin for library construction and Next-Gen sequencing, or we can perform the ChIP for you using an optimized chromatin shearing/enrichment procedure.

Sequencing & Expression Analysis

De Novo Sequencing, Re-sequencing and Targeted Sequencing

Zymo Research offers the latest Next-Generation Sequencing technology and state of the art bioinformatics for *de novo* sequencing, re-sequencing, and targeted sequencing of large and small genomes.

RNA-Seq

Zymo Research's RNA-Seq service makes Next-Gen 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-Gen sequencing technology.

Useful for:

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

Let our 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. Or, we can perform only the steps you want. 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.

Other Services

Mass Spectrometry

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

Custom Bioinformatics

Do you have Next-Gen 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

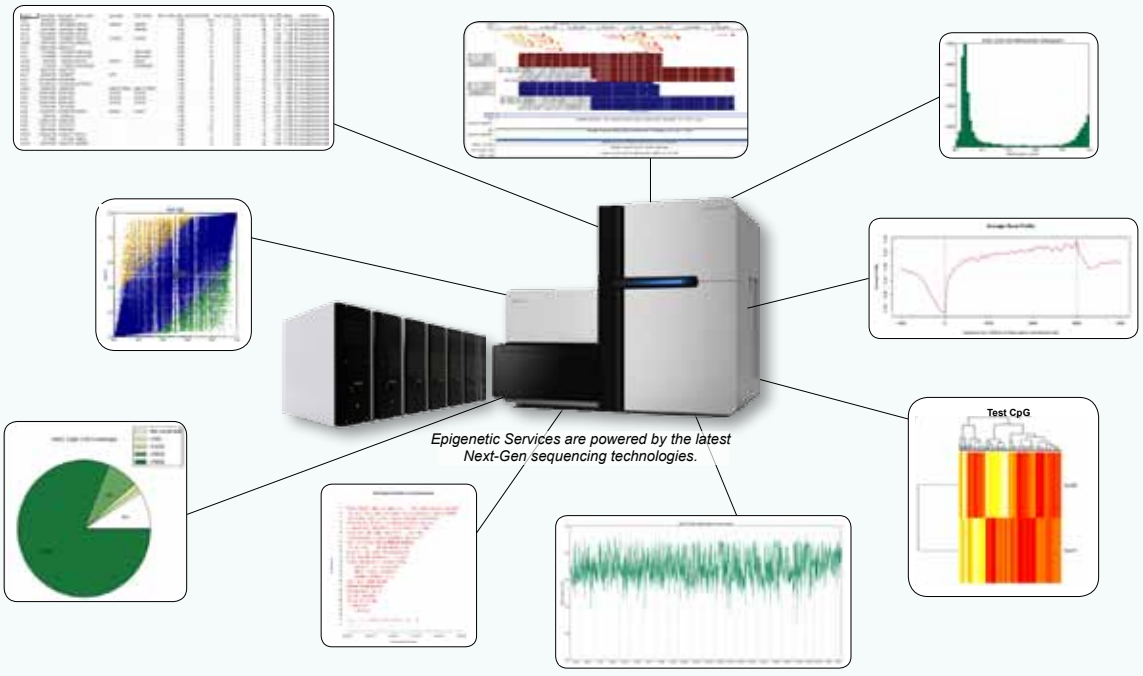
Basic Service Packages for all of the platforms include sample standardization, library construction, NGS, and raw data alignment.

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

Zymo Research is an established epigenetics company and our service staff is flexible to accommodate all of your epigenetic needs. Inquire today at www.zymoresearch.com or contact us at services@zymoresearch.com.

Services are customizable and can be combined to suit your needs!

Please contact us at services@zymoresearch.com to inquire today.



2 DNA Purification

The fidelity of the method used for the isolation/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 source (i.e. tough-to-lyse). 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. This considered, 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

DNA CLEAN-UP

GEL DNA RECOVERY

PLASMID DNA PURIFICATION

GENOMIC DNA PURIFICATION

ENVIRONMENTAL DNA PURIFICATION

DNA/RNA CO-PURIFICATION

DNA MOLECULAR WEIGHT MARKERS

FAX: (949) 266-9452 | TOLL-FREE: (888) 882-9682 | TEL: (949) 679-1190 | INFO@ZYMORESEARCH.COM | WWW.ZYMORESEARCH.COM

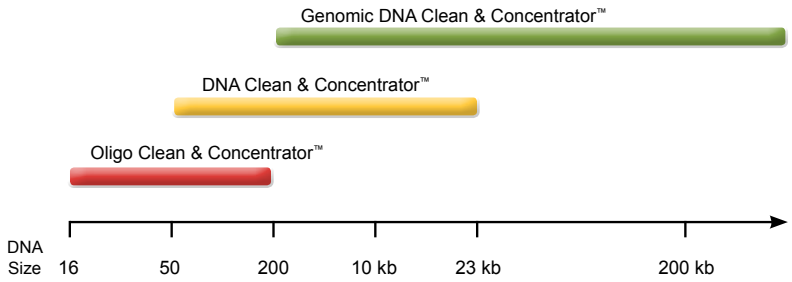
DNA Clean-up from any Enzymatic Reaction

High quality, inhibitor-free DNA is crucial for successful PCR, DNA ligation/cloning, sequencing, arrays, etc. The scientists at Zymo Research 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.

Enzymatic Reactions & Impure or Diluted DNA *Small Oligos & Probes*

	DNA Clean & Concentrator™ (DCC™)					ZR-96 DNA Clean-up Kit™	Oligo Clean & Concentrator™	
	DCC™-5		DCC™-25	DCC™-100	DCC™-500			
Format	Spin Column	96-Well	Spin Column			96-Well	Spin Column	96-Well
Binding Capacity	5 µg	5 µg	25 µg	100 µg	500 µg	5 µg	5 µg	5 µg
DNA Range	50 bp to 23 kb						≥ 16 nt	
Elution Volume	≥ 6 µl	≥ 10 µl	≥ 25 µl	≥ 150 µl	≥ 2 ml	≥ 30 µl	≥ 6 µl	≥ 10 µl
Processing Time	2 min.	15 min.	2 min.	15 min.	25 min.	20 min.	2 min.	20 min.
Use	✓ PCR Clean-up ✓ Enzyme Removal ✓ Nucleotide/Dye Removal ✓ Probe Purification ✓ cDNA/ssDNA Purification ✓ M13 Phage DNA						✓ DNA/RNA Oligo Clean-up ✓ Enzyme Removal ✓ Nucleotide/Dye Removal ✓ Probe Purification ✓ cDNA/ssDNA Purification	
PAGE NO.	53	53	54	55	56	57	58	58

Which DNA Clean & Concentrator™ (DCC™) kit should I use?



Genomic DNA *Sequencing Clean-up* *Contaminated DNA* *Gel DNA Recovery*

Genomic DCC™	**ZR DNA Sequencing Clean-up Kit™**		***OneStep*™ PCR Inhibitor Removal**		**Zymoclean™ Gel DNA Recovery Kit**		**Zymoclean™ Large Fragment DNA Recovery Kit**
Spin Column	Spin Column	96-Well	Spin Column	96-Well	Spin Column	96-Well	Spin Column
10 µg	5 µg	5 µg	No DNA/RNA Binding		5 µg	5 µg	10 µg
50 bp to ≥ 200 kb	50 bp to 23 kb				50 bp to 23 kb		1 kb to ≥ 200 kb
≥ 10 µl	≥ 6 µl	≥ 15 µl	50-200 µl	50-100 µl	≥ 6 µl	≥ 15 µl	≥ 10 µl
5 min.	2 min.	10 min.	5 min.	10 min.	15 min.	20 min.	15 min.
✓ Large-sized DNA Clean-up ✓ PCR Clean-up ✓ Enzyme Removal ✓ Nucleotide/Dye Removal	✓ Sequencing DNA Clean-up ✓ Dye Terminator Removal ✓ Enzyme Removal ✓ Nucleotide/Dye Removal ✓ Probe Purification		✓ Removal of Polyphenolic Inhibitors		✓ DNA From Agarose Gel Slices		✓ Large-sized DNA from Agarose Gel Slices
59	60	60	61	61	62	62	63

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.

***6** µl elution volume, **2** minute procedure, **0** µl retention volume*
For DCC™-5 Kit

Single Column Format

	DCC™-5	DCC™-5	DCC™-25	DCC™-25	DCC™-100	DCC™-500	Genomic DCC™	Oligo CC™
Name	Zymo-Spin™ I	Zymo-Spin™ IC	Zymo-Spin™ II	Zymo-Spin™ IIC	Zymo-Spin™ V	Zymo-Spin™ VI	Zymo-Spin™ IC-XL	Zymo-Spin™ IC
Binding Cap.	5 µg / prep.	5 µg / prep.	25 µg / prep.	25 µg / prep.	100 µg / prep.	500 µg / prep.	10 µg / prep.	5 µg / prep.
Elution Vol.	≥ 6 µl	≥ 6 µl	≥ 25 µl	≥ 25 µl	≥ 150 µl	≥ 2 ml	≥ 10 µl	≥ 6 µl
Kits	D4003, D4004	D4013, D4014	D4005, D4006	D4033, D4034	D4029, D4030	D4031, D4032	D4010, D4011	D4060, D4061

96-Well Format

	ZR-96 DCC™-5	ZR-96 Oligo CC™	ZR-96 DNA Clean-up Kit™
Name	Zymo-Spin™ I-96 Plate	Zymo-Spin™ I-96 Plate	Silicon-A™ Plate
Binding Cap.	5 µg/well	5 µg/well	5 µg/well
Elution Vol.	10 µl	10 µl	30 µl
Dimensions (H x W x L)	35 mm x 83 mm x 125 mm	35 mm x 83 mm x 125 mm	19 mm x 83 mm x 125 mm
Binding + Collection Plate Height	60 mm	60 mm	43 mm
Kits	D4023, D4024	D4062, D4063	D4017, D4018

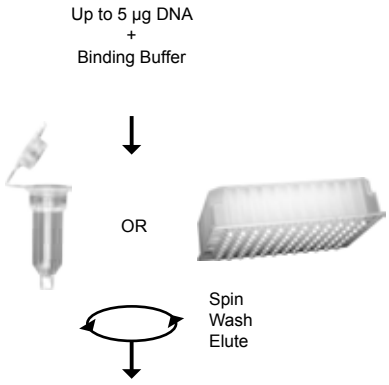
DNA Clean & Concentrator™-5 Kits

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.

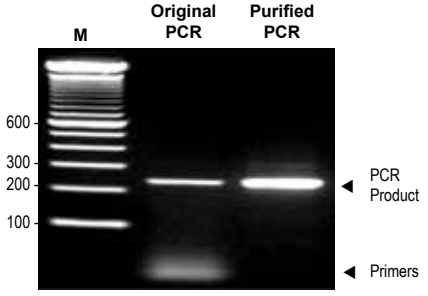
Description

The DNA Clean & Concentrator™-5 and ZR-96 DNA Clean & Concentrator™-5 products provide purification of up to 5 µg DNA from PCR, endonuclease digestions, DNA modification reactions, isotope/fluorescence labeling reactions, etc. The products 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.



Ultra-pure DNA for...

- ✓ Sequencing
- ✓ DNA Ligation
- ✓ Endonuclease Digestion, 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.

Product	*Cat. No.*	*Size*
DNA Clean & Concentrator™-5 (uncapped)	D4003 D4004	50 preps. 200 preps.
DNA Clean & Concentrator™-5 (capped)	D4013 D4014	50 preps. 200 preps.
ZR-96 DNA Clean & Concentrator™-5	D4023 D4024	2 x 96 preps. 4 x 96 preps.

Use

PCR Clean-up..... ✓
Enzyme Removal..... ✓
Nucleotide/Dye Remova..... ✓
cDNA/ssDNA Purification..... ✓
Probe Purification..... ✓
Lysate DNA Clean-up..... ✓
M13 Phage..... ✓

Specifications

Binding Capacity..... 5 µg/prep.
DNA Size Limits..... 50 bp - 23 kb

DNA Clean & Concentrator™-5
Format..... Spin Column
Elution Volume..... ≥ 6 µl
Processing Time..... 2 min.

ZR-96 DNA Clean & Concentrator™-5
Format..... 96-Well
Elution Volume..... ≥ 10 µl
Processing Time..... 15 min.

Available Formats

Zymo-Spin™ I D4003, D4004 (p. 160)

Zymo-Spin™ IC D4013, D4014 (p. 160)

Zymo-Spin™ I-96 D4023, D4024 (p. 162)

DNA Clean & Concentrator™-25

Use

PCR Clean-up.....✓
Enzyme Removal.....✓
Nucleotide/Dye Removal.....✓
cDNA/ssDNA Purification.....✓
Probe Purification.....✓
Lysate DNA Clean-up.....✓
M13 Phage.....✓

Specifications

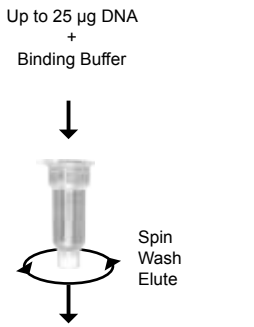
Format.....Spin Column
Binding Capacity.....25µg/prep.
Elution Volume.....≥25µl
DNA Size Limits.....50 bp - 23 kb
Processing Time.....2 min.

Highlights

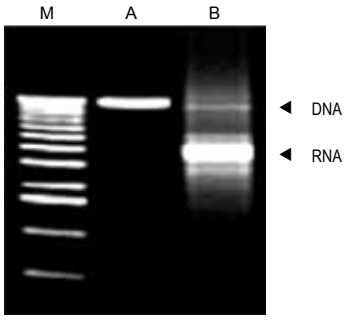
- Quick (2 minute) desalting and recovery of ultra-pure DNA from enzymatic reactions (e.g., PCR and endonuclease digestions), cell-free lysates, etc.
- Column design allows DNA to be eluted at high concentrations into minimal volumes.

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 *Fast-Spin* column technology to yield 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.



Ultra-pure DNA for...
✓ Sequencing
✓ DNA Ligation
✓ Endonuclease Digestion, etc.



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

Available Formats

Zymo-Spin™ II D4005, D4006 (p. 160)

Zymo-Spin™ IIC D4033, D4034 (p. 160)

Product	*Cat. No.*	*Size*
DNA Clean & Concentrator™-25 (uncapped)	D4005 D4006	50 preps. 200 preps.
DNA Clean & Concentrator™-2 5 (capped)	D4033 D4034	50 preps. 200 preps.

DNA Clean & Concentrator™-100

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 (DCC™-100) is designed for the rapid desalting and purification of up to 100 µg of high quality DNA from PCR, large format restriction endonuclease digestions, or cell-free lysates. Eluted DNA is suitable 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 typically takes less than 20 minutes and can be performed using a syringe, centrifuge or vacuum source together with a microcentrifuge.

Loading and ***washing*** the Zymo-Spin™ V Column can be performed using any combination of the following:

Syringe

Centrifuge

Vacuum

Elute DNA Using a Microcentrifuge

Spin
Wash
Elute

Ultra-pure DNA for...

- ✓ Sequencing
- ✓ DNA Ligation
- ✓ Endonuclease Digestion, etc.

Product	*Cat. No.*	*Size*
DNA Clean & Concentrator™-100	D4029 D4030	25 preps. 50 preps.

Use

PCR Clean-up..... ✓
Enzyme Removal..... ✓
Nucleotide/Dye Removal..... ✓
cDNA/ssDNA Purification..... ✓
Probe Purification..... ✓
Lysate DNA Clean-up..... ✓
M13 Phage..... ✓

Specifications

Format..... Spin Column
Binding Capacity..... 100 µg/prep.
Elution Volume..... ≥ 150 µl
DNA Size Limits..... 50 bp - 23 kb
Processing Time..... 15 min.

Available Format

Zymo-Spin™ V D4029, D4030 (p. 161)

DNA Clean & Concentrator™-500

Use

PCR Clean-up.....✓
Enzyme Removal.....✓
Nucleotide/Dye Removal.....✓
cDNA/ssDNA Purification.....✓
Probe Purification.....✓
Lysate DNA Clean-up.....✓
M13 Phage.....✓

Specifications

Format.....Spin Column
Binding Capacity.....500 µg/prep.
Elution Volume.....≥2 ml
DNA Size Limits.....50 bp - 23 kb
Processing Time..... 25 min.

Available Format

Zymo-Spin™ VI D4031, D4032 (p. 161)

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

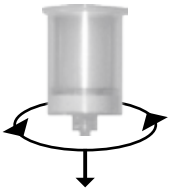
The DNA Clean & Concentrator™-500 (DCC™-500) is our highest capacity DNA Clean & Concentrator™ product. It is designed for the rapid, large format purification and concentration of up to 500 µg of high quality DNA from samples such as large-scale restriction endonuclease digestions and crude DNA preparations. Eluted DNA is well suited for use in PCR, DNA sequencing, DNA transfection, DNA ligation, endonuclease digestion, RNA transcription, radiolabeling, etc. The entire DNA purification/concentration procedure typically takes less than 25 minutes.

Loading and ***washing*** the Zymo-Spin VI™ Column can be performed using any combination of the following methods.

Vacuum

Centrifuge

Elute DNA Using a Centrifuge



Ultra-pure DNA for...

✓ Sequencing
✓ Transfection
✓ Endonuclease Digestion
✓ Cloning, etc.

Product	*Cat. No.*	*Size*
DNA Clean & Concentrator™-500	D4031 D4032	10 preps. 20 preps.

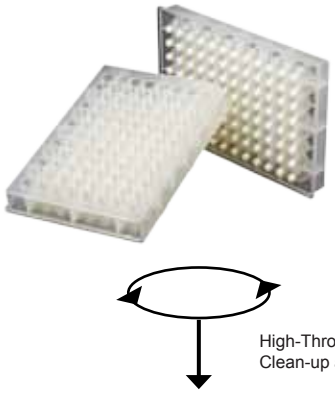
ZR-96 DNA Clean-up Kit™

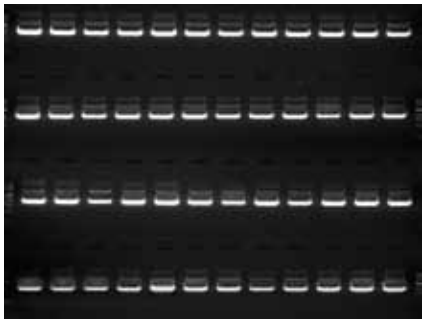
Highlights

- 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. There is no need for organic denaturants or chloroform. Instead, the product features *Fast-Spin* plate technology to yield high-quality, purified DNA in just minutes.





High-throughput DNA processing. Crude preparations of a 3 kb plasmid DNA from bacterial lysates were processed using the ZR-96 DNA Clean-up Kit™. Following elution from the plate, 48 samples were then separated in a 0.8% (w/v) agarose gel.

Use

PCR Clean-up..... ✓
Enzyme Removal..... ✓
Nucleotide/Dye Removal..... ✓
cDNA/ssDNA Purification..... ✓
Probe Purification..... ✓
Lysate DNA Clean-up..... ✓
M13 Phage..... ✓

Specifications

Format..... 96-Well
Binding Capacity..... 5 µg/well
Elution Volume..... ≥ 30 µl
DNA Size Limits..... 50 bp - 23 kb
Processing Time..... 20 min.

Available Format

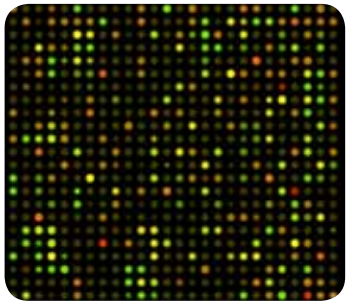
Silicon-A™ Plate D4017, 4018 (p. 162)

Product	*Cat. No.*	*Size*
ZR-96 DNA Clean-up Kit™	D4017	2 x 96 preps.
	D4018	4 x 96 preps.

Oligo Clean & Concentrator™ Kits

Use

Oligonucleotide Clean-up..... ✓
cDNA/ssDNA Purification..... ✓
Probe Purification..... ✓
Enzyme Removal..... ✓
Nucleotide/Dye Removal..... ✓



Specifications

Binding Capacity:
.....10 µg ssDNA/RNA
.....5 µg dsDNA

Size Limit.....16 nt – 23 kb

Oligo Clean & Concentrator™

Format..... Spin Column
Elution Volume..... ≥ 6 µl
Processing Time..... 2 min.

ZR-96 Oligo Clean & Concentrator™

Format..... 96-Well
Elution Volume..... ≥ 10 µl
Processing Time..... 20 min.

Available Formats

Zymo-Spin™ IC D4060, D4061 (p. 160)

Zymo-Spin™ I-96 D4063, D4044 (p. 162)

Highlights

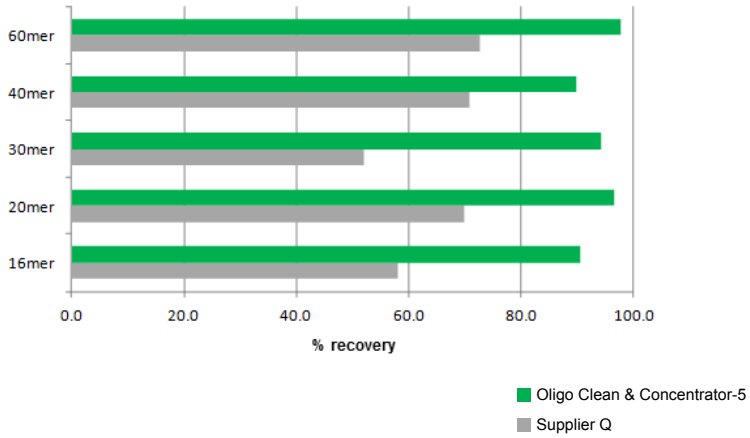
- Quick (2 minute) recovery of ultra-pure DNA and RNA oligonucleotides.
- Complete removal of dyes, salts, enzymes, nucleotides, and short oligos.
- ≥ 6 µl elution with zero retention *Fast-Spin* columns.
- Eluted DNA/RNA is well suited for use in hybridization, sequencing, PCR, ligation, etc.

Description

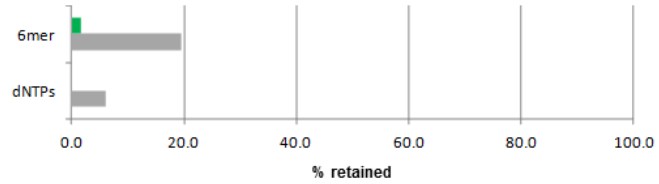
The Oligo Clean & Concentrator™ provides a streamlined method for efficient recovery and clean-up of DNA fragments and oligonucletides ≥ 16 nt from labeling (radioactive, biotin, DIG, etc.) and other enzymatic reactions. Unincorporated nucleotides, short oligos, dyes, enzymes, and salts are effectively removed by the clean-up procedure.

There is no need for organic denaturants or chloroform. Instead, the kit features *Fast-Spin* column technology and employs a single-buffer system that allows for efficient DNA adsorption. DNA is washed and concentrated into a small volume of water (≥ 6 µl). Purified DNA, available in just 2 minutes, is suitable for hybridization, gel shift assays, enzymatic reactions, ligation, sequencing, microarray analysis, etc.

Oligonucleotide Recovery



Nucleotide Retention



Product	*Cat. No.*	*Size*
Oligo Clean & Concentrator™	D4060 D4061	50 preps. 200 preps.
ZR-96 Oligo Clean & Concentrator™	D4062 D4063	2 x 96 preps. 4 x 96 preps.

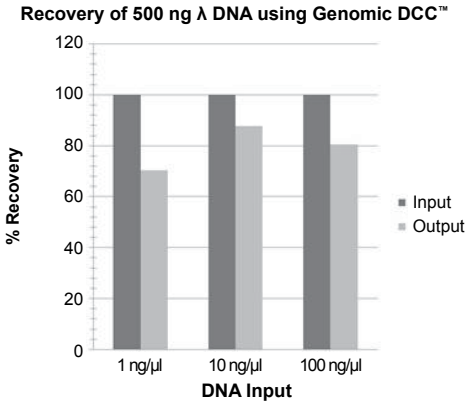
Genomic DNA Clean & Concentrator™

Highlights

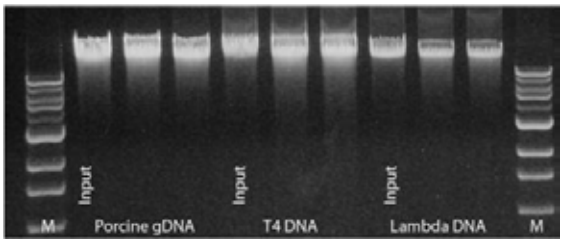
- Quick (5 minute) clean-up of large-sized DNA from any enzymatic reaction or impure preparation without messy precipitations.
- Unique spin column for low volume (≥ 10 µl) elution of ultra-pure, high-yield DNA.
- Eluted DNA is ideal for PCR, endonuclease digestion, sequencing, etc.

Description

The Genomic DNA Clean & Concentrator™ (Genomic DCC™) is for the quick (5 minute) recovery of ultra-pure, large-sized DNA from any enzymatic reaction or impure preparation (e.g., Proteinase K digestion). This includes genomic, mitochondrial, BAC/PAC/YAC, bacterial, viral, phage, (wga)DNA, etc. 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™ Column. 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.



Phage DNA Recovery. λ DNA (48.5 kb) is effectively recovered from 10-fold concentrations of starting material using the Genomic DCC™.



High molecular weight DNA is efficiently purified using the Genomic DCC™. Porcine gDNA (~35-50 kb), T4 phage DNA (170 kb), and λ 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 (shown above). The size marker "M" is a 1 kb ladder (Zymo Research).

Product	*Cat. No.*	*Size*
Genomic DNA Clean & Concentrator™	D4010 D4011	25 preps. 100 preps.

Use

Large-sized DNA Clean-up..... ✓
PCR Clean-up..... ✓
Enzyme Removal..... ✓
Nucleotide/Dye Removal..... ✓
cDNA/ssDNA Purification..... ✓
Probe Purification..... ✓
Lysate DNA Clean-up..... ✓
M13 Phage..... ✓

Specifications

Format..... Spin Column
Binding Capacity..... 10 µg/prep.
Elution Volume..... ≥ 10 µl
DNA Size Limits... 50 bp to ≥ 200 kb
Processing Time..... 5 min.

Available Format

Zymo-Spin™ IC-XL D4010, D4011 (p. 160)

ZR DNA Sequencing Clean-up Kits™

Use

Sequencing DNA Clean-up.....✓
Dye Terminator Removal.....✓
Enzyme Removal.....✓
Nucleotide/Dye Removal.....✓

Specifications

ZR DNA Sequencing Clean-up Kit™

Format.....Spin Column
Binding Capacity.....5µg/prep.
Elution Volume.....≥6µl
Processing Time.....2min.

ZR-96 DNA Sequencing Clean-up Kit™

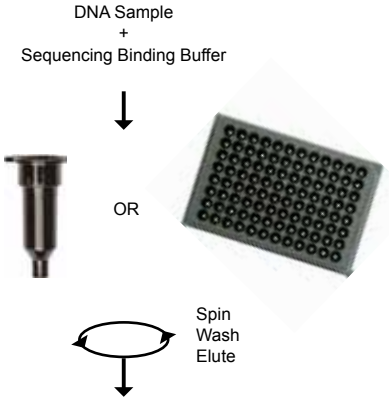
Format.....96-Well
Binding Capacity.....5µg/well
Elution Volume.....≥15µl
Processing Time.....10min.

Highlights

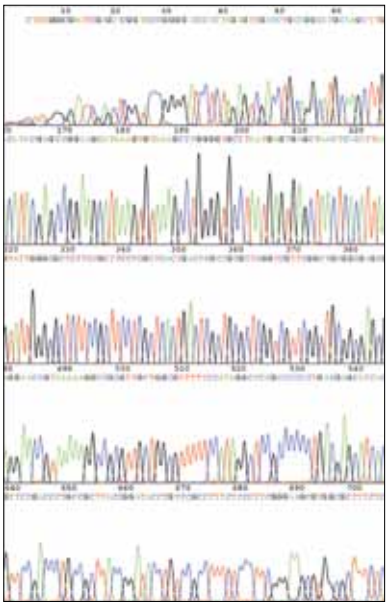
- Complete elimination of "dye blobs" for high quality Phred scores and long read lengths.
- Flexible 6 - 20 µl elution volumes allow for direct loading of samples with no precipitation or drying steps.
- Reusable!

Description

The ZR DNA Sequencing Clean-up Kit™ and ZR-96 DNA Sequencing Clean-up Kit™ provide simple methods for the rapid 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. In particular, unincorporated dyes can result in dye peaks ("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. The entire DNA purification procedure typically takes about 2 minutes.



Ultra-pure DNA for...
✓ Sequencing



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™.

Available Formats

Zymo-Spin™ IB D4050, D4051 (p. 160)

Zymo-Spin™ IB-96 Plate D4052, D4053 (p.162)

Product	*Cat. No.*	*Size*
ZR DNA Sequencing Clean-up Kit™	D4050 D4051	50 preps. 200 preps.
ZR-96 DNA Sequencing Clean-up Kit™	D4052 D4053	2 x 96 preps. 4 x 96 preps.

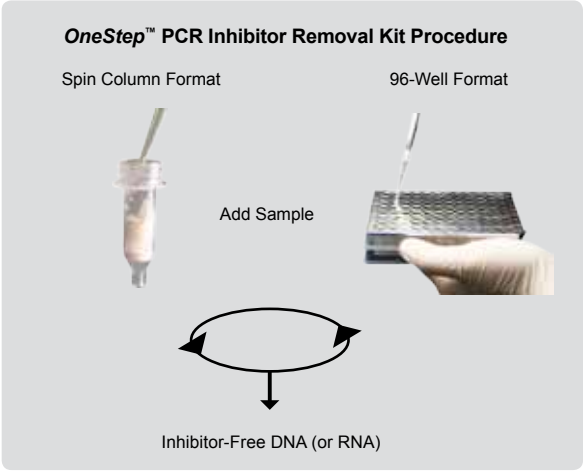
OneStep™ PCR Inhibitor Removal Kits

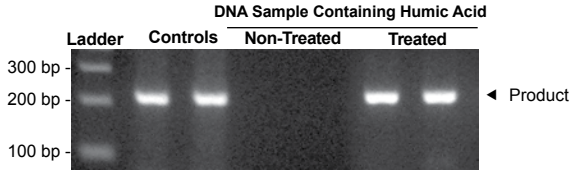
Highlights

- 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.

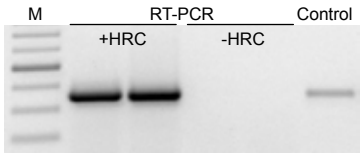
Description

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.





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).



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).

Product	*Cat. No.*	*Size*
OneStep™ PCR Inhibitor Removal Kit	D6030	50 preps.
OneStep-96™ PCR Inhibitor Removal Kit	D6035	2 x 96 preps.

Use

Polyphenolic PCR Inhibitor Removal from DNA..... ✓
Polyphenolic RT Inhibitor Removal from RNA..... ✓

Specifications

Binding Capacity..... Variable
DNA (RNA) Recovery..... 50 - 90%

***OneStep*™ PCR Inhibitor Removal Kit**
Format..... Spin Column
Elution Volume..... 50 - 200 µl
Processing Time..... 5 min.

***OneStep-96*™ PCR Inhibitor Removal Kit**
Format..... 96-Well
Elution Volume..... 50 - 100 µl
Processing Time..... 10 min.

Available Formats

Zymo-Spin™ IV-HRC D6030 (p. 161)

Silicon-A™ -HRC Plate D6035 (p. 162)

Zymoclean™ Gel DNA Recovery Kits

Use

DNA From Agarose Gel Slices..... ✓

Specifications

Binding Capacity..... 5 µg/prep.
DNA Size Limits..... 50 bp - 23 kb

Zymoclean™ Gel DNA Recovery
Format..... Spin Column
Elution Volume..... ≥ 6 µl
Processing Time..... 15 min.

ZR-96 Zymoclean™ Gel DNA Recovery
Format..... 96-Well
Elution Volume..... ≥ 15 µl
Processing Time..... 20 min.

Available Formats

Zymo-Spin™ I D4001, D4002 (p. 160)

Zymo-Spin™ IC D4007, D4008 (p. 160)

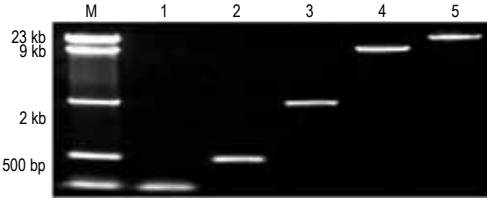
Zymo-Spin™ I-96 D4021, D4022 (p. 162)

Highlights

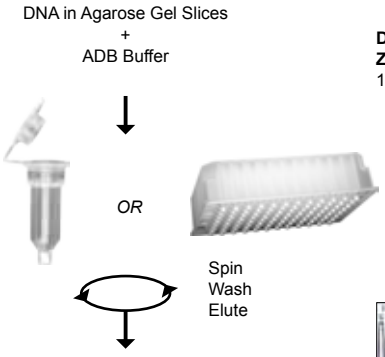
- Quick (15 minute) recovery of ultra-pure DNA from agarose gels.
- Column design permits DNA elution at high concentrations into minimal volumes (≥ 6 µl).
- Eluted DNA is well suited for use in DNA ligation, sequencing, labeling, PCR, etc.

Description

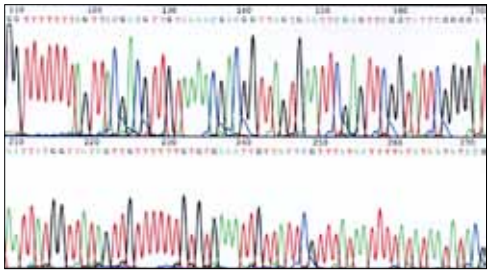
The Zymoclean™ Gel DNA Recovery and ZR-96 Zymoclean™ Gel DNA Recovery Kits provide for the rapid purification of high quality DNA from TAE/TBE-buffered agarose gels. The products feature *Fast-Spin* technology to yield high-quality, purified DNA in just minutes. DNA purified using the Zymoclean™ Gel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



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



Ultra-pure DNA for...
- ✓ Sequencing
- ✓ DNA Ligation
- ✓ Endonuclease Digestion, 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.

Product	*Cat. No.*	*Size*
Zymoclean™ Gel DNA Recovery Kit (uncapped)	D4001 D4002	50 preps. 200 preps.
Zymoclean™ Gel DNA Recovery Kit (capped)	D4007 D4008	50 preps. 200 preps.
ZR-96 Zymoclean™ Gel DNA Recovery Kit	D4021 D4022	2 x 96 preps. 4 x 96 preps.

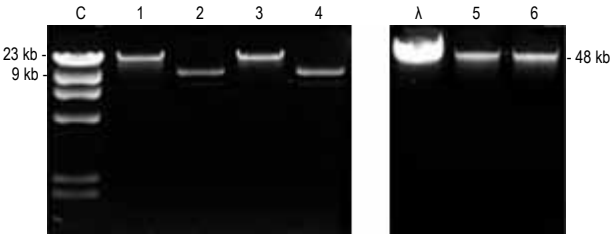
Zymoclean™ Large Fragment DNA Recovery Kit

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 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, let dissolve, and then transfer to the supplied Zymo-Spin™ IC-XL Column. There is no need for organic denaturants or chloroform. Instead, the product utilizes unique spin column technology to yield high-quality, purified DNA in just minutes. DNA purified using the Zymoclean™ Large Fragment DNA Recovery Kit is ideal for PCR, sequencing, endonuclease digestion, ligation, etc. The entire procedure typically takes about 15 minutes.



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*
Zymoclean™ Large Fragment DNA Recovery Kit	D4045 D4046	25 preps. 100 preps.

Use

Large-sized DNA From Agarose Gel Slices..... ✓

Specifications

Format.....Spin Column
Binding Capacity.....10 µg/prep.
Elution Volume.....≥10 µl
DNA Size Limits....≥50 bp to >200 kb
Processing Time.....15 min.

Available Format

Zymo-Spin™ IC-XL
D4045, D4046 (p. 160)

Transfection Quality DNA Directly from *E. coli* Culture

Zymo Research provides plasmid DNA purification kits (pp. 68-75) that allow researchers to separate plasmid DNA efficiently from chromosomal DNA and cellular RNA in bacterial host cell lysates using procedures that are fast, user-friendly, and reliable when compared to those offered by other suppliers.

The Zyppy™ Plasmid Miniprep Kit features a pellet-free modified alkaline lysis method that omits bacterial culture centrifugation and resuspension steps common to classical plasmid preparation procedures. Additionally, the innovative colored buffers included in the kit permit error-free visualization and identification of complete bacterial cell lysis and neutralization. All of our plasmid purification kits feature high yields of transfection quality plasmid DNA.

Pellet-Free Purification of Transfection Grade Plasmid DNA

	Zyppy™ Plasmid MiniPrep	**Zyppy™ Plasmid MidiPrep**	**Zyppy-96™ Plasmid MiniPrep**	**Zyppy-96™ Plasmid MagBead MiniPrep**
Format	Spin Column	Spin Column	96-Well	MagBead
Binding Capacity	25 µg	120 µg	5 µg	10 µg
Elution Volume	≥ 30 µl	≥ 150 µl	≥ 30 µl	≥ 40 µl
Processing Time	8 min.	15 min.	45 min.	60 min.
Culture Input	600 µl - 3 ml	6 - 35 ml	750 µl	750 µl
Typical Yield	2-15 µg	20-80 µg	2-5 µg	2-5 µg
Product Quality	Cloning, Sequencing, Transfection			
Use	✓ Plasmid Recovery From *E. coli*			
PAGE NO.	68	70	69	69

Classic Procedure *Large-Sized Plasmid* *Yeast Plasmid*

ZR Plasmid MiniPrep™ -Classic	Zyppy™ Plasmid MaxiPrep	ZR Plasmid GigaPrep	ZR BAC DNA MiniPrep	Zymoprep™ Yeast Plasmid MiniPrep	
				I	II
Spin Column	Spin Column	Spin Column	Spin Column	Precipitation	Spin Column
25 µg	500 µg	Scalable	10 µg	Not Applicable	5 µg
≥ 30 µl	≥ 2 ml	3 ml	≥ 10 µl	Resuspend in ≥ 35 µl	≥ 10 µl
15 min.	30 min.	60-75 min.	15 min.	35-90 min.	
0.5-5ml	150 ml	1 L	0.5-5 ml	0.5-1 ml	0.1-1.5 ml
Up to 25 µg	Up to 500 µg	2-2.5mg	up to 10 µg	Variable	
Cloning, Sequencing, Transfection			PCR, Sequencing, Transfection	PCR, Transformation, Hybridization	
✓ Plasmid Recovery From *E. coli*			✓ Large Plasmid Recovery From *E. coli*	✓ Plasmid Recovery From Yeast	
72	71	73	74	75	75

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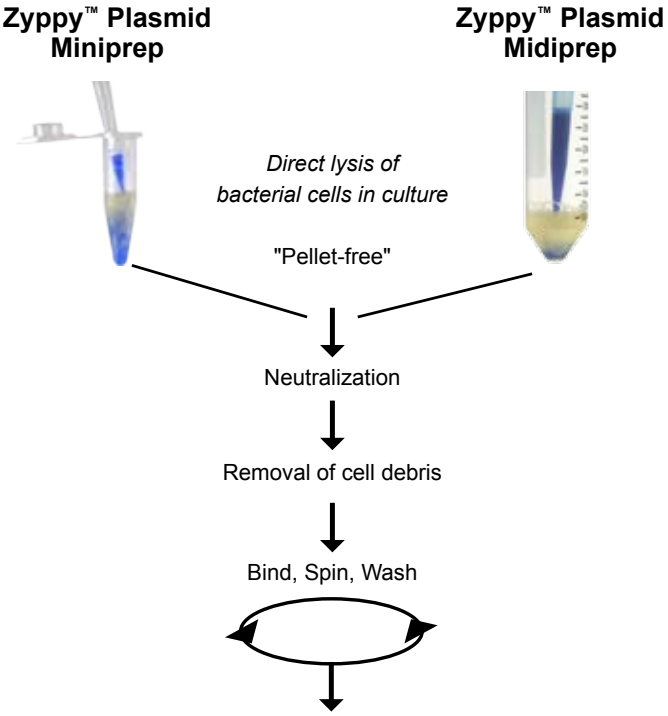
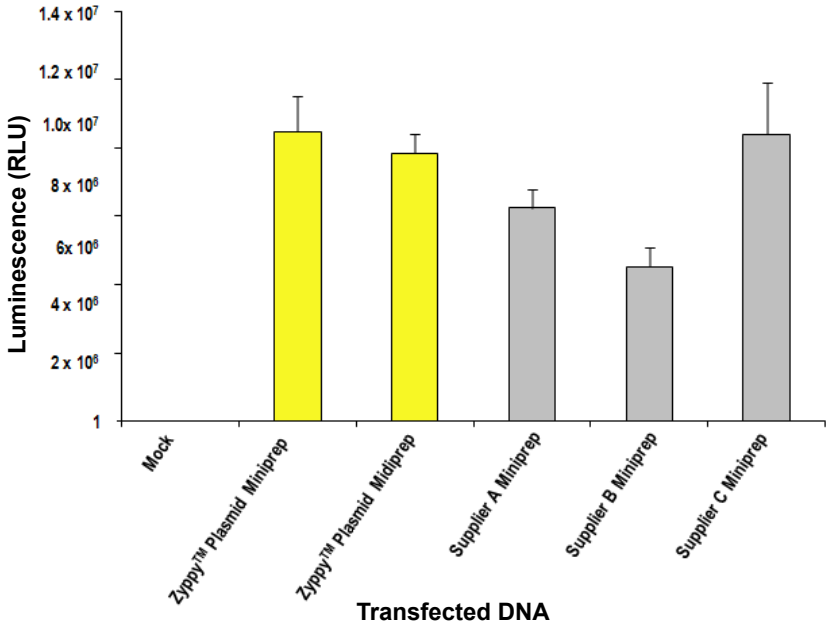
Technology Overview: Zyppy™ Pellet-free Procedure

The Zyppy™ Plasmid Miniprep and Zyppy™ Plasmid Midiprep kits from Zymo Research feature a pellet-free plasmid DNA purification procedure. Compared with most conventional procedures that involve spinning down the bacteria and lysing with P1, P2, and P3 buffers, the Zyppy™ procedure facilitates direct lysis of bacterial cells in culture and subsequent purification of the plasmid DNA. Bypassing the spin step and consolidating the buffer chemistries as colored lysis and neutralization buffers greatly reduces overall processing time making the Zyppy™ Miniprep and Midiprep procedures the fastest currently available in the market. Additionally, the speed of the procedures does not affect the yield or the quality of the DNA. In fact, eluted DNA is high quality and endotoxin-free making it ideal for transfection, sequencing, restriction endonuclease digestion, etc.

An overview of the Zyppy™ Plasmid Miniprep and Midiprep pellet-free procedures is shown here together with transfection data from DNA purified with the Zyppy™ Plasmid kits.



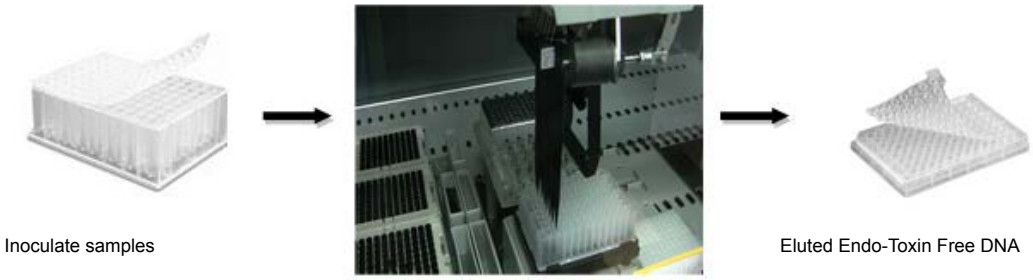


Luciferase activity in transfected cells. Lysates from cells transfected with various DNAs extracted using the pellet-free (Zyppy™ system) and non-pellet-free (suppliers A, B, and C) formats were used to measure luciferase activity. The activity is indicated as relative light units (RLU).

High-throughtput and Automated Plasmid DNA Purification

The Zyppy™ Pellet-Free procedure from Zymo Research allows for the only fully automated, high-throughput method for 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.

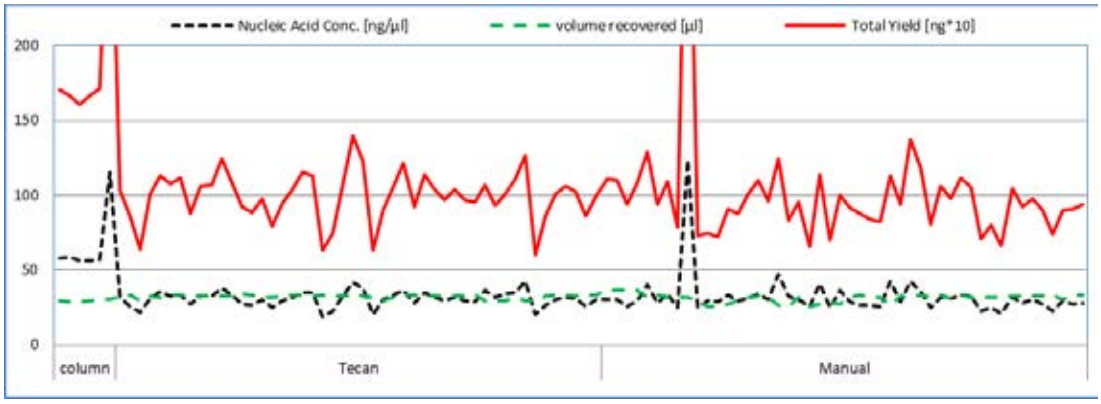
Samples grown overnight in a 96-Well Block are transferred to an automated liquid handler (e.g., Tecan – Freedom Evo®).The uniquely formulated Deep Blue Lysis Buffer is added directly to bacterial cultures in each well. After neutralization, lysate separation steps are expedited using non-DNA binding MagClearing Beads to pull down cellular debris. The cleared lysates are then automatically transferred to another plate for the remaining wash and purification steps. DNA binding, 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.



Inoculate samples

Process

Eluted Endo-Toxin Free DNA



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.

Product	*Cat. No.*	*Size*
Zyppy™-96 Plasmid Miniprep	D4041	2 x 96 Preps.
	D4042	4 x 96 Preps.
	D4043	8 x 96 Preps.
Zyppy™-96 Plasmid MagBead Miniprep	D4100	2 x 96 Preps.
	D4101	4 x 96 Preps.
	D4102	8 x 96 Preps.

Zyppy™ Plasmid MiniPrep Kits

Use

Plasmid Recovery Directly from *E. coli* culture..... ✓

Specifications

Pellet-Free, Direct Culture Input.... ✓
Colored Buffers..... ✓
Endotoxin-Free..... ✓

Format..... Spin Column
Binding Capacity..... 25 µg/prep.
Elution Volume..... ≥ 30 µl
Culture Input..... 600 µl - 3 ml
Typical Yield (high copy plasmid):
.....2 - 15 µg
DNA Size Limits..... ≤ 25 kb
Processing Time..... 8 min.

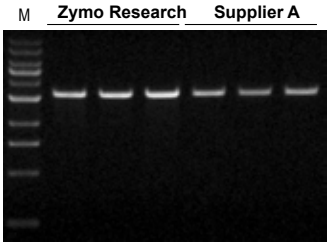
Highlights

- The fastest, easiest miniprep available for purifying transfection quality plasmid DNA.
- Pellet-free procedure omits conventional cell pelleting and resuspension steps.
- DNA quality appropriate for cloning, sequencing, and transfection.

Description

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



DNA yield from Zyppy™ Plasmid Miniprep Kit and a kit from Supplier A. Plasmid DNA (pGEM®) was digested with EcoRI prior to agarose gel electrophoresis. Performed in triplicate. M, ZR 1 kb DNA Marker (Zymo Research).

Available Format

Zymo-Spin™ IIN D4036, D4019, D4020, D4037 (p. 160)

Product	*Cat. No.*	*Size*
Zyppy™ Plasmid Miniprep Kit	D4036	50 preps.
	D4019	100 preps.
	D4020	400 preps.
	D4037	800 preps.

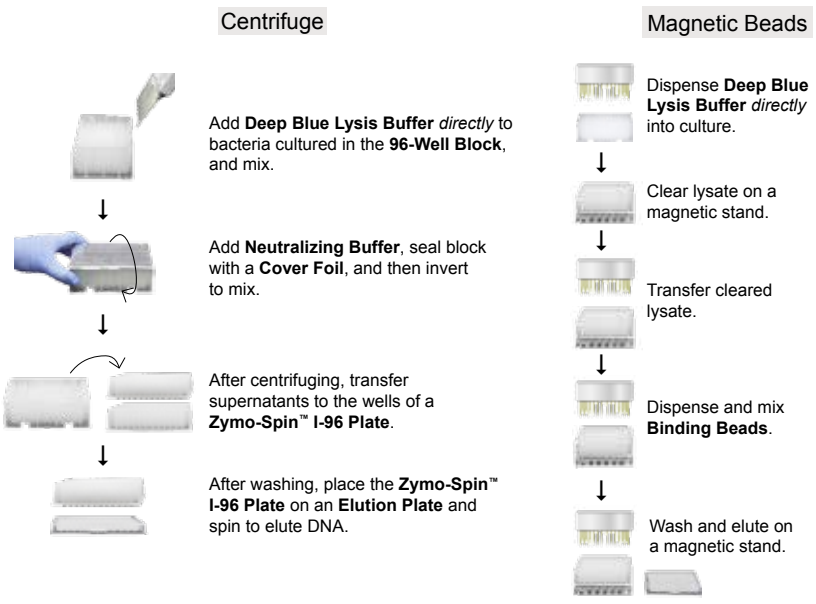
Zyppy™-96 Plasmid Miniprep Kits

Highlights

- Innovative centrifugation based procedure omits conventional cell pelleting and re-suspension steps.
- The fastest and simplest high-throughput procedure for purifying the highest quality endotoxin-free plasmid DNA.
- Patented colored buffer technology for visualization of complete bacterial cell lysis and neutralization.

Description

The Zyppy™-96 Plasmid Miniprep Kits are the fastest high-throughput (96-well), pellet-free method available for efficient isolation of plasmid DNA from *E. coli*. The kit features a modified alkaline lysis system that bypasses tedious centrifugation, pelleting, and resuspension steps common to conventional procedures. Instead, the uniquely formulated Deep Blue Lysis Buffer is added directly to bacterial cultures in a 96-Well Block. Buffer neutralization and lysate separation steps are expedited using a specially designed Neutralization Buffer. The remaining DNA purification steps are straightforward and simple. Eluted plasmid DNA is of the highest quality, endotoxin-free, and is well suited for use in restriction endonuclease digestion, DNA ligation, PCR, transcription, sequencing, and other sensitive downstream applications including transfection. An overview of the purification procedures are shown below.



Product	*Cat. No.*	*Size*
Zyppy™-96 Plasmid Miniprep	D4041	2 x 96 Preps.
	D4042	4 x 96 Preps.
	D4043	8 x 96 Preps.
Zyppy™-96 Plasmid MagBead Miniprep	D4100	2 x 96 Preps.
	D4101	4 x 96 Preps.
	D4102	8 x 96 Preps.

Use

Plasmid Recovery Directly from *E. coli* culture..... ✓

Specifications

Pellet-Free, Direct Culture Input.... ✓
Colored Buffers..... ✓
Endotoxin-Free..... ✓

Culture Input..... 750 µl
Typical Yield (high copy plasmid):
..... 2 - 5 µg
DNA Size Limits..... ≤ 25 kb
Automation Ready!

Zyppy™-96 Plasmid MiniPrep
Format..... 96-Well
Binding Capacity..... 10 µg/prep.
Elution Volume... ≥ 30 µl per well
Processing Time..... 45 min.

Zyppy™-96 Plasmid MagBead MiniPrep
Format..... Magnetic Beads
Binding Capacity..... 5 µg/prep.
Elution Volume... ≥ 40 µl per well
Processing Time..... 60 min.

Available Formats

Zymo-Spin™ I-96 D4041, D4042, D4043 (p. 162)

MagBinding Beads D4100, D4101, D4102 (p. 167)

Zyppy™ Plasmid Midiprep Kit

Use

Plasmid Recovery Directly from *E. coli* culture..... ✓

Specifications

Pellet-Free, Direct Culture Input... ✓
Colored Buffers..... ✓
Endotoxin-Free..... ✓

Format..... Spin Column
Binding Capacity..... 120 µg/prep.
Elution Volume..... ≥ 150 µl
Culture Input..... 6 ml - 35 ml
Typical Yield (high copy plasmid):
..... 20 - 80 µg
DNA Size Limits..... ≤ 25 kb
Processing Time..... 15 min.

Available Format

Zymo-Spin™ V-E D4025, D4026 (p. 161)

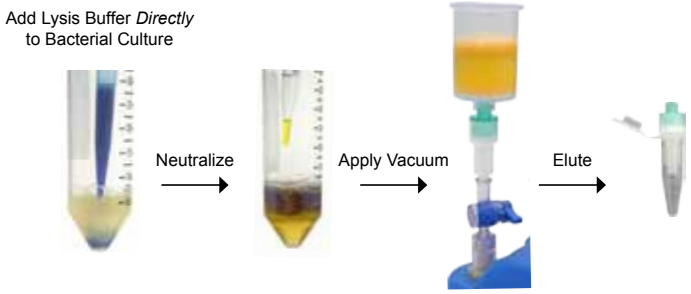
Highlights

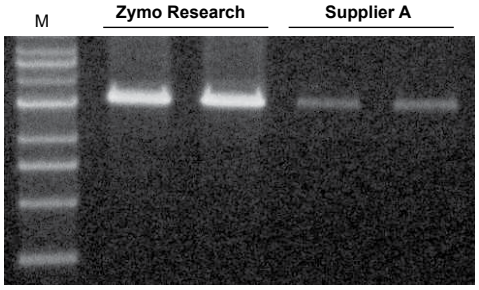
- The fastest, simplest midiprep available for purifying transfection quality plasmid DNA.
- Pellet-free procedure omits conventional cell pelleting and resuspension steps.
- DNA quality appropriate for cloning, sequencing, and transfection.

Description

The Zyppy™ Plasmid Midiprep Kit is a large-scale (up to 120 µg DNA) version of the Zyppy™ Plasmid Miniprep Kit. It 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 our *Fast-Spin* column technology. Additionally, the innovative colored buffers permit error-free visualization and identification of complete bacterial cell lysis and neutralization.

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





DNA yield from Zyppy™ Plasmid Midiprep Kit and a kit from Supplier A. EcoRI digestion of plasmid DNA (pGEM®) isolated from a 6 ml *E. coli* culture using the Zyppy™ Plasmid Midiprep Kit or a kit from Supplier A. Performed in duplicate. M, ZR 1 kb DNA Marker (Zymo Research).

Product	*Cat. No.*	*Size*
Zyppy™ Plasmid Midiprep Kit	D4025 D4026	25 preps. 50 preps.

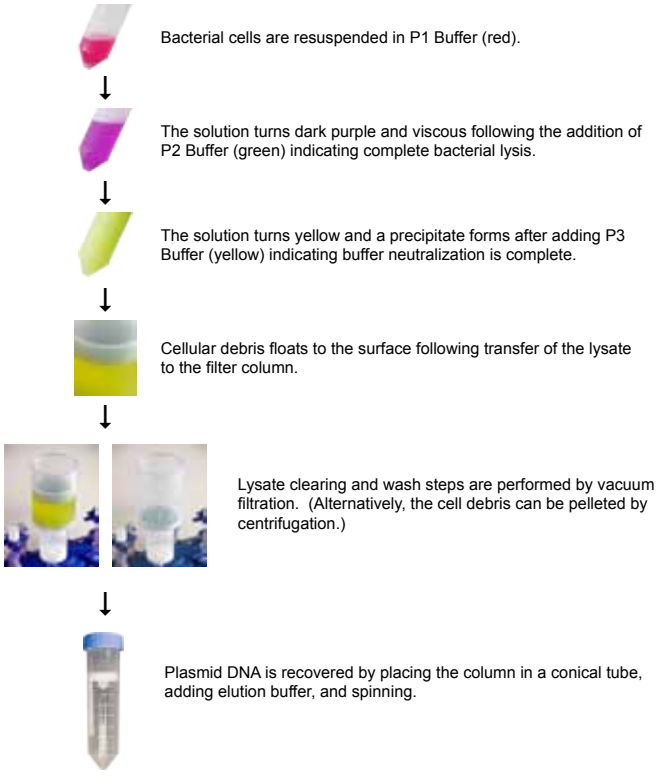
Zyppy™ Plasmid Maxiprep Kit

Highlights

- Easy and versatile procedure: lyse cells then centrifuge or vacuum, wash, and elute DNA.
- Innovative colored buffers permit error-free visual identification of complete bacterial cell lysis and neutralization.
- DNA quality appropriate for cloning, sequencing, and transfection.

Description

The Zyppy™ Plasmid Maxiprep Kit employs a modified alkaline lysis method in conjunction with spin-column purification to isolate high quality, endotoxin-free plasmid DNA in minutes. The innovative colored buffers included in the kit permits error-free visualization identification of complete bacterial cell lysis and neutralization. Additionally, the uniquely designed Zymo-Maxi Filter™ column permits lysate clearing without centrifugation while the high capacity DNA-binding Zymo-Spin™ VI column allows for low 2 - 3 ml elution volumes, eliminating the need for DNA precipitation and resuspension steps common to other column-based maxiprep procedures. The purified DNA is suitable for use in transfection, restriction endonuclease digestion, ligation, bacterial transformation, PCR amplification, sequencing, and other sensitive downstream applications.



Bacterial cells are resuspended in P1 Buffer (red).

The solution turns dark purple and viscous following the addition of P2 Buffer (green) indicating complete bacterial lysis.

The solution turns yellow and a precipitate forms after adding P3 Buffer (yellow) indicating buffer neutralization is complete.

Cellular debris floats to the surface following transfer of the lysate to the filter column.

Lysate clearing and wash steps are performed by vacuum filtration. (Alternatively, the cell debris can be pelleted by centrifugation.)

Plasmid DNA is recovered by placing the column in a conical tube, adding elution buffer, and spinning.

Product	*Cat. No.*	*Size*
Zyppy™ Plasmid Maxiprep Kit	D4027 D4028	10 preps. 20 preps.

Use

Plasmid Recovery from *E. coli*..... ✓

Specifications

Colored Buffers..... ✓
Endotoxin-Free..... ✓

Format..... Spin Column
Binding Capacity..... 500 µg/prep.
Elution Volume..... ≥ 2 ml
Culture Input..... up to 150 ml
DNA Size Limits..... ≤ 25 kb
Processing Time..... 30 min.

Available Format

Zymo-Spin™ VI D4027, D4028 (p. 161)

ZR Plasmid Miniprep™-*Classic*

Use

Plasmid Recovery from *E. coli*... ✓

Specifications

Colored Buffers..... ✓
Endotoxin-Free..... ✓

Format..... Spin Column
Culture Input..... 0.5 - 5.0 ml
Binding Capacity..... 25 µg/prep.
Processing Time..... 15 min.
Elution Volume..... ≥ 30 µl
DNA Size Limits..... ≤ 25 kb

Available Format

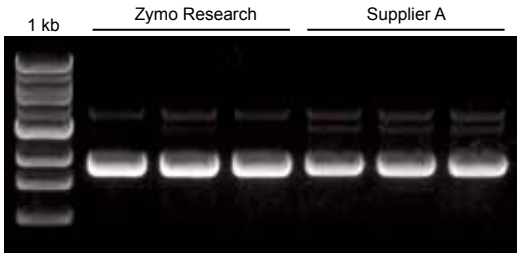
Zymo-Spin™ IIN D4015, D4016, D4054 (p. 160)

Highlights

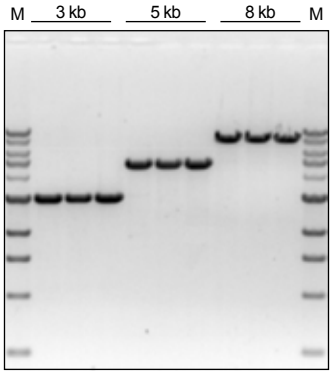
- For purification of high quality, endotoxin-free plasmid DNA for restriction endonuclease digestion, DNA sequencing, transformation, cloning, transfection, *in vitro* transcription reactions, etc.
- Innovative colored P1, P2, and P3 buffers for rapid identification of complete bacterial cell lysis and neutralization steps.
- Unique column design: zero buffer retention and low (30 µl) elution volume.

Description

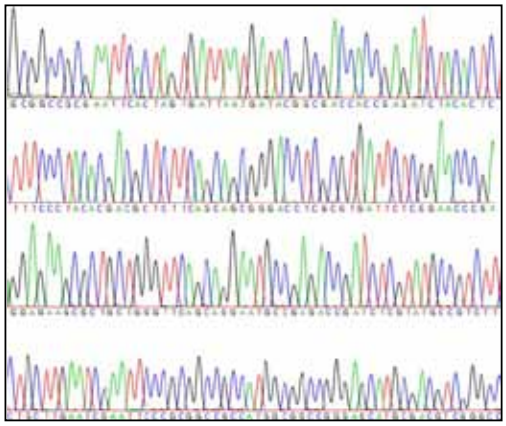
The ZR Plasmid Miniprep™-*Classic* is designed for efficient isolation of plasmid DNA from *E. coli* using a traditional 3-buffer (P1, P2, P3) procedure that is simple, rapid, user-friendly, and reliable. It features a modified alkaline lysis protocol together with a unique *Fast-Spin* column to yield high quality plasmid DNA in minutes. The buffers are color-coded (red, green, yellow) for easy determination of complete cell lysis and neutralization. The innovative Zymo-Spin™ IIN columns yield endotoxin-free plasmid DNA. Plasmid DNA purified using the ZR Plasmid Miniprep™-*Classic* is well suited for use in restriction endonuclease digestion, sequencing, DNA ligation, cloning, PCR, bacterial transformation, transfection, etc.



	ng/µl	A_{260}	$A_{260/280}$
Zymo Research's *Classic*	94.0	1.9	1.7
	75.3	1.5	1.9
	66.4	1.3	1.9
Supplier A	72.8	1.5	1.8
	77.5	1.6	1.8
	60.4	1.2	1.9



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).



Sequence-quality DNA preparations. DNA sequencing chromatogram of plasmid DNA prepared using the ZR Plasmid Miniprep™-Classic.

Product	*Cat. No.*	*Size*
ZR Plasmid Miniprep™-*Classic*	D4015	100 preps.
	D4016	400 preps.
	D4054	800 preps.

ZR Plasmid Gigaprep Kit

Highlights

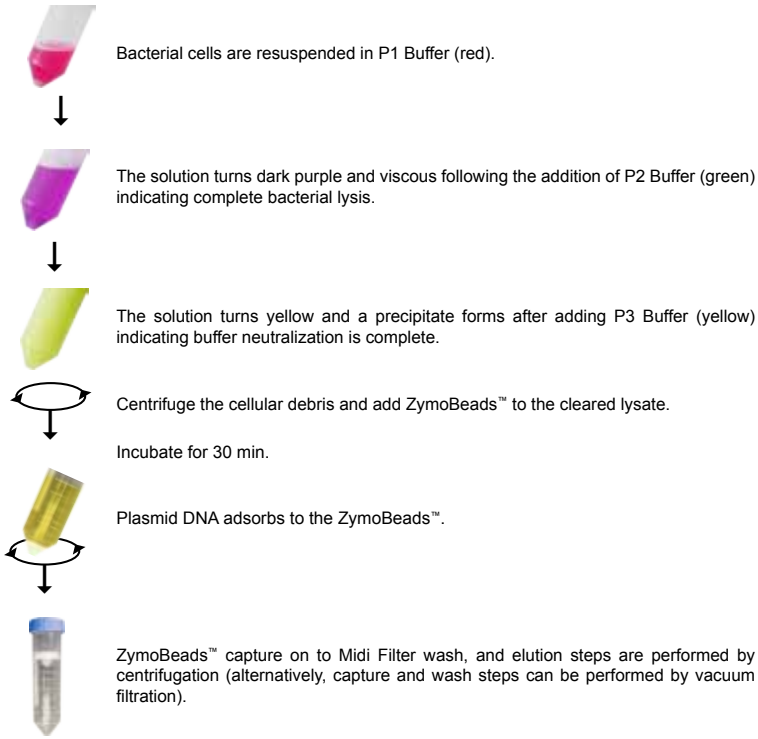
- 2 - 10 mg of high quality, endotoxin free (for transfection) plasmid in about an hour.
- Innovative chemistry and streamlined procedure for consistent high concentration plasmid recovery directly in water or low salt buffer.
- Colored buffers for visualization of complete bacterial cell lysis and neutralization.

Description

The ZR Plasmid Gigaprep Kit employs a modified alkaline lysis method in conjunction with DNA binding beads (ZymoBeads™) to isolate high quality endotoxin-free, transfection quality plasmid DNA in about an hour. The purified DNA is suitable for use in transfection, restriction endonuclease digestion, ligation, bacterial transformation, PCR amplification, DNA sequencing and other sensitive molecular biology applications.

The innovative patented colored buffers included in the kit permit error-free visualization of both complete bacterial cell lysis and neutralization. Additionally, the uniquely designed Midi Filter allows the capture of ZymoBeads™ either by centrifugation or vacuum. The unique design of the filter also allows for low elution volumes of 2 - 3 ml directly in supplied elution buffer or water, thus eliminating the need for plasmid DNA precipitation and resuspension steps common to other column-based gigaprep procedures.

The ZR Plasmid Gigaprep Kit is designed for use with a combination of both centrifuge, and vacuum manifold, or a centrifuge alone, therefore providing flexibility in large scale plasmid DNA purification from *E. coli*. An overview of the purification procedure is shown below.



Bacterial cells are resuspended in P1 Buffer (red).

The solution turns dark purple and viscous following the addition of P2 Buffer (green) indicating complete bacterial lysis.

The solution turns yellow and a precipitate forms after adding P3 Buffer (yellow) indicating buffer neutralization is complete.

Centrifuge the cellular debris and add ZymoBeads™ to the cleared lysate.

Incubate for 30 min.

Plasmid DNA adsorbs to the ZymoBeads™.

ZymoBeads™ capture on to Midi Filter wash, and elution steps are performed by centrifugation (alternatively, capture and wash steps can be performed by vacuum filtration).

Product	*Cat. No.*	*Size*
ZR Plasmid Gigaprep Kit	D4056 D4057	5 preps. 10 preps.

Use

Plasmid Recovery from *E. coli*..... ✓

Specifications

Colored Buffers..... ✓
Endotoxin-Free..... ✓

Format... Affinity Bead, Spin Column
Binding Capacity..... Scalable
Elution Volume..... ≥ 3 ml
Culture Input..... 1,000 ml
Typical Yield (high copy plasmid):
..... 2 - 2.5 mg
Processing Time..... 60-75 min.

Available Format

ZymoBeads™ D4056, D4057 (p. 167)

ZR BAC DNA Miniprep Kit

Use

Large Plasmid Recovery from *E. coli*..... ✓
Plasmid Recovery from *E. coli*... ✓

Specifications

Colored Buffers..... ✓
Endotoxin-Free..... ✓

Format.....Spin Column
Culture Input.....0.5-5.0 ml
Binding Capacity.....10 µg/prep.
Elution Volume.....≥10 µl
Processing Time.....15 min.
DNA Size Limits....50 bp to ≥200 kb

Available Format

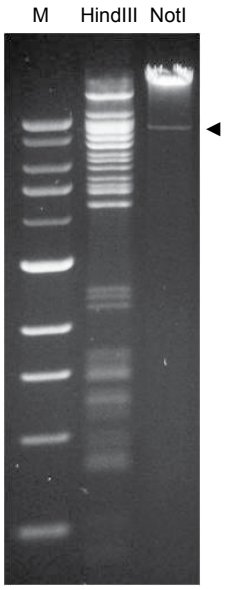
Zymo-Spin™ IC-XL D4048, D4049 (p. 160)

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: zero buffer retention and low-volume (≥ 10 µl) elution.

Description

The ZR BAC DNA Miniprep Kit is for the efficient isolation of BAC plasmid DNA or other large plasmids (e.g., PAC) from *E. coli* using a procedure that is simple, rapid, user-friendly, and reliable. It features a modified alkaline lysis protocol with color-coded reagents that allow easy visualization and assessment of complete bacterial cell lysis and neutralization. The innovative Zymo-Spin™ IC-XL columns are optimized for high yield endotoxin-free plasmid DNA recovery. BAC DNA purified using the ZR BAC DNA Miniprep Kit is ideal for sequencing, PCR, endonuclease digestion, etc.



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*
ZR BAC DNA Miniprep Kit	D4048 D4049	25 preps. 100 preps.

Zymoprep™ Yeast Plasmid Miniprep Kits

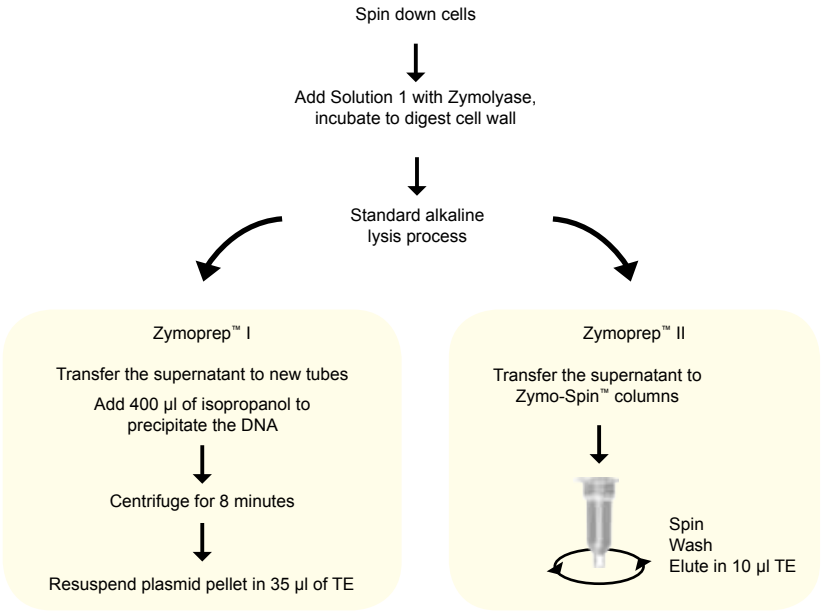
Highlights

- Simple procedures for plasmid rescue from yeast.
- Ideal for low-copy and hard-to-isolate plasmids.
- For isolation of plasmid DNA 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, and there is 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.

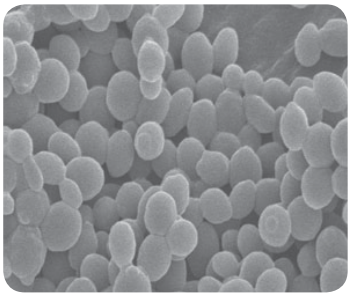
Procedure for Zymoprep™ Yeast Plasmid Miniprep I & II



Product	*Cat. No.*	*Size*
Zymoprep™ Yeast Plasmid Miniprep I	D2001	100 Preps.
Zymoprep™ Yeast Plasmid Miniprep II	D2004	50 Preps.

Use

Plasmid Recovery From Yeast..... ✓



Specifications

Processing Time..... 35 - 90 min.
DNA Size Limits..... ≤ 23 kb

Zymoprep™ Yeast Plasmid Miniprep Kit I
Format..... Isopropanol Precipitation
Elution Volume..... ≥ 35 µl

Zymoprep™ Yeast Plasmid Miniprep Kit II
Format..... Spin Column
Binding Capacity..... 5 µg/prep.
Elution Volume..... ≥ 10 µl

Available Format

Zymo-Spin™ I D2004 (p. 160)

High Quality DNA from Tissues and Biological Liquids

Zymo Research offers a range of genomic DNA isolation kits (pp. 78-97) 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 dsDNA that is ideal for use in downstream applications such as PCR, Southern blotting, endonuclease digestion, and methylation detection. Like our DNA clean-up kits, most of our genomic DNA isolation kits feature *Fast-Spin* technology which allows for minimal elution volumes and high DNA concentrations.

	Cells & Soft Tissue				*Cells & Fresh Tissue*				*Solid Tissue*
	Quick-gDNA™				**ZR Genomic-DNA™-Tissue**				
	MicroPrep	MiniPrep	MidiPrep	ZR-96	MicroPrep	MiniPrep	MidiPrep	96-Well	MagPrep
Format	Spin Column			96-Well	Spin Column			96-Well	MagBead
Binding Capacity	5 µg	25 µg	125 µg	5 µg	5 µg	25 µg	125 µg	5 µg	10 µg
Elution Volume	≥10 µl	≥ 50 µl	≥ 150 µl	≥ 30 µl	≥ 10 µl	≥ 50 µl	≥ 150 µl	≥ 30 µl	≥ 100 µl
Processing Time	15 min.	15 min.	30 min.	30 min.	25 min.	25 min.	30 min.	45 min.	3 hr.
Features	✓ No organic denaturants or Proteinase K				✓ Proteinase K				
Sample Source	✓ Fresh/Frozen Soft Tissue ✓ Cultured Cells ✓ Buccal Cells/Swabs ✓ Whole Blood/Plasma/Serum ✓ Semen ✓ Mitochondria				✓ Fresh/Frozen Solid Tissue ✓ Tail Snips ✓ Ear Punches ✓ Hair and Feathers ✓ Fresh/Frozen Soft Tissue ✓ Cultured Cells ✓ Buccal Cells/Swabs ✓ Whole Blood/Plasma/Serum ✓ Semen ✓ Mitochondria				
PAGE NO.	78	78	78	78	79	79	79	79	79

Fixed Tissue		*Low DNA Fluids*		*Viral DNA*		*Yeast*
FFPE	***Tissue Sections***	***Urine***	***Serum***			
ZR FFPE DNA MiniPrep™	**Pinpoint™ Slide DNA Isolation System**	**ZR Urine DNA Isolation Kit™**	**ZR Serum DNA Kit™**	**ZR Viral DNA Kit™**		**YeaStar™ DNA Kit**
Spin Column	Spin Column	Spin Column	Spin Column	Spin Column	96-Well	Spin Column
25 µg	5 µg	5 µg	Scalable	5 µg	5 µg	25 µg
≥ 50 µl	≥ 10 µl	≥ 6 µl	Scalable	≥ 6 µl	≥ 10 µl	≥ 60 µl
< 2 hr.	5 hr.	10 min.	Variable	15 min.	25 min.	30 min.
✓ DNA >100bp from FFPE	✓ Targeted Slide DNA Isolation	✓ Filter & Isolate Urine DNA	✓ Scalable System for High Volumes	✓ Inactivate and Extract Viral DNA		✓ Zymolyase
✓ Fresh/Frozen Solid Tissue ✓ FFPE Tissue Blocks and Sections	✓ Tissue Sections ✓ FFPE Tissue Sections	✓ Urine ✓ Urine Sediment	✓ Plasma ✓ Serum	✓ Buccal Cells/Swabs ✓ Plasma/Serum ✓ Virus		✓ Fungi Susceptible to Yeast Lytic Enzyme
84	85	82	83	87	87	86

Quick-gDNA™ Kits

Use

Fresh/Frozen Soft Tissue..... ✓
Cultured Cells..... ✓
Buccal Cells/Swabs..... ✓
Buffy Coat..... ✓
Whole Blood..... ✓
Plasma/Serum..... ✓
Semen..... ✓
Mitchondria..... ✓

Specifications

Removal of PCR Inhibitors..... ✓
Format..... Spin Column / 96-Well
Processing Time..... 15 - 30 min.

***Quick-gDNA*™ MicroPrep**
Binding Capacity..... 5 µg/prep.
Elution Volume..... ≥ 10 µl

***Quick-gDNA*™ MiniPrep**
Binding Capacity..... 25 µg/prep.
Elution Volume..... ≥ 50 µl

***Quick*-gDNA™ MidiPrep**
Binding Capacity... 125 µg/prep.
Elution Volume..... ≥ 150 µl

ZR-96 *Quick-gDNA*™
Binding Capacity..... 5 µg/well
Elution Volume..... ≥ 30 µl

Available Formats

Zymo-Spin™ IC D3020, D3021 (p. 160)

Zymo-Spin™ IIC D3024, D3025 (p. 160)

Zymo-Spin™ V-E with Zymo-Midi Filter™ D3100 (p. 165)

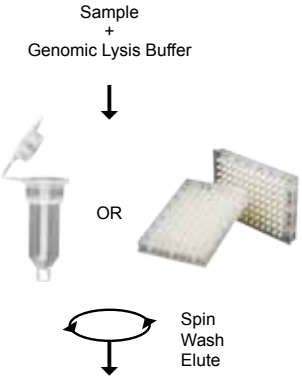
Silicon-A™ Plate D3010, D3011, D3012 (p. 162)

Highlights

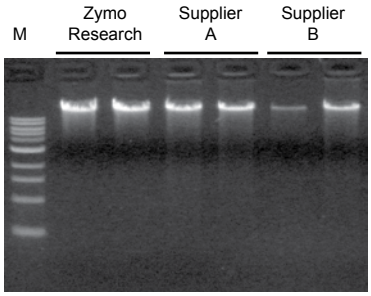
- Easy purification of high quality DNA from whole blood, plasma, serum, body fluids, buffy coat, lymphocytes, tissue, swabs, or cultured cells.
- Protocol excludes the use of Proteinase K and organic denaturants.
- Compatible with commonly used anticoagulants (i.e., EDTA, heparin, citrate).
- Eluted, inhibitor-free DNA is ideal for PCR, endonuclease digestion, bisulfite conversion/methylation detection, sequencing, genotyping, etc.

Description

The *Quick-gDNA*™ kits are for the convenient, rapid isolation of total DNA (e.g., genomic, mitochondrial, viral) from a variety of biological sample sources. Whole blood (fresh or stored), serum, plasma, buffy coat, solid tissue, bone marrow and buccal cells, cells from culture, and many biological liquid samples can be processed with these kits. These products feature *Fast-Spin* column/plate technology for high-quality DNA purification in minutes. PCR inhibitors are effectively removed, and the eluted DNA is suitable 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*-gDNA™ MiniPrep. Equivalent amounts (100 µl) of blood were processed without Proteinase K using the *Quick-gDNA*™ MiniPrep 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*
Quick-gDNA™ MicroPrep	D3020 D3021	50 preps. 200 preps.
Quick-gDNA™ MiniPrep (uncapped)	D3006 D3007	50 preps. 200 preps.
Quick-gDNA™ MiniPrep (capped)	D3024 D3025	50 preps. 200 preps.
Quick-gDNA™ MidiPrep	D3100	25 preps.
ZR-96 *Quick-gDNA*™	D3010 D3011 D3012	2 x 96 preps. 4 x 96 preps. 10x 96 preps.

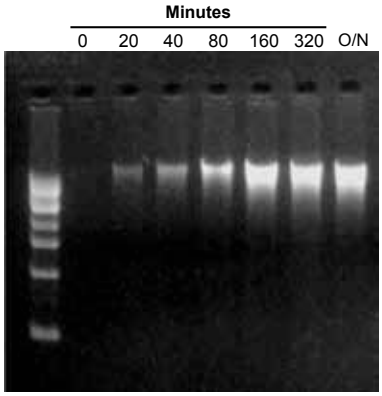
ZR Genomic DNA™-Tissue Kits

Highlights

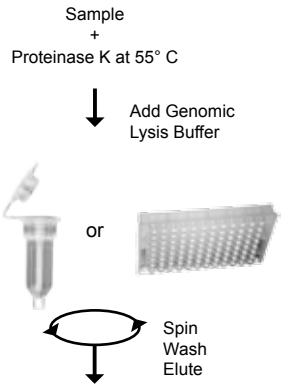
- For high quality DNA purification from solid tissues (e.g., tail snips, ear punches, adipose tissue, etc.), whole blood, plasma, serum, buffy coat, lymphocytes, cultured cells, buccal cells, FFPE tissues, semen, hair, and other biological sources.
- Combines Proteinase K digestion with innovative *Fast-Spin* column technology.
- Isolated DNA is ideal for PCR, endonuclease digestion, Southern blotting, bisulfite conversion/methylation detection, sequencing, genotyping, etc.

Description

The ZR Genomic DNA™-Tissue kits are simple procedures for the rapid isolation of total DNA (e.g., genomic, mitochondrial, parasitic, microbial, viral) from a variety of solid tissues. The products have been optimized for maximal recovery of ultra-pure DNA without RNA contamination and are also compatible with inputs including: buffy coat, bone marrow, cells from culture, whole blood (fresh or stored), serum, plasma, and many biological liquid samples. For processing, simply digest the sample with the supplied Proteinase K then add the Genomic Lysis Buffer, vortex, and transfer the mixture to the supplied spin column. PCR inhibitors are effectively removed during the purification process and purified DNA is suitable for downstream applications including: PCR, Southern blotting, DNA sequencing, endonuclease digestion, bisulfite conversion/methylation analysis, etc.



High yield/quality DNA is successfully isolated from porcine muscle using the ZR Genomic DNA™-Tissue MiniPrep. Equivalent amounts (25 mg) of muscle tissue were processed using the ZR Genomic DNA™-Tissue MiniPrep after incubation with Proteinase K at 55ºC for the indicated times (in minutes) or overnight (O/N). Equal volumes of eluted DNA were analyzed in a 0.8% (w/v) TAE/agarose/ethidium bromide gel. M: 1 kb ladder (Zymo Research).



Ultra-pure DNA for...

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

Product	*Cat. No.*	*Size*
ZR Genomic DNA™-Tissue MicroPrep	D3040 D3041	50 preps. 200 preps.
ZR Genomic DNA™-Tissue MiniPrep	D3050 D3051	50 preps. 200 preps.
ZR Genomic DNA™-Tissue MidiPrep	D3110	25 preps.
ZR-96 Genomic DNA™-Tissue MiniPrep Kit	D3055 D3056 D3057	2 x 96 preps. 4 x 96 preps. 10 x 96 preps.
ZR-96 Genomic DNA™-Tissue MagPrep	D3083 D3084	2 x 96 preps. 4 x 96 preps.

Use

Fresh/Frozen Soft & Solid Tissue..... ✓
FFPE TIssue..... ✓
Tail Snips..... ✓
Ear Punches..... ✓
Feathers & Hair..... ✓
Cultured Cells..... ✓
Buccal Cells/Swabs..... ✓
Buffy Coat..... ✓
Whole Blood..... ✓
Plasma/Serum..... ✓
Semen..... ✓
Mitochondria..... ✓

Specifications

Removal of PCR Inhibitors..... ✓
Format..... Spin Column/ 96-Well / Magnetic Beads
Processing Time.....15-45 min.

ZR Genomic DNA™ -Tissue MicroPrep
Binding Capacity.....5µg/prep.
Elution Volume.....≥10µl

ZR Genomic DNA™ -Tissue MiniPrep
Binding Capacity.....25µg/prep.
Elution Volume.....≥50µl

ZR Genomic DNA™ -Tissue MidiPrep
Binding Capacity.....125µg/prep.
Elution Volume.....≥150µl

ZR-96 Genomic DNA™ -Tissue MiniPrep
Binding Capacity.....5µg/well
Elution Volume.....≥30µl

ZR-96 Genomic DNA™ -Tissue MagPrep
Binding Capacity.....10µg/well
Elution Volume.....≥100µl
Processing Time.....3hr.
Automation Ready!

Quick-gDNA™ Blood Kits

Use

Buffy Coat..... ✓
Whole Blood..... ✓
Plasma/Serum..... ✓

Specifications

Removal of PCR Inhibitors..... ✓
Format..... Spin Column / 96-Well
Processing Time.... 15 min. / 30 min.

***Quick-gDNA*™ Blood MicroPrep**
Binding Capacity..... 5 µg/prep.
Elution Volume..... ≥ 10 µl

***Quick-gDNA*™ Blood MiniPrep**
Binding Capacity..... 25 µg/prep.
Elution Volume..... ≥ 50 µl

***Quick-gDNA*™ Blood MidiPrep**
Binding Capacity.. 125 µg/prep.
Elution Volume..... ≥ 150 µl

ZR-96 *Quick-gDNA*™ Blood
Binding Capacity..... 5 µg/well
Elution Volume..... ≥ 30 µl

Available Formats

Zymo-Spin™ IC D3070, D3071 (p. 160)

Zymo-Spin™ IIC D3072, D3073 (p. 160)

Zymo-Spin™ V-E with Zymo-Midi Filter™
D3074 (p. 165)

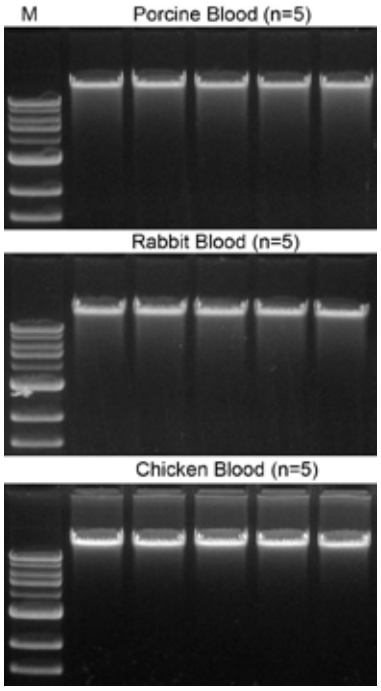
Silicon-A™ Plate D3075, D3076, D3077 (p. 162)

Highlights

- Quick purification of high quality DNA from whole blood, plasma, and serum using innovative *Fast-Spin* column technology.
- Compatible with commonly used anticoagulants (i.e., EDTA, heparin, citrate).
- Unique extraction technology excludes the use of Proteinase K and organic denaturants.
- Isolated DNA is ideal for PCR, endonuclease digestion, bisulfite conversion/ methylation detection, sequencing, genotyping, etc.

Description

The *Quick-gDNA*™ Blood Kits are simple procedures for the rapid isolation of total DNA (e.g., genomic, mitochondrial, viral) from a variety of biological sample sources. These products have been optimized for maximal recovery of ultra-pure DNA without RNA contamination and is compatible with whole blood (fresh or stored), serum, and plasma.



High-throughput DNA isolation from porcine, rabbit, and chicken blood using the ZR-96 *Quick-gDNA*™ Blood kit. DNAs from different blood samples were isolated from select wells of a Silicon-A™ Plate. Equivalent amounts of DNA were then separated by electrophoresis and visualized in a 0.8% agarose/TAE/EtBr gel (shown above). M is a 1 kb molecular weight DNA marker (Zymo Research).

Product	*Cat. No.*	*Size*
Quick-gDNA™ Blood MicroPrep	D3070 D3071	50 preps. 200 preps.
Quick-gDNA™ Blood MiniPrep	D3072 D3073	50 preps. 200 preps.
Quick-gDNA™ Blood MidiPrep	D3074	25 preps.
ZR-96 *Quick*-gDNA™ Blood	D3075 D3076 D3077	2 x 96 preps. 4 x 96 preps. 10 x 96 preps.

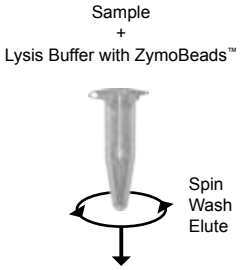
ZymoBead™ Genomic DNA Kit

Highlights

- Easy purification of high quality DNA from whole blood, plasma, serum, body fluids, buffy coat, lymphocytes, tissue, swabs or cultured cells in less than 20 minutes using innovative ZymoBead™ silica-bead technology.
- Compatible with commonly used anticoagulants (i.e., EDTA, heparin, citrate).
- Unique extraction technology excludes the use of Proteinase K and organic denaturants.

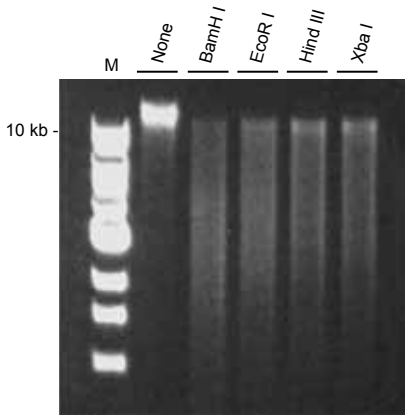
Description

The ZymoBead™ Genomic DNA Kit is a simple procedure for the rapid isolation of total DNA (e.g., genomic, mitochondrial, viral) from a variety of biological sample sources. This product has been optimized for maximal recovery of ultra-pure DNA without RNA contamination and is compatible with whole blood (fresh or stored), serum, plasma, buffy coat, solid tissue, bone marrow and buccal cells, cells from culture, and many biological liquid samples. For processing, simply add the specially formulated Genomic Lysis Buffer to a sample in a 1.5 ml tube, add ZymoBeads™, vortex, then centrifuge. There is no need for organic denaturants or Proteinase K digestion because of the unique chemistries featured in the kit that yield high-quality, purified DNA in just minutes (see below). PCR inhibitors are effectively removed during the purification process. DNA purified using the ZymoBead™ Genomic DNA Kit is suitable for PCR, nucleotide blotting, DNA sequencing, endonuclease digestion, bisulfite conversion/methylation analysis, and other downstream applications.



Ultra-pure DNA for...

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



Digested genomic DNA. Restriction endonuclease digestion of genomic DNA purified with the ZymoBead™ Genomic DNA Kit.

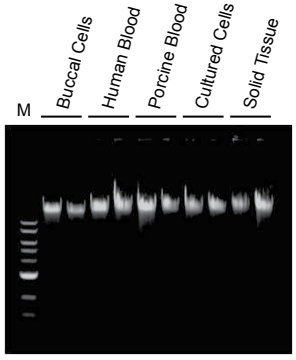
Product	*Cat. No.*	*Size*
ZymoBead™ Genomic DNA Kit	D3004 D3005	~100 preps. ~400 preps.

Use

Fresh/Frozen Soft Tissue..... ✓
Cultured Cells..... ✓
Buccal Cells/Swabs..... ✓
Buffy Coat..... ✓
Whole Blood..... ✓
Plasma/Serum..... ✓
Semen..... ✓
Mitchondria..... ✓

Specifications

Removal of PCR Inhibitors..... ✓
Format..... Affinity Beads
Binding Capacity..... Scalable
Elution Volume..... Scalable
Processing Time..... 20 min.



DNA isolation using the ZymoBead™ Genomic DNA Kit. Purifications were performed in duplicate for each sample and an equal volume of eluted DNA was loaded into each lane of a 0.8% (w/v) TAE/agarose/ethidium bromide gel. M is a 1 kb DNA ladder (Zymo Research).

Available Format

ZymoBeads™ D3004, D3005 (p. 167)

ZR Urine DNA Isolation Kit™

Use

Urine..... ✓

Specifications

Removal of PCR Inhibitors..... ✓
Format..... Spin Column
Binding Capacity..... 5 µg/prep.
Elution Volume.....≥6 µl
Processing Time..... 10 min.

Available Format

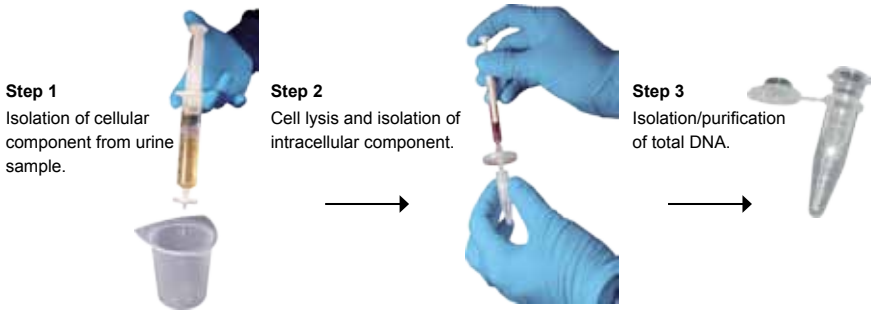
Zymo-Spin™ IC D3060 (p. 160)

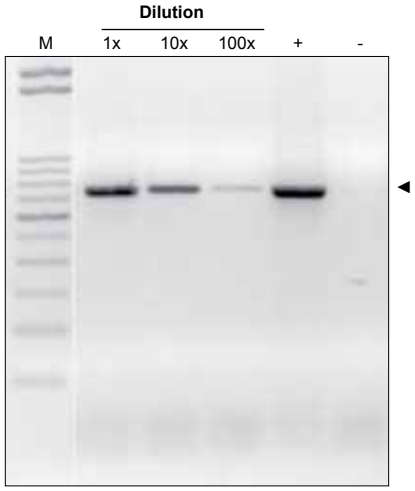
Highlights

- Reliable, quick (10 minute) recovery of DNA from urine.
- *Fast-Spin* column design allows DNA to be eluted at high concentrations into minimal volumes (≥ 6 µl) of elution buffer or water.

Description

The ZR Urine DNA Isolation Kit™ is an innovative product designed for the easy, reliable, and rapid isolation of total DNA from cells and biological sediment in urine samples. The 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 can be processed immediately or at a later time following transportation and/or storage. The DNA isolation procedure is simple and can be performed in less than 10 minutes with the technologies featured in this kit. Total DNA isolated with the ZR Urine DNA Isolation Kit™ is ideal for PCR, array, methylation detection, etc.





DNA purified from human urine using the ZR Urine DNA Isolation Kit™ is ideal for use in PCR. The gel image above shows the results of PCR amplification of 15 ng, 1.5 ng, and 0.15 ng total DNA (1x, 10x 100x dilutions, respectively) isolated from human urine using primers specific for the human β-actin gene. (M) is a 50 bp DNA ladder (Zymo Research) and amplicons are indicated (◀). The (+) and (–) are positive and negative controls, respectively.

Product	*Cat. No.*	*Size*
ZR Urine DNA Isolation Kit™	D3060	20 preps.

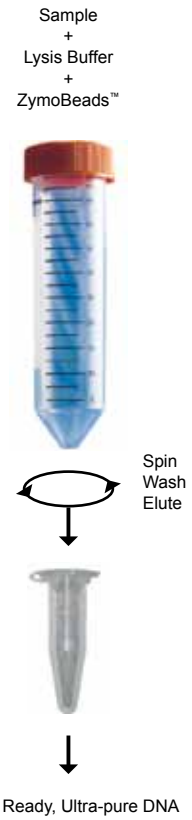
ZR Serum DNA Kit™

Highlights

- Isolate DNA from up to 250 ml serum or plasma efficiently using innovative ZymoBead™ silica-bead technology.
- Scalability facilitates processing of small (100 µl) or large (10 ml) sample volumes.

Description

The ZR Serum DNA Kit™ is based on a state of the art, single buffer procedure for rapid DNA isolation from large volume serum and plasma samples. The product recovers genomic, mitochondrial, and viral DNAs having typical sizes from 25 kb to 50 kb without RNA contamination. The uniquely formulated Genomic Lysis Buffer efficiently lyses cells, virus, and/or cellular particles. DNA/ZymoBead™ complexes are separated by centrifugation, and then washed to remove contaminants. Eluted, purified DNA is ideal for PCR and other sensitive analytical procedures.



Use

Plasma/Serum..... ✓

Specifications

Removal of PCR Inhibitors..... ✓
Format..... Affinity Beads
Binding Capacity..... Scalable
Elution Volume..... Scalable
Processing Time..... Variable

Available Format

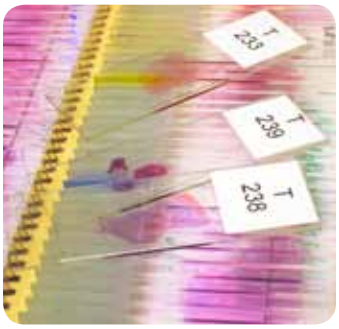
ZymoBeads™ D3013 (p. 167)

Product	*Cat. No.*	*Size*
ZR Serum DNA Kit™	D3013	up to 80 ml serum

ZR FFPE DNA MiniPrep™

Use

FFPE Blocks..... ✓
FFPE Tissue Sections..... ✓



Specifications

Removal of PCR Inhibitors..... ✓
Proteinase K Digestion..... ✓

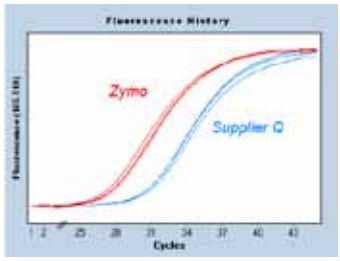
Sample Size..... Up to 25 mg tissue
Format..... Spin Column
Binding Capacity..... 25 µg/prep.
Elution Volume..... ≥ 30 µl
DNA Size Limits..... 50 bp - 25 kb

Highlights

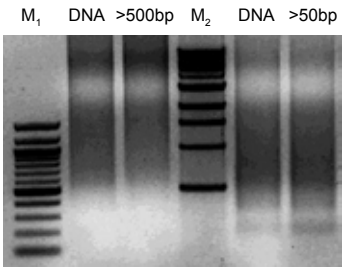
- High performance sample prep technology for high quality DNA (up to ~25 µg/prep) from FFPE tissue samples & sections.
- Selectable size cutoff technology; recover total DNA >50 bp or >500 bp.
- Eluted DNA is RNA-free and ideal for PCR, Next-Gen library prep, enzymatic manipulation, etc.

Description

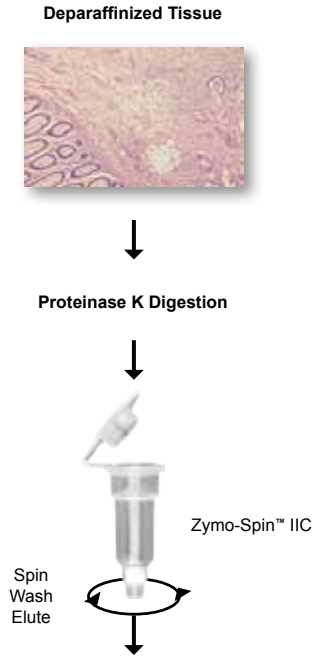
The ZR FFPE DNA MiniPrep™ provides a simple and reliable method for high yield/quality DNA isolation from formalin-fixed, paraffin embedded (FFPE) tissue samples and sections. The unique chemistries of the product have been optimized for maximum recovery of non-crosslinked, ultra-pure DNA without RNA. Simply digest deparaffinized tissues using the provided Proteinase K, heat, and then purify the DNA with the *Fast-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-Gen library prep, enzymatic manipulation, etc.



High quality FFPE DNA. Equivalent amounts of DNA isolated using Zymo and Supplier Q procedures were used for real time PCR analysis. DNA isolated using the ZR FFPE DNA MiniPrep™ consistently yielded lower *Ct* values as depicted by the amplification curves above.



Selectable DNA Size. Equivalent amounts of DNA resolved in a 1% agarose/TAE/EtBr gel show binding conditions may be adjusted with the ZR FFPE DNA MiniPrep™ to selectively isolate DNA > 50 bp or > 500 bp. M_1 is a 100 bp DNA ladder, M_2 is a 1 kb DNA ladder (Zymo Research).



Available Format

Zymo-Spin™ IIC D3065, D3066 (p. 160)

Product	*Cat. No.*	*Size*
ZR FFPE DNA MiniPrep™	D3065 D3066	50 Preps. 200 Preps.

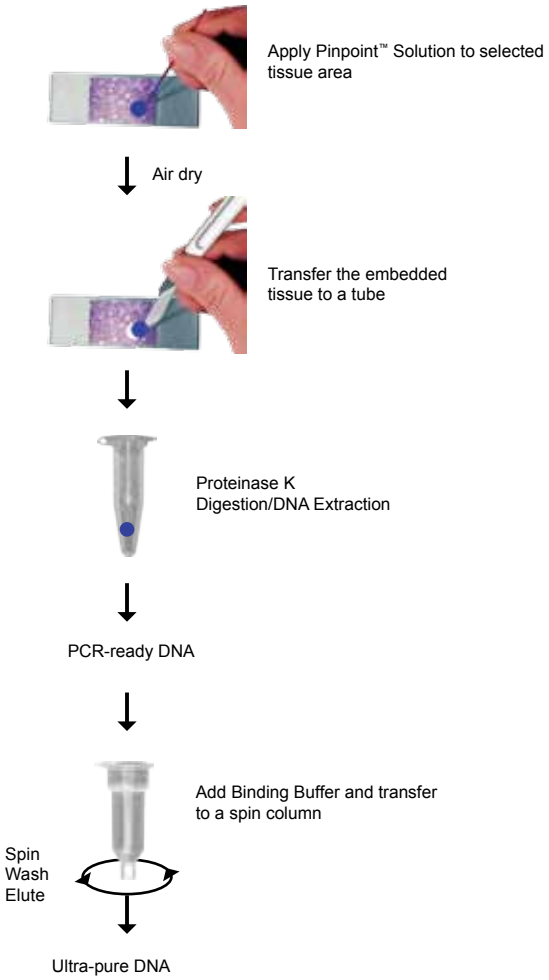
Pinpoint™ Slide DNA Isolation System

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. There is no 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*
Pinpoint™ Slide DNA Isolation System	D3001	50 preps.

Use

Tissue Sections..... ✓
FFPE Tissue Sections..... ✓

Specifications

Removal of PCR Inhibitors..... ✓
Proteinase K Digestion..... ✓

Format..... Spin Column
Binding Capacity..... 5 µg/prep.
Elution Volume..... ≥ 10 µl
DNA Size Limits..... 75 bp - 25 kb
Processing Time..... 5 hr.

Available Format

Zymo-Spin™ I D3001 (p. 160)

YeaStar™ Genomic DNA Kit

Use

Yeast..... ✓
Zymolyase-sensitive Fungi..... ✓

Specifications

Removal of PCR Inhibitors..... ✓
Format..... Spin Column
Binding Capacity.....25 µg/prep.
Elution Volume.....≥60 µl
Removal of PCR Inhibitors
Processing Time.....1.5 hr.

Available Format

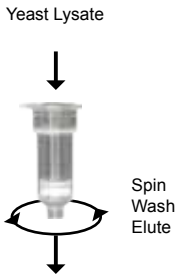
Zymo-Spin™ III D2002 (p. 160)

Highlights

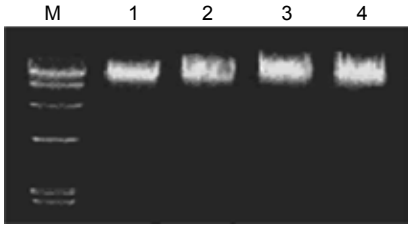
- Efficient DNA isolation from a broad spectrum of fungal species susceptible to yeast lytic enzyme (i.e., Zymolyase) lysis.
- Genomic DNA can be used for Southern blotting, PCR, restriction enzyme digestion, etc.

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 *Fast-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 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*
YeaStar™ Genomic DNA Kit	D2002	40 preps.

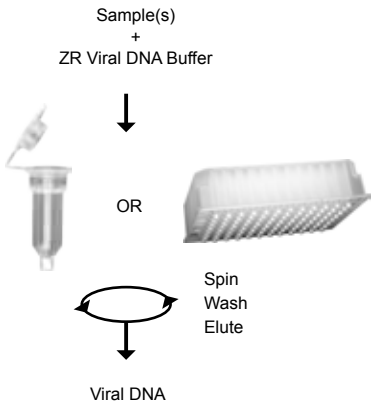
ZR Viral DNA Kits™

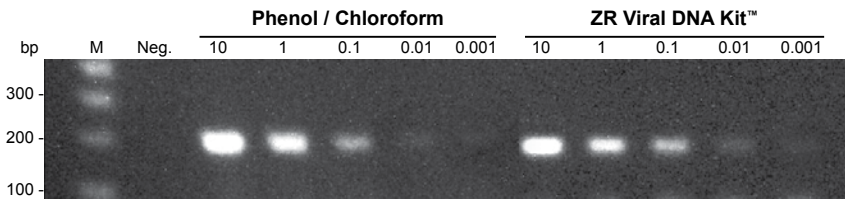
Highlights

- Quick recovery of viral DNA from a wide range of sources using *Fast-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 ZR Viral DNA Kit™ and ZR-96 Viral DNA Kit™ 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 from liquid samples. DNA can be eluted with elution buffer or water and is suitable for subsequent PCR, nucleotide blotting, and restriction endonuclease digestion procedures.



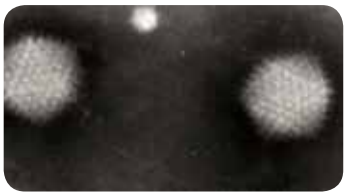


Viral DNA purification. Human HBV DNA was isolated from 10 to 0.001 µl of human serum using phenol/chloroform or ZR Viral DNA Kit™. The presence of HBV DNA is evidenced by a ~200 bp PCR amplicon. Lane M is a 100 bp DNA Ladder and "Neg." is the negative control for PCR.

Product	*Cat. No.*	*Size*
ZR Viral DNA Kit™	D3015 D3016	50 Preps. 200 Preps.
ZR-96 Viral DNA Kit™	D3017 D3018	2 x 96 preps. 4 x 96 preps.

Use

Fresh/Frozen Soft Tissue..... ✓
Cultured Cells..... ✓
Whole Blood..... ✓
Plasma/Serum..... ✓
Virus..... ✓



Specifications

Removal of PCR Inhibitors..... ✓
Binding Capacity..... 5 µg/prep.
DNA Size Limits..... 100 bp - 50 kb

ZR Viral DNA Kit™
Format..... Spin Column
Elution Volume..... ≥ 6 µl
Processing Time..... 15 min.

ZR-96 Viral DNA Kit™
Format..... 96-Well
Elution Volume..... ≥ 10 µl
Processing Time..... 25 min.

Available Formats

Zymo-Spin™ IC D3015, D3016 (p. 160)

Zymo-Spin™ I-96 D3017, D3018 (p. 162)

High Quality DNA from Environmental Samples

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 (pp. 92-97), 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 (+) and Gram (-) 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.

	ZR Soil Microbe DNA Kits				ZR Fungal/Bacterial DNA Kits			
	MicroPrep	MiniPrep	MidiPrep	ZR-96	MicroPrep	MiniPrep	MidiPrep	ZR-96
Format	Spin Column			96-Well	Spin Column			96-Well
ZR BashingBead™ Lysis	✓	✓	✓	✓	✓	✓	✓	✓
Binding Capacity	5 µg	25 µg	125 µg	5 µg	5 µg	25 µg	125 µg	5 µg
Elution Volume	≥ 10 µl	≥ 25 µl	≥ 150 µl	≥ 50 µl	≥ 10 µl	≥ 25 µl	≥ 150 µl	≥ 25 µl
Removal of PCR Inhibitors	✓	✓	✓	✓	✓	✓	✓	✓
Removal of Humic, Fulvic, Polyphenolic Substances	✓	✓	✓	✓				
Processing Time	15 min.	15 min.	25 min.	50 min.	10 min.	10 min.	20 min.	40 min.
Sample Source	✓Soil ✓Sediment ✓Sludge ✓Bacteria ✓Fungi Unicellular Filamentous ✓Algae Unicellular Filamentous ✓Protists ✓Yeast				✓Bacteria ✓Fungi Unicellular Filamentous ✓Algae Unicellular Filamentous ✓Protists ✓Yeast			
PAGE NO.	92	92	92	92	93	93	93	93

ZR Fecal DNA Kits				ZR Tissue & Insect DNA Kits				ZR Plant/Seed DNA Kits			
Micro Prep	Mini Prep	Midi Prep	ZR-96	Micro Prep	Mini Prep	Midi Prep	ZR-96	Micro Prep	Mini Prep	Midi Prep	ZR-96
Spin Column			96-Well	Spin Column			96-Well	Spin Column			96-Well
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
5 µg	25 µg	125 µg	5 µg	5 µg	25 µg	125 µg	5 µg	5 µg	25 µg	125 µg	5 µg
≥ 10 µl	≥ 25 µl	≥ 150 µl	≥ 50 µl	≥ 10 µl	≥ 25 µl	≥ 150 µl	≥ 25 µl	≥ 10 µl	≥ 25 µl	≥ 150 µl	≥ 50 µl
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓					✓	✓	✓	✓
15 min.	15 min.	25 min.	50 min.	10 min.	10 min.	20 min.	40 min.	15 min.	15 min.	25 min.	50 min.
✓Feces ✓Soil ✓Sediment ✓Sludge ✓Bacteria ✓Fungi Unicellular Filamentous ✓Algae Unicellular Filamentous ✓Protists ✓Yeast				✓Soft Tissues ✓Soft Tissues (Food) ✓Tough-to-Lyse Tissues ✓Tough-to-Lyse Organisms ✓Insects/Arthropods				✓Plant Material ✓Seeds ✓Fruit			
94	94	94	94	95	95	95	95	96	96	96	96

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 page.

For processing, samples are simply transferred to the provided ZR BashingBead™ Lysis Tubes where samples are rapidly and efficiently lysed by bead beating in uniquely designed 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 *Fast-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 typically takes about 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 ZR Soil Microbe DNA, ZR Fecal DNA, and ZR Plant/Seed DNA Kits only.

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

PCR Ready, Ultra-pure DNA

MidiPrep Format

Pulverize Sample in ZR BashingBead™ Lysis/Filtration Tube

Centrifuge & Transfer Lysate to Zymo-Spin™ V-E with Zymo-Midi Filter™

OR

Spin
Wash
Elute

PCR Ready Ultra-pure DNA

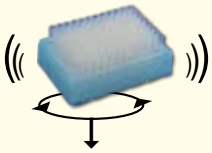
Continue with the following step for ZR Soil Microbe DNA, ZR Fecal DNA, and ZR Plant/Seed DNA Kits only.

Polyphenolic Removal with Zymo-Spin™ IV-HRC

PCR Ready, Ultra-pure DNA

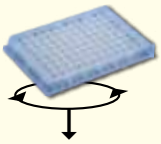
Zymo Research's state of the art BashingBeads™ are constructed of the highest quality, most dense ceramic material available today. They are used when thorough sample homogenization/lysis is required by the researcher. DNA shearing by physical and chemical methods is minimized since the beads are fracture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

96-Well Format



Pulverize Samples with ZR BashingBead™ Lysis Rack

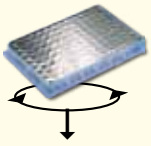
Deep-well Block



Bind, Wash, Elute DNA with Silicon-A™ Plate

PCR Ready Ultra-pure DNA

Continue with the following steps for ZR Soil Microbe DNA, ZR Fecal DNA, and ZR Plant/Seed DNA Kits only.



Polyphenolic Removal with Silicon-A™-HRC Plate

PCR Ready, Ultra-pure DNA

FAX: (949) 266-9452 | TOLL-FREE: (888) 882-9682 | TEL: (949) 679-1190 | INFO@ZYMORESEARCH.COM | WWW.ZYMORESEARCH.COM

ZR Soil Microbe DNA Kits

Use

Soil..... ✓
Sediment..... ✓
Sludge..... ✓
Gram(+)Bacteria..... ✓
Gram(-)Bacteria..... ✓
Yeast..... ✓
FilamentousFungi..... ✓
UnicellularAlgae..... ✓
FilamentousAlgae..... ✓
Protist..... ✓

Specifications

ZR BashingBead™ Lysis..... ✓
Removal of PCR Inhibitors..... ✓
Removal of Polyphenolic PCR Inhibitors..... ✓

ZR Soil Microbe DNA MicroPrep™
Format.....SpinColumn
BindingCapacity.....5µg/prep.
ElutionVolume.....≥10µl
ProcessingTime.....15min.

ZR Soil Microbe DNA MiniPrep™
Format.....SpinColumn
BindingCapacity.....25µg/prep.
ElutionVolume.....≥25µl
ProcessingTime.....15min.

ZR Soil Microbe DNA MidiPrep™
Format.....SpinColumn
BindingCapacity.....125µg/prep.
ElutionVolume.....≥150µl
ProcessingTime.....25min.

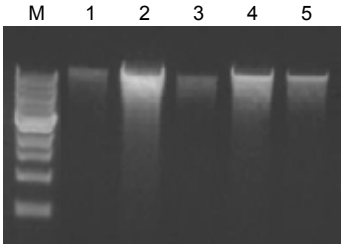
ZR-96 Soil Microbe DNA Kit™
Format..... 96-Well
BindingCapacity.....5µg/well
ElutionVolume.....≥50µl
ProcessingTime.....50min.

Highlights

- Simple, efficient isolation of humic-free DNA from microbes in soil, sludge, sediment, and sand in minutes including tough-to-lyse bacteria, fungi, algae, and protozoa.
- Ultra-high density BashingBeads™ are fracture resistant and chemically inert.

Description

The ZR Soil Microbe DNA MicroPrep™, ZR Soil Microbe DNA MiniPrep™, ZR Soil Microbe DNA MidiPrep™, and ZR-96 Soil Microbe DNA Kit™ are designed for the simple and rapid isolation of humic-free, PCR-quality DNA from microbes in soil. These products can be used to isolate DNA from tough-to-lyse bacteria, fungi, protozoa, and algae that inhabit a variety of samples including clay, sandy, silty, peaty, chalky, and loamy soils. Soil microbes are rapidly and efficiently lysed by bead beating with our state of the art, ultra-high density BashingBeads™. *Fast-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.



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).

Available Formats

Zymo-Spin™ IC (p. 160) D6003
Zymo-Spin™ IIC (p. 160) D6001
Zymo-Spin™ V-E with Zymo-Midi Filter™ (p. 165) D6101
Silicon-A™ Plate (p. 162) D6002

Product	*Cat. No.*	*Size*
ZR Soil Microbe DNA MicroPrep™	D6003	50 preps.
ZR Soil Microbe DNA MiniPrep™	D6001	50 preps.
ZR Soil Microbe DNA MidiPrep™	D6101	25 preps.
ZR-96 Soil Microbe DNA Kit™	D6002	2 x 96 preps.

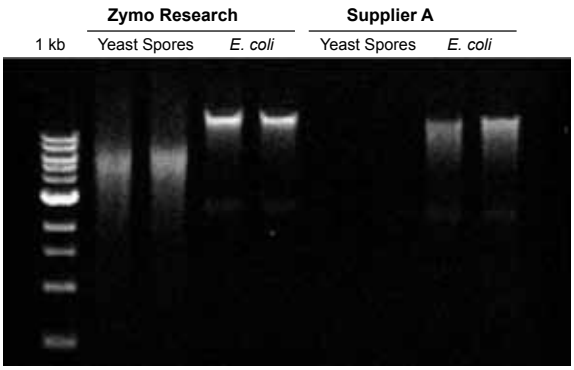
ZR Fungal/Bacterial DNA Kits

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 ZR Fungal/Bacterial DNA MicroPrep™, ZR Fungal/Bacterial DNA MiniPrep™, ZR Fungal/Bacterial DNA MidiPrep™, and ZR-96 Fungal/Bacterial DNA Kit™ 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 (+/-) 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™. *Fast-Spin* column or plate technology is then used to isolate the DNA that 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 ZR Fungal/Bacterial DNA MiniPrep™ is high quality and structurally intact. Equivalent amounts of yeast and bacteria were processed using the ZR Fungal/Bacterial DNA MiniPrep™ 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).

Available Formats

Zymo-Spin™ IC
(p. 160) D6007

Zymo-Spin™ IIC
(p. 160) D6005

Zymo-Spin™ V-E with Zymo-Midi Filter™
(p. 165) D6105

Silicon-A™ Plate
(p. 162) D6006

Product	*Cat. No.*	*Size*
ZR Fungal/Bacterial DNA MicroPrep™	D6007	50 preps.
ZR Fungal/Bacterial DNA MiniPrep™	D6005	50 preps.
ZR Fungal/Bacterial DNA MidiPrep™	D6105	25 preps.
ZR-96 Fungal/Bacterial DNA Kit™	D6006	2 x 96 preps.

Use

Gram (+) Bacteria..... ✓
Gram (-) Bacteria..... ✓
Yeast..... ✓
Filamentous Fungi..... ✓
Unicellular Algae..... ✓
Filamentous Algae..... ✓
Protist..... ✓

Specifications

ZR BashingBead™ Lysis..... ✓
Removal of PCR Inhibitors..... ✓

ZR Fungal/Bacterial DNA MicroPrep™
Format.....Spin Column
Binding Capacity.....5µg/prep.
Elution Volume.....≥10µl
Processing Time.....10min.

ZR Fungal/Bacterial DNA MiniPrep™
Format.....Spin Column
Binding Capacity.....25µg/prep.
Elution Volume.....≥25µl
Processing Time.....10min.

ZR Fungal/Bacterial DNA MidiPrep™
Format.....Spin Column
Binding Capacity.....125µg/prep.
Elution Volume.....≥150µl
Processing Time.....20 min.

ZR-96 Fungal/Bacterial DNA Kit™
Format.....96-Well
Binding Capacity.....5 µg/well
Elution Volume.....≥25 µl
Processing Time.....40 min.

ZR Fecal DNA Kits

Use

Feces..... ✓
Gram (+) Bacteria..... ✓
Gram (-) Bacteria..... ✓
Yeast..... ✓
Filamentous Fungi..... ✓
Unicellular Algae..... ✓
Filamentous Algae..... ✓
Protist..... ✓

Specifications

ZR BashingBead™ Lysis..... ✓
Removal of PCR Inhibitors..... ✓
Removal of Polyphenolic PCR Inhibitors..... ✓

ZR Fecal DNA MicroPrep™
Format.....Spin Column
Binding Capacity.....5 µg/prep.
Elution Volume.....≥ 10 µl
Processing Time.....15 min.

ZR Fecal DNA MiniPrep™
Format..... Spin Column
Binding Capacity.....25µg/prep.
Elution Volume.....≥25 µl
Processing Time.....15 min.

ZR Fecal DNA MidiPrep™
Format.....Spin Column
Binding Capacity.....125µg/prep.
Elution Volume.....≥150 µl
Processing Time.....25 min.

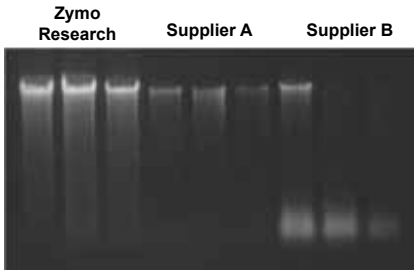
ZR-96 Fecal DNA Kit™
Format..... 96-Well
Binding Capacity.....5µg/well
Elution Volume.....≥50 µl
Processing Time.....50 min.

Highlights

- Rapid methods for the isolation of inhibitor-free, PCR-quality DNA from fecal samples in minutes including those from humans, birds, rats, mice, cattle, etc.
- Ultra-high density BashingBeads™ are fracture resistant and chemically inert.
- *Fast-Spin* column and unique filtration technologies effectively removes PCR inhibitors from the DNA product.

Description

The ZR Fecal DNA MicroPrep™, ZR Fecal DNA MiniPrep™, ZR Fecal DNA MidiPrep™, and the ZR-96 Fecal DNA Kit™ are designed for the simple and rapid isolation of inhibitor-free, PCR-quality host cell and microbial DNA from a variety of sample sources including humans, birds, rats, mice, cattle, etc. The procedures are easy and can be completed in minutes: Fecal samples are rapidly and efficiently lysed by bead beating with our state of the art, ultra-high density BashingBeads™. *Fast-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. 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 ZR Fecal DNA MiniPrep™ 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.

Available Formats

Zymo-Spin™ IC (p. 160) D6012
Zymo-Spin™ IIC (p. 160) D6010
Zymo-Spin™ V-E with Zymo-Midi Filter™ (p. 165) D6110
Silicon-A™ Plate (p. 162) D6011

Product	*Cat. No.*	*Size*
ZR Fecal DNA MicroPrep™	D6012	50 preps.
ZR Fecal DNA MiniPrep™	D6010	50 preps.
ZR Fecal DNA MidiPrep™	D6110	25 preps.
ZR-96 Fecal DNA Kit™	D6011	2 x 96 preps.

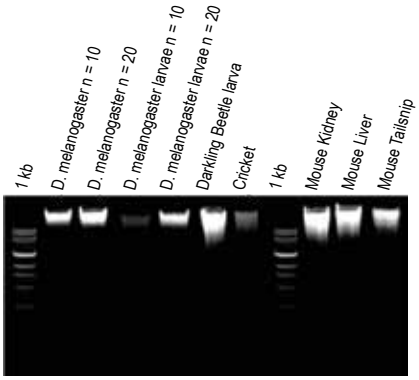
ZR Tissue & Insect DNA Kits

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 ZR Tissue & Insect DNA MicroPrep™, ZR Tissue & Insect DNA MiniPrep™, ZR Tissue & Insect DNA MidiPrep™, and ZR-96 Tissue & Insect DNA Kit™ 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: 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 *Fast-Spin* column and plate technologies and is ideal for downstream molecular-based applications including PCR, array, genotyping, etc. The procedures are compatible with mammalian tissues, whole blood, and cultured cells.



DNA yields from various insect and mouse samples using the ZR Insect & Tissue DNA MiniPrep™. 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.

Available Formats

Zymo-Spin™ IC
(p. 160) D6015

Zymo-Spin™ IIC
(p. 160) D6016

Zymo-Spin™ V-E with Zymo-Midi Filter™
(p. 165) D6115

Silicon-A™ Plate
(p. 162) D6017

Product	*Cat. No.*	*Size*
ZR Tissue & Insect DNA MicroPrep™	D6015	50 preps.
ZR Tissue & Insect DNA MiniPrep™	D6016	50 preps.
ZR Tissue & Insect DNA MidiPrep™	D6115	25 preps.
ZR-96 Tissue & Insect DNA Kit™	D6017	2 x 96 preps.

Use

Insects/Arthropods..... ✓
Tough-to-Lyse Tissues..... ✓
Tough-to-Lyse Organisms..... ✓
Soft & Solid Tissues (Food)..... ✓

Specifications

ZR BashingBead™ Lysis..... ✓
Removal of PCR Inhibitors..... ✓

ZR Tissue & Insect DNA MicroPrep™
Format..... Spin Column
Binding Capacity..... 5 µg/prep.
Elution Volume..... ≥ 10 µl
Processing Time..... 10 min.

ZR Tissue & Insect DNA MiniPrep™
Format..... Spin Column
Binding Capacity..... 25 µg/prep.
Elution Volume..... ≥ 25 µl
Processing Time..... 10 min.

ZR Tissue & Insect DNA MidiPrep™
Format..... Spin Column
Binding Capacity..... 125 µg/prep.
Elution Volume..... ≥ 150 µl
Processing Time..... 20 min.

ZR-96 Tissue & Insect Kit™
Format..... 96-Well
Binding Capacity..... 5 µg/well
Elution Volume..... ≥ 25 µl
Processing Time..... 40 min.

ZR Plant/Seed DNA Kits

Use

PlantMaterial.....✓
Seeds.....✓
Fruit.....✓

Specifications

ZR BashingBead™ Lysis..... ✓
Removal of PCR Inhibitors..... ✓
Removal of Polyphenolic
PCR Inhibitors..... ✓

ZR Plant/Seed DNA MicroPrep™
Format.....Spin Column
Binding Capacity.....5µg/prep.
Elution Volume.....≥10µl
Processing Time.....15min.

ZR Plant/Seed DNA MiniPrep™
Format.....Spin Column
Binding Capacity.....25µg/prep.
Elution Volume.....≥25µl
Processing Time.....15min.

ZR Plant/Seed DNA MidiPrep™
Format..... Spin Column
Binding Capacity.....125µg/prep.
Elution Volume.....≥150µl
Processing Time.....25min.

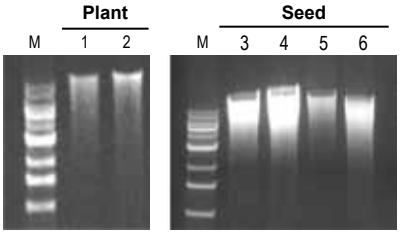
ZR-96 Plant/Seed DNA Kit™
Format..... 96-Well
Binding Capacity.....5µg/well
Elution Volume.....≥50µl
Processing Time.....50min.

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.
- *Fast-Spin* column technology coupled with filtration removes polyphenolic PCR inhibitors from the DNA product.

Description

The ZR Plant/Seed DNA MicroPrep™, ZR Plant/Seed DNA MiniPrep™, ZR Plant/Seed DNA MidiPrep™, and the ZR-96 Plant/Seed DNA Kit™ are designed for the simple, 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 *Fast-Spin* column or plate 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 ZR Plant/Seed DNA MiniPrep™. 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).

Available Formats

Zymo-Spin™ IC
(p. 160) D6022

Zymo-Spin™ IIC
(p. 160) D6020

Zymo-Spin™ V-E with Zymo-Midi Filter™
(p. 165) D6120

Silicon-A™ Plate
(p. 162) D6021

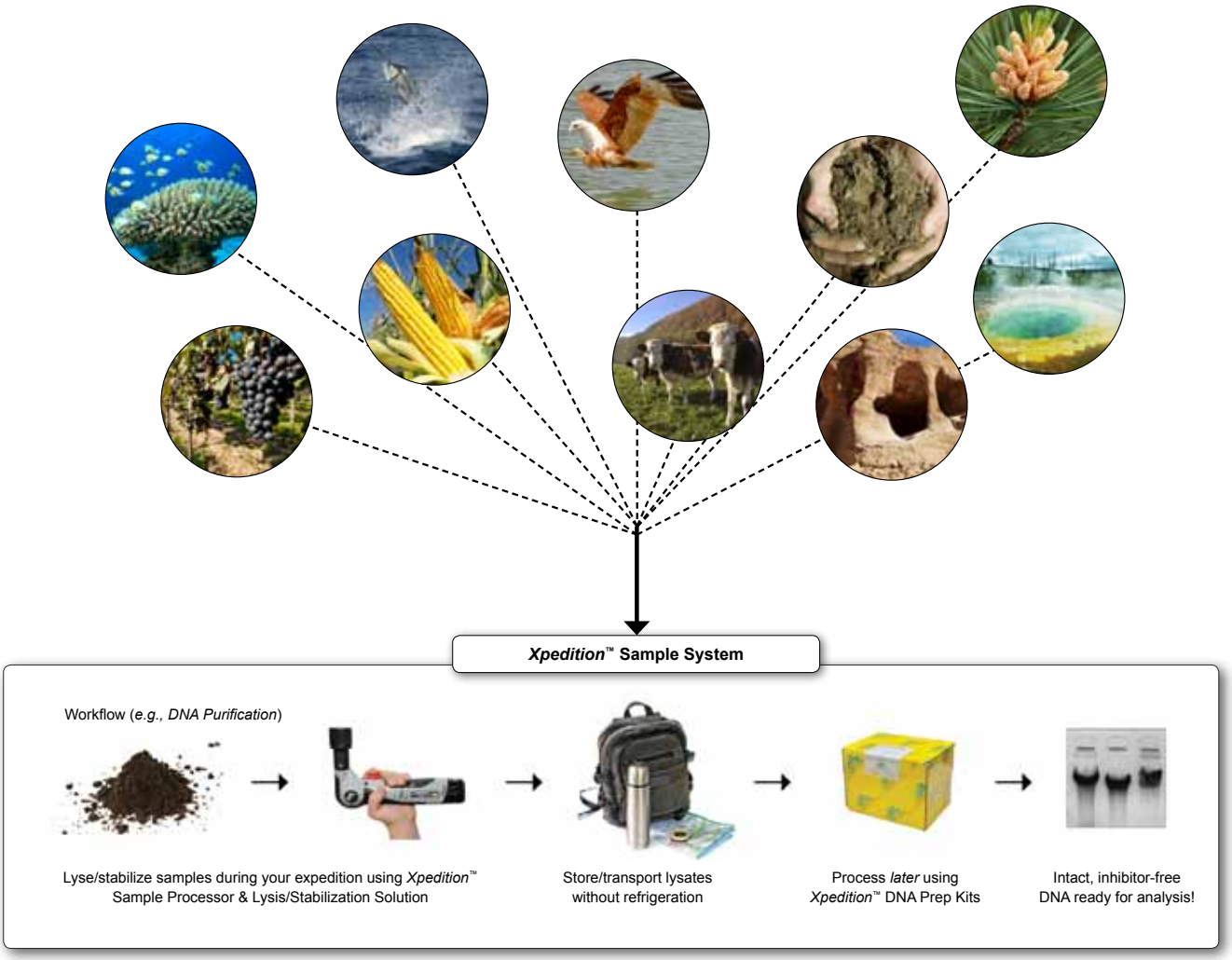
Product	*Cat. No.*	*Size*
ZR Plant/Seed DNA MicroPrep™	D6022	50 preps.
ZR Plant/Seed DNA MiniPrep™	D6020	50 preps.
ZR Plant/Seed DNA MidiPrep™	D6120	25 preps.
ZR-96 Plant/Seed DNA Kit™	D6021	2 x 96 preps.

Technology Overview:
"Take the Lab to the Field" with Xpedition™ Technologies

Degradation and contamination of biological samples have been obstacles to scientific study, and may be particularly problematic in highly sensitive molecular-analysis techniques (e.g., PCR of low copy DNA). Use of cryogenic freezing methods for environmental/forensic sample preservation may often be too impractical to be employed. The solution is the *Xpedition*™ Sample Processor (*XSP*) and *Xpedition*™ Sample Prep Technologies from Zymo Research. The *XSP* is a portable, hand-held device developed for vigorous cell disruption (bead beating) that allows the researcher/investigator to ***"Take the Lab to the Field"***.

DNA in samples processed with *Xpedition*™ DNA Sample Prep Technology is preserved for subsequent storage/transportation without the requirement for refrigeration. This is due to a unique lysis/stabilization solution that is featured in all *Xpedition*™ DNA Prep kits.

The *XSP* is ideal for both field and lab use. *You can use it here, use it there, you can use it anywhere!*



Product	Cat. No.	Size
Xpedition™ Soil/Fecal DNA MiniPrep	D6202	50 preps.
Xpedition™ Fungal/Bacterial DNA MiniPrep	D6206	50 preps.
Xpedition™ Tissue/Insect DNA MiniPrep	D6221	50 preps.
Xpedition™ Plant/Seed DNA MiniPrep	D6221	50 preps.
Xpedition™ Lysis/Stabilization Solution	D6202-1-40	40 ml
Xpedition™ Sample Processor	S6020	1 unit

Product Guide: DNA/RNA 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. A scientist can process cells or tissues with the ZR-*Duet*™ DNA/RNA MiniPrep to purify DNA and RNA from the same sample into separate products. The ZR Viral DNA/RNA Kits™ are for the purification of viral and host DNA and RNA together using blood or cell culture as input. The Oligo Clean & Concentrator™ facilities the rapid recovery of both small DNA and RNA. Finally, the ssDNA/RNA Clean & Concentrator™ is an adaptation of our DCC™ product line for purifying ssDNA/RNA samples.

	Parallel Purification			*Co-Purification*		
	ZR-*Duet*™ DNA/RNA MiniPrep	**Oligo Clean & Concentrator™**		**ssDNA/RNA Clean & Concentrator™**	**ZR Viral DNA/RNA Kits™**	
Format	Spin Column	Spin Column	96-Well	Spin Column	Spin Column	96-Well
Binding Capacity	25 µg DNA 25 µg RNA	10 µg	10 µg	10 µg	10 µg	10 µg
Elution Volume	≥ 50 µl DNA / ≥ 25 µl RNA	≥ 6 µl	≥ 10 µl	≥ 6 µl	≥ 6 µl	≥ 10 µl
Processing Time	15 min.[1]	2 min.	20 min.	10 min.	5 min.	15 min.
Features	✓DNA Separation Column ✓In-column DNase Digestion ✓RNAlater® Compatible	✓Short (≥ 16 nt) DNA or RNA Recovery		✓dsDNA Removal	✓One-step Viral Inactivation and Purification	
Sample Source	✓Fresh/Frozen Soft Tissue ✓Fresh/Frozen Solid Tissue (limited[2]) ✓Bacteria (limited[2]) ✓Yeast (limited[2]) ✓Small RNA[3] ✓Cultured Cells ✓Buffy Coat	✓DNA/RNA ✓Probe Purification		✓Small RNA[3] ✓Probe Purification	✓Cultured Cells ✓Whole blood (≤ 50 µl) ✓Plasma/Serum ✓Virus	
PAGE NO.	100	58	58	101	102	102

[1] Time does not account for in-column DNase I treatment (~20 min.).
[2] Some tissue samples may require mechanical and/or enzymatic pre-treatment for efficient processing.
[3] Can isolate RNAs ≥ 17 nucleotides.

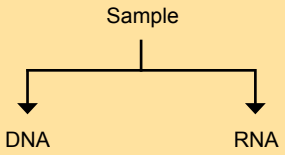
Technology Overview:
Parallel Purification & Co-purification of DNA & RNA

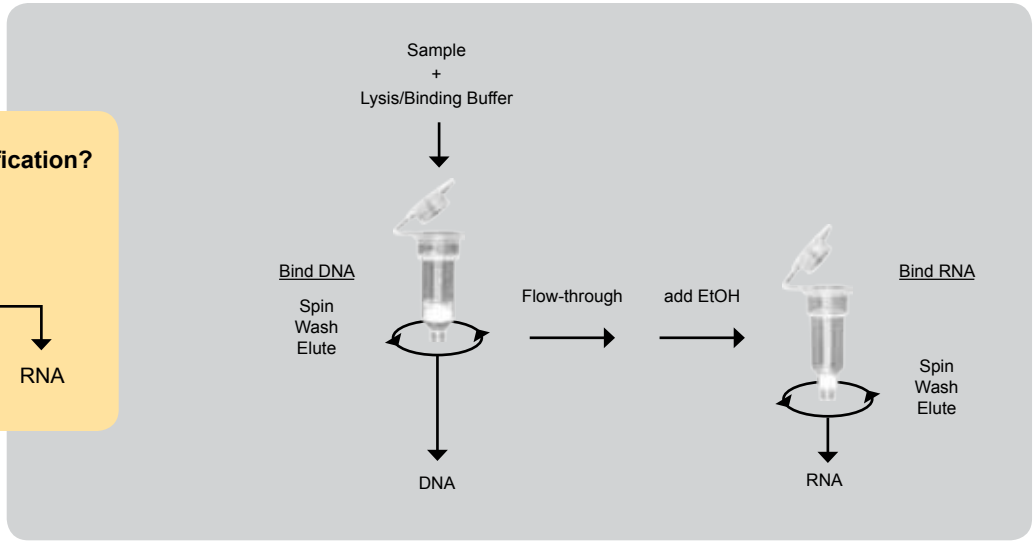
Zymo Research features a series of products for simultaneous purification of DNA and RNA from variety of samples. Both parallel purification or co-purification products provide high quality DNA and RNA while the procedures are fast and simple to perform. The overview of parallel purification and co-purification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

The ZR-*Duet*™ DNA/RNA MiniPrep 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).

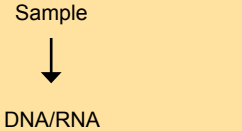
Viral nucleic acids can be readily extracted and co-purified from cells or body fluids with a single column format using the ZR Viral DNA/RNA Kit™. For high-throughput (96-well) sample processing, the ZR-96 Viral DNA/RNA Kit™ is available. The ssDNA/RNA Clean & Concentrator™ streamlines the separation 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.

What is Parallel Purification?





What is Co-purification?



ZR-*Duet*™ DNA/RNA MiniPrep

Use

Fresh/Frozen Soft Tissue..... ✓
Cultured Cells..... ✓
Buccal Cells/Swabs..... ✓
Buffy Coat..... ✓

Specifications

In-column DNase Digestion..... ✓
RNA*later*® Compatible..... ✓

Format..... Spin Column
DNA Binding Capacity...25µg/prep.
RNA Binding Capacity...25µg/prep.
DNA Elution Volume..... ≥ 50 µl
RNA Elution Volume..... ≥ 25 µl
Processing Time..... 15 min.

Available Formats

Zymo-Spin™ IIC D7001 (p.160)

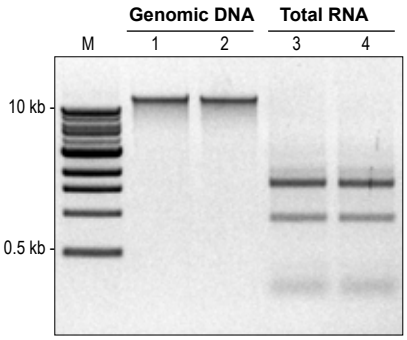
Zymo-Spin™ IIIC D7001 (p. 160)

Highlights

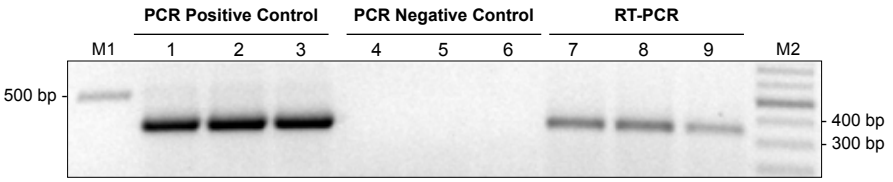
- Quick isolation and separation of genomic DNA and total RNA (up to ~25 µg each) from a wide range of sources using *Fast-Spin* column technology.
- DNA/RNA products are suitable for use in PCR, RT-PCR, and other procedures.
- Omits the use of organic denaturants and proteases.

Description

The ZR-*Duet*™ DNA/RNA MiniPrep provides a quick method for parallel purification of high quality genomic DNA and total RNA from small amounts of cells and tissue. The kit isolates 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 (up to ~25 µg each) from 5 x 10^6 cells can be isolated in less than 15 minutes.



DNA and RNA purified using the ZR-*Duet*™ DNA/RNA MiniPrep. Genomic DNA (lane 1, 2) and total RNA (lane 3, 4) isolated from human epithelial cells (HCT 116) with the ZR-*Duet*™ DNA/RNA MiniPrep. 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 ZR-*Duet*™ DNA/RNA MiniPrep: 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*
ZR-*Duet*™ DNA/RNA MiniPrep Kit	D7001	50 preps.

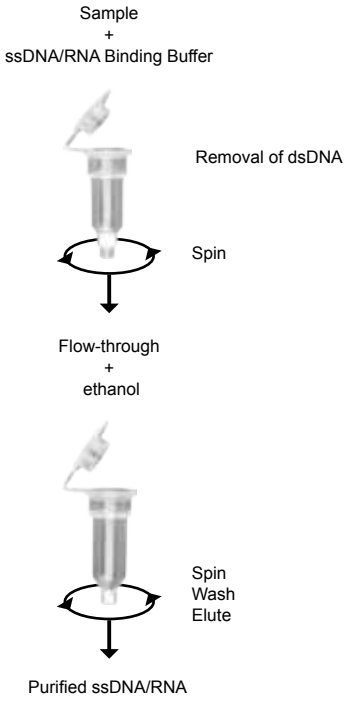
ssDNA/RNA Clean & Concentrator™

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.
- *Fast-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 *Fast-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 result is highly concentrated, purified DNA/RNA that is suitable for subsequent molecular methods including PCR, RT-PCR, hybridization, etc.



Product	*Cat. No.*	*Size*
ssDNA/RNA Clean & Concentrator™ Kit	D7010 D7011	20 preps. 50 preps.

Use

Cell Lysates..... ✓
Enzyme Removal..... ✓
Nucleotide/Dye Removal..... ✓
cDNA/ssDNA Purification..... ✓
Probe Purification..... ✓
M13 Phage..... ✓

Specifications

Format..... Spin Column
Binding Capacity..... 10 µg/prep.
Elution Volume..... ≥ 6 µl
Size Limits..... 17-200 nt
Processing Time..... 10 min.

Available Formats

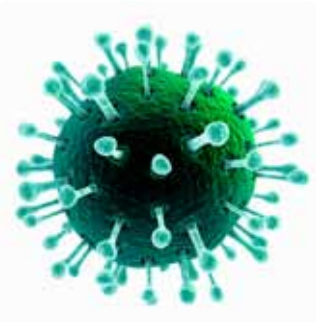
Zymo-Spin™ IC D7010, D7011 (p. 160)

Zymo-Spin™ IIC D7010, D7011 (p. 160)

ZR Viral DNA/RNA Kits™

Use

Cultured Cells..... ✓
Plasma/Serum..... ✓
Virus..... ✓



Specifications

Binding Capacity..... 10 µg/prep.
RNA Size limits..... ≥ 200 nt

ZR Viral DNA/RNA Kit™
Format..... Spin Column
Elution Volume..... ≥ 6 µl
Processing Time..... 5 min.

ZR-96 Viral DNA/RNA Kit™
Format..... 96-Well
Elution Volume..... ≥ 10 µl
Processing Time..... 15 min.

Available Formats

Zymo-Spin™ IC D7020, D7021 (p. 160)

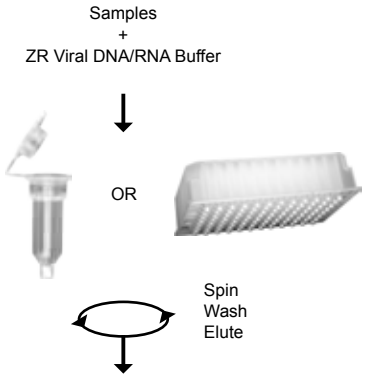
Zymo-Spin™ I-96 D7022, D7023 (p. 162)

Highlights

- Quick co-purification of viral DNA/RNA from a wide range of sources.
- *Fast-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 ZR Viral DNA/RNA Kit™ and ZR-96 Viral DNA/RNA Kit™ 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. The procedure employs a single buffer system that facilitates viral particle lysis and allows for the subsequent DNA/RNA binding onto the matrix of the Zymo-Spin™ IC Column or Zymo-Spin™ I-96 Plate. The nucleic acids are washed then eluted with DNase/RNase-free Water. The eluted DNA and RNA are suitable for use in various subsequent procedures including RT/PCR.



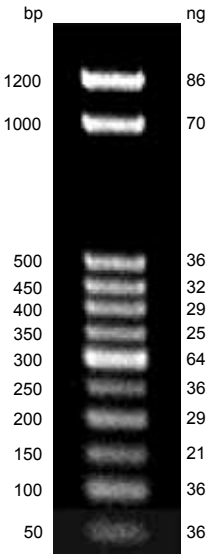
Ultra-pure DNA/RNA for...
✓ Reverse Transcription
✓ PCR

Product	*Cat. No.*	*Size*
ZR Viral DNA/RNA Kit™	D7020 D7021	25 preps. 100 preps.
ZR-96 Viral DNA/RNA Kit™	D7022 D7023	2 x 96 preps. 4 x 96 preps.

DNA Molecular Weight Markers

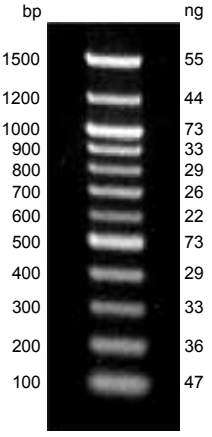
Description

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. Each marker comes with product information detailing the product and its application.



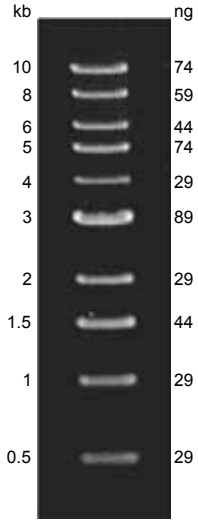
ZR 50 bp DNA Marker™

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.

Use

DNA Size Standard for Gel Electrophoresis..... ✓

Specifications

Provided as nucleic acid in TE or as a ready-to-load liquid*.... ✓

Ranges available:

ZR 50 bp DNA Marker™: 50-1200 bp

ZR 100 bp DNA Marker™: 100-1500 bp

ZR 1 kb DNA Marker™: 0.5-10 kb

Inclusion of an intensified band is provided in each marker for easy identification.

*All ready-to-load markers contain Xylene-Cyanol FF and Orange G dyes.

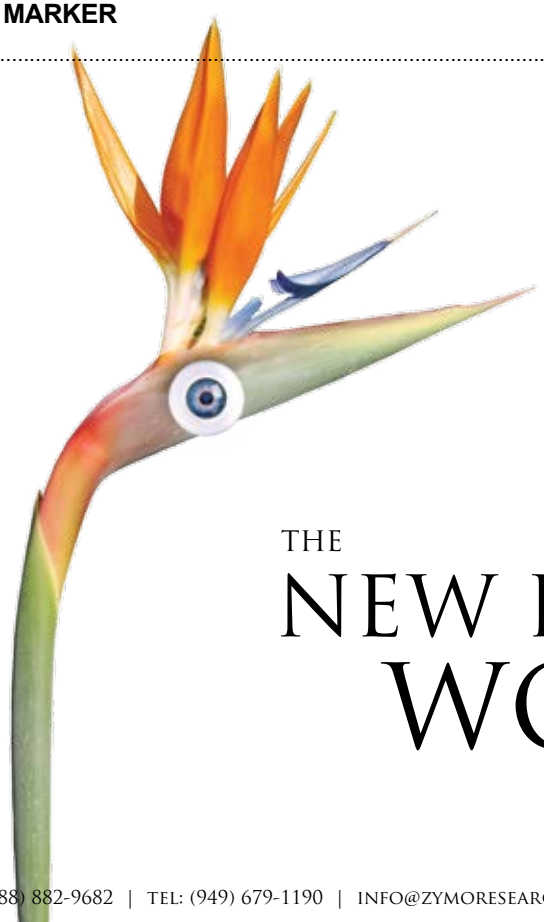
Product	*Cat. No.*	*Size*
ZR 50 bp DNA Marker™	M5001-50 M5001-200	50 µg / 100 µl 200 µg / 400 µl
ZR 50 bp DNA Marker™ (ready-to-load*)	M5004-50	50 µg / 600 µl
ZR 100 bp DNA Marker™	M5002-50 M5002-200	50 µg / 100 µl 200 µg / 400 µl
ZR 100 bp DNA Marker™ (ready-to-load*)	M5005-50	50 µg / 600 µl
ZR 1 kb DNA Marker™	M5003-50 M5003-200	50 µg / 100 µl 200 µg / 400 µl
ZR 1 kb DNA Marker™ (ready-to-load*)	M5006-50	50 µg / 600 µl

3 The New RNA World

RNA is truly an amazing and important biological molecule that plays 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 a... *New RNA World*.

Zymo Research understands the central role that RNA plays in biological processes and now offers a complete portfolio of products and reagents 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 and concentrating crude or contaminated RNA samples and isolation of RNA from a wide variety of sources. The success of all RNA-based experiments depends on first isolating ultra-pure high quality RNA, and our industry-leading products ensure that your RNA samples are ready for all standard and Next-Gen applications to investigate this New RNA World!

THE NEW RNA WORLD



THE
NEW RNA
WORLD

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Inhibitor-free RNA from Any Enzymatic Reaction

The RNA Clean & Concentrator™ (RCC™) kits (p. 108) and the DNA-Free RNA Kit™ (p. 109) 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. Zymo Research developed the Zymoclean™ Gel RNA Recovery Kit (p. 110) and the ZR small-RNA™ PAGE Recovery Kit (p. 111) for recovery of RNA from agarose and polyacrylamide gel matrices. All clean-up kits feature our state of the art *Fast-Spin* column technology so that RNA can be eluted with 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-PCR.

Enzymatic Reactions, RNA in Aqueous Phase, Crude or Diluted RNA

	RNA Clean & Concentrator™ -5	**RNA Clean & Concentrator™ -25**	**RNA Clean & Concentrator™ -100**	**ZR-96 RNA Clean & Concentrator™**
Format	Spin Column	Spin Column	Spin Column	96-Well
Binding Capacity	10 µg	50 µg	250 µg	25 µg
Elution Volume	≥ 6 µl	≥ 25 µl	≥ 100 µl	≥ 10 µl
Processing Time	5 min.	5 min.	10 min.	20 min.
Use	✓ RNA Clean-up ✓ Enzyme Removal ✓ Nucleotide/Dye Removal, ✓ Small-RNA/Probe Purification			
PAGE NO.	108	108	108	108

Contaminated RNA *RNA Gel Recovery*

DNA-Free RNA Kit™	*OneStep*™ PCR Inhibitor Removal		Zymoclean™ Gel RNA Recovery Kit	ZR small-RNA™ PAGE Recovery Kit
Spin Column	Spin Column	96-Well	Spin Column	Spin Column
10 µg	No DNA/RNA Binding		5 µg	
≥ 6 µl	50-200 µl	50-100 µl	≥ 6 µl	
20 min.	5 min.	10 min.	30 min.	45 min.
✓ DNA-free RNA ✓ RNA Clean-up ✓ Enzyme Removal ✓ Nucleotide/Dye Removal ✓ Small-RNA/Probe Purification	✓ Removal of Polyphenolic RT Inhibitors		✓ RNA From Agarose Gel Slices	✓ RNA From Polyacrylamide Gel Slices
109	61	61	110	111

RNA Clean & Concentrator™ Kits

Use

RNA Clean-up..... ✓
DNA-free RNA..... ✓
Enzyme Removal..... ✓
Nucleotide/Dye Removal..... ✓
Small-RNA/Probe Purification.... ✓

Specifications

Format... Spin Column / 96-Well
RNA Size Limits..... ≥ 17 nt

RNA Clean & Concentrator™-5
Binding Capacity.....10 µg/prep.
Elution Volume..... ≥ 6 µl
Processing Time..... 5 min.

RNA Clean & Concentrator™-25
Binding Capacity..... 50 µg/prep.
Elution Volume..... ≥ 25 µl
Processing Time..... 5 min.

RNA Clean & Concentrator™-100
Binding Capacity... 250 µg/prep.
Elution Volume..... ≥ 100 µl
Processing Time..... 10 min.

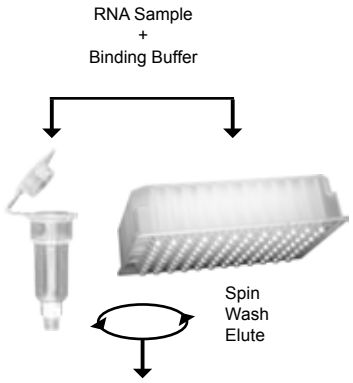
ZR-96 RNA Clean & Concentrator™
Binding Capacity..... 25 µg/well
Elution Volume..... ≥ 10 µl
Processing Time..... 20 min.

Highlights

- Quick methods for cleaning and concentrating RNA.
- *Fast-Spin* column/plate technology allows RNA to be eluted into minimal 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. These simple procedures are based on the use of a unique single-buffer system and *Fast-Spin* technology. The procedures are easy: add the binding buffer to your sample, adjust the conditions for binding by adding ethanol, 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 suitable for subsequent RNA-based methods including RT-PCR, hybridization, etc.



Ultra-pure RNA for...
✓ RT-PCR
✓ qPCR
✓ Hybridization
✓ RNA Interference

Available Formats

Zymo-Spin™ IC
(p. 160)
R1015, R1016

Zymo-Spin™ IIC
(p. 160)
R1017, R1018

Zymo-Spin™ V-E with Reservoir
R1019

Zymo-Spin™ I-96 Plate
(p. 162)
R1080

Product	*Cat. No.*	*Size*
RNA Clean & Concentrator™-5	R1015 R1016	50 preps. 200 preps.
RNA Clean & Concentrator™-25	R1017 R1018	50 preps. 100 preps.
RNA Clean & Concentrator™-100	R1019	25 preps.
ZR-96 RNA Clean & Concentrator™ Kit	R1080	2 x 96 preps.

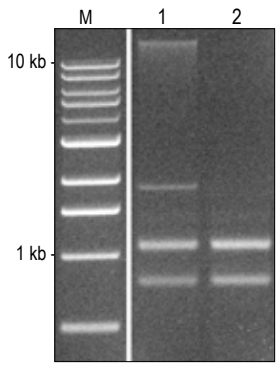
DNA-Free RNA Kit™

Highlights

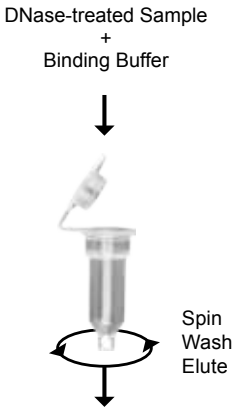
- Quick (20 minute) method for DNA-free RNA preparation.
- *Fast-Spin* column technology allows RNA to be eluted into minimal volumes (≥ 6 µl).
- DNase I is provided.

Description

The DNA-Free RNA Kit™ provides a simple and reliable method for the rapid preparation of up to ~10 µg (per prep.) of high-quality RT-PCR-ready, DNA-free RNA. The kit is provided with high-fidelity DNase I for complete DNA removal. Purification of the RNA is easy: Simply treat your RNA sample with DNase I, add the binding buffer, adjust the conditions by adding ethanol, and then bind, wash, and elute the pure RNA from the provided Zymo-Spin™ IC Column. RNA ≥ 17 bases can be safely treated and recovered using this kit. The result is highly-concentrated, purified RNA that is suitable for subsequent RNA-based methods including RT-PCR, hybridization, etc.



Purification of RNA samples containing genomic and plasmid DNA treated with the DNA-Free RNA Kit™. (1) RNA/DNA sample purified without prior DNase treatment. (2) DNase treated, purified RNA sample. M is a 1 kb DNA Marker (Zymo Research).



Ultra-pure RNA for...

- ✓ RT-PCR
- ✓ q-PCR
- ✓ Hybridization
- ✓ RNA Interference

Product	*Cat. No.*	*Size*
DNA-Free RNA Kit™	R1013 R1014	50 preps. 200 preps.

Use

RNA Clean-up..... ✓
DNA-free RNA..... ✓
Enzyme Removal..... ✓
Nucleotide/Dye Removal..... ✓
Small-RNA/Probe Purification.... ✓

Specifications

Format..... Spin Column
RNA Size Limits..... ≥ 17 nt
Binding Capacity..... 10 µg/prep.
Elution Volume..... ≥ 6 µl
Processing Time..... 20 min.

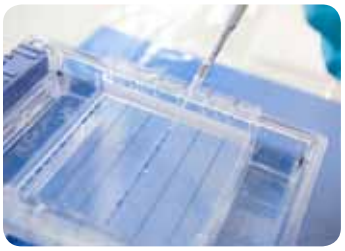
Available Format

Zymo-Spin™ IC R1013, R1014 (p. 160)

Zymoclean™ Gel RNA Recovery Kit

Use

RNA from Agarose Gel Slices.... ✓



Specifications

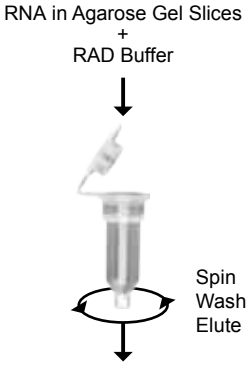
Format..... Spin Column
Binding Capacity..... 5 µg/prep.
Elution Volume..... ≥ 6 µl
RNA Size Limits..... ≥ 200 nt
Processing Time..... 30 min.

Highlights

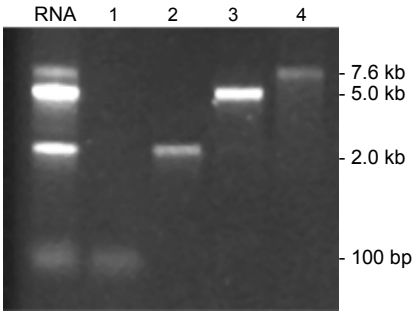
- Quick (30 minute) recovery of purified RNA fragments from agarose gels.
- Recovery ≥ 80% for RNA > 500 nt.

Description

The Zymoclean™ Gel RNA Recovery Kit provides a quick and efficient purification method for recovery of RNA fragments from agarose gels. The procedure combines a unique, single-step agarose dissolving/RNA binding buffer with *Fast-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%).



Ultra-pure RNA for...
✓ Reverse Transcription
✓ Northern Blotting, etc.



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).

Available Format

Zymo-Spin™ IC R1011 (p. 160)

Product	*Cat. No.*	*Size*
Zymoclean™ Gel RNA Recovery Kit	R1011	50 preps.

ZR small-RNA™ PAGE Recovery Kit

Highlights

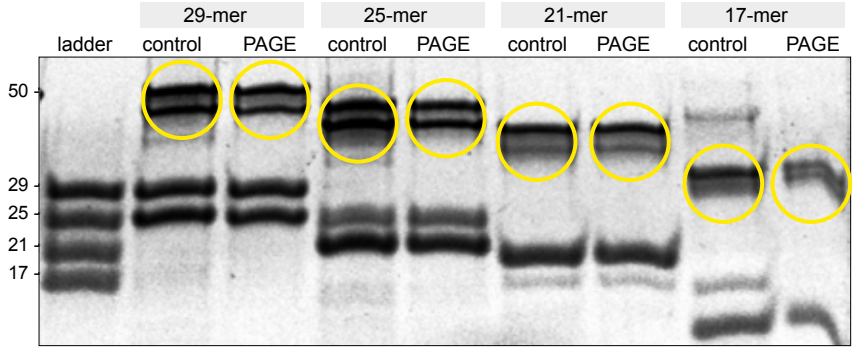
- For efficient recovery of small RNA fragments from polyacrylamide gels.
- Compatible with up to 25% (w/v) polyacrylamide.

Description

The ZR small-RNA™ PAGE Recovery Kit provides an easy and efficient method for the extraction of high quality small RNAs from polyacrylamide gels (native or denatured). The ZR small-RNA™ PAGE Recovery Kit is a refinement of the "crush and soak" method that incorporates a unique buffer system together with *Fast-Spin* column technologies for improved recovery and added convenience. The recovered RNA can be concentrated into volumes ≥ 6 µl, making it ideal for many downstream enzymatic reactions and manipulations.

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

Self-ligated ssRNA Fragments



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*
ZR small-RNA™ PAGE Recovery Kit	R1070	20 preps.

Use

RNA from Polyacrylamide Gel Slices..... ✓

Specifications

Format.....Spin Column
Binding Capacity.....5µg/prep.
Elution Volume.....≥6µl
Size Limits..... 17-200 nt
Processing Time.....45min.

Available Format

Zymo-Spin™ IC R1070 (p. 160)

Product Guide: Total RNA Purification

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. Like our RNA clean-up kits, all of the RNA isolation kits feature *Fast-Spin* column technology for highly concentrated RNA that is well suited for applications such as microarrays, denaturing-gel electrophoresis, Northern blotting, and RT-PCR. Each kit has been optimized for a particular application with specialized, nuclease-free components that 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.

Samples in TRIzol®, TRI Reagent®, etc.

Cells & Tissue

Cells, Tissue, Biological Fluids

	Direct-zol™ RNA				***Quick-RNA™***			
	MicroPrep	MiniPrep	ZR-96		MicroPrep	MiniPrep	MidiPrep	ZR-96
Format	Spin Column		96-Well	MagBead	Spin Column			96-Well
Binding Capacity	10 µg	100 µg	10 µg	5 µg	10 µg	100 µg	1 mg	10 µg
Elution Volume	≥ 6 µl	≥ 35 µl	≥ 10 µl	50 µl	≥ 6 µl	≥ 30 µl	≥ 100 µl	≥ 25 µl
Processing Time	10 min.	10 min.	30 min.	2 hr.	10 min.	10 min.	15 min.	30 min.
Features	✓ Viral Inactivation ✓ Small RNA Purification ✓ DNase I Provided ✓ RNA Shield™ & RNA*later*® Compatible				✓ Non-organic Extraction ✓ Small RNA Purification ✓ DNase I Provided ✓ RNA Shield™ & RNA*later*® Compatible			
Sample Source	✓ Fresh/Frozen Soft Tissue ✓ Cultured Cells ✓ Buccal Cells/Swabs ✓ Whole Blood/Plasma/Serum ✓ Buffy Coat ✓ Virus				✓ Fresh/Frozen Soft Tissue ✓ Cultured Cells ✓ Buccal Cells/Swabs ✓ Buffy Coat ✓ Biological Fluids			
PAGE NO.	114	114	114	115	116	116	116	116

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Fixed Tissue		*Biological Fluids*				*Yeast*
Sections	***FFPE***	***Plasma/Serum***		***Blood***		***Urine***
Pinpoint™ Slide RNA Isolation		**ZR Viral RNA Kit™**		**ZR Whole-Blood RNA™**		**ZR Urine RNA Isolation Kit™**	**YeaStar™ RNA Kit**
System I	System II						
Spin Column		Spin Column	96-Well	Spin Column	96-Well	Spin Column	Spin Column
10 µg		10 µg		10 µg		10 µg	25 µg
≥ 10 µl	≥ 10 µl	≥ 6 µl	≥ 10 µl	≥ 6 µl	≥ 10 µl	≥ 10 µl	≥ 60 µl
1.5 hr.	5 hr.	5 min.	15 min.	10 min.	45 min.	15 min.	30 min.
✓ Includes Proteinase K ✓ Targeted RNA Isolation		✓ Viral Inactivation		✓ Blood Partitioning (Optional) ✓ Blood Storage		✓ miRNA ✓ 200 µl - 30 ml input	✓ Includes Zymolyase
✓ Frozen Tissue Sections	✓ Fixed Tissue Sections	✓ Buccal Cells/Swabs ✓ Plasma/Serum ✓ Virus		✓ Whole Blood ✓ Plasma/Serum		✓ Urine ✓ Microvesicles ✓ Exosomes	✓ Fungi Susceptible to Yeast Lytic Enzyme
120	120	117	117	118	118	119	121

Direct-zol™ RNA Kits

Use

Cells From Culture..... ✓
Solid Tissue..... ✓
Plasma..... ✓
Serum..... ✓
Whole Blood..... ✓
In vitro Processed RNA..... ✓

Samples stored in TRIzol®, TRI Reagent®, RNAzol®, QIAzol®, TriPure, TriSure™ and all other acid-guanidinium-phenol reagents..... ✓

Add Sample in *TRI Reagent®* *directly* to Zymo-Spin Column

↓

Spin
Wash
Elute

↓

Ready-to-use RNA

Specifications

Direct-zol™ RNA MicroPrep

Format:.....Spin Column
Binding Capacity..... 10 µg
Elution Volume..... ≥ 6 µl
RNA Size Limit..... ≥ 17 nt
Processing Time..... 10 min.

Direct-zol™ RNA MiniPrep

Format..... Spin Column
Binding Capacity..... 100 µg
Elution Volume..... ≥ 35 µl
RNA Size Limit..... ≥ 17 nt
Processing Time..... 10 min.

Direct-zol™ -96 RNA

Format..... 96-Well
Binding Capacity..... 10 µg
Elution Volume..... ≥ 10 µl
RNA Size Limit..... ≥ 17 nt
Processing Time..... 30 min.

Highlights

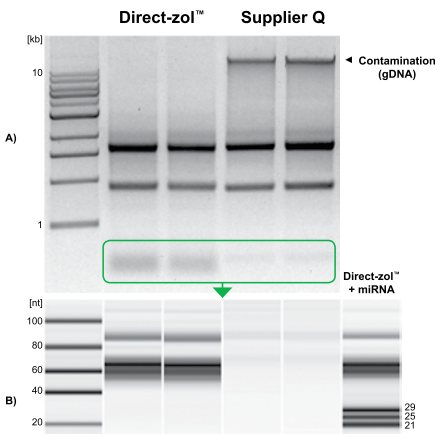
- Quick purification of high-quality (DNA-free) total RNA directly from samples stored in TRIzol®, TRI Reagent® and all other acid-guanidinium-phenol based reagents.
- Bypasses phase separation and precipitation procedures.
- Efficient, broad range purification of small and large RNAs from cells, tissues, biological liquids, *in vitro* transcripts, etc.
- Ideal for viral inactivation/sample storage (R2051 & R2053).

Description

The Direct-zol™ RNA kits facilitates efficient and consistent broad size-range purification (including miRNAs) of high quality (DNA-free) total RNA directly from samples stored in TRIzol®, TRI Reagent®, and all other acid-guanidinium-phenol based reagents. 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.

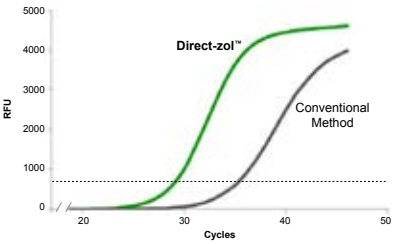
The Direct-zol™ technology couples the effectiveness of TRI Reagent® for infectious agent inactivation and sample preservation with a convenient hassle-free, mess-free procedure for DNA-free RNA.

Broad Range RNA Recovery



High quality broad range RNA is purified with the Direct-zol™ RNA MiniPrep. (A) DNA-free RNA purified from human epithelial cells using the Direct-zol™ RNA MiniPrep compared to a DNA contaminated preparation from supplier Q (1% agarose/TAE). (B) Small RNAs are effectively recovered with the Direct-zol™ procedure while absent in supplier Q preparations (Agilent Bioanalyzer 2100, Small RNA Chip data shown).

Sensitive RNA Detection



Viral RNA is detected with high sensitivity following the Direct-zol™ isolation method. The Direct-zol™ method significantly improves the detection of West Nile virus when compared to conventional phase-separation method. The RT-qPCR data show ΔCt = 5 (average of two independent experiments). RNA was isolated from cell-free samples inactivated using TRI Reagent®.

Product	*Cat. No.*	*Size*
Direct-zol™ RNA MiniPrep	R2050, R2051* R2052, R2053*	50 preps. 200 preps
Direct-zol™ RNA MicroPrep	R2060, R2061* R2062, R2063*	50 preps. 200 preps.
Direct-zol™-96 RNA	R2054, R2055* R2056, R2057*	2 x 96 preps. 4 x 96 preps.

*Supplied with TRI Reagent®, All Direct-zol™ RNA Kits supplied with DNase I

Direct-zol™-96 Magbead RNA

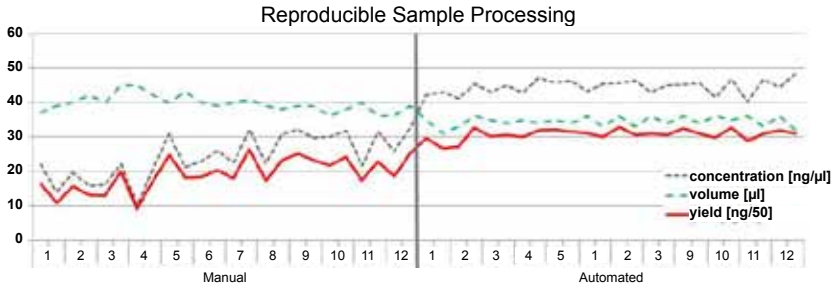
Highlights

- 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.
- Bypasses 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

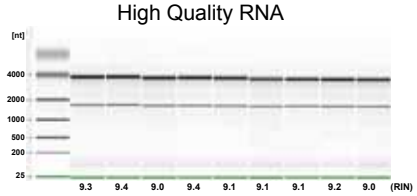
The Direct-zol™-96 MagBead RNA is a high-throughput adaptation of Direct-Zol™ technology for high-quality RNA directly from samples in TRI Reagent® and similar. The magnetic bead format allows the procedure to be easily automated. The extraction method inactivates viruses and other infectious agents. 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!



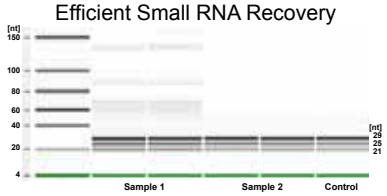
Comparison between manual and automated (Freedom EVO®, Tecan) sample processing with the Direct-zol™-96 MagBead RNA across a 96-Well plate. RNA was purified from human epithelial cells (5 x 10^5/well).

High Quality RNA



RNA quality assessed using a Bioanalyzer. RNA was purified from human epithelial cells using the Direct-zol™-96 MagBead RNA on Freedom EVO® (Tecan).

Efficient Small RNA Recovery



Small RNA recovery with the Direct-zol™-96 MagBead RNA. Bioanalyzer (Small RNA Chip) gel image shown.

Product	*Cat. No.*	*Size*
Direct-zol™-96 MagBead RNA	R2100	2 x 96 preps.
	R2102	4 x 96 preps.
	R2104	8 x 96 preps.
Direct-zol™-96 MagBead RNA Supplied with TRI Reagent®	R2101	2 x 96 preps.
	R2103	4 x 96 preps.
	R2105	8 x 96 preps.

Use

Cells From Culture..... ✓
Plasma..... ✓
Serum..... ✓
Whole Blood..... ✓
In vitro Processed RNA..... ✓
Samples stored in TRIzol®, TRI Reagent®, RNAzol®, QIAzol®, TriPure, TriSure™ and all other acid-guanidinium-phenol reagents..... ✓

Specifications

Format..... Magnetic Beads
Binding Capacity... 5 µg/20 µl beads
Elution Volume..... 50 µl
RNA Size Limit..... ≥ 17 nt
Automation Ready!

Available Format

MagBinding Beads R2100-R2105 (p. 167)

Quick-RNA™ Kits

Use

Cultured Cells..... ✓
Fresh/Frozen Soft Tissue*..... ✓
Buccal Cells/Swabs..... ✓
Buffy Coat..... ✓
Biological Fluids ..... ✓

* For solid tissue or tough-to-lyse samples use: ZR Tissue & Insect RNA MicroPrep™ (p. 125)

Specifications

***Quick-RNA*™ MicroPrep**
Format..... Spin Column
Binding Capacity..... 10 µg/prep.
Elution Volume..... ≥ 6 µl
Sample Size..... ≤ 10^6 cells
Processing Time..... 10 min.

***Quick-RNA*™ MiniPrep**
Format..... Spin Column
Binding Capacity..... 100 µg/prep.
Elution Volume..... ≥ 30 µl
Sample Size..... ≤ 10^7 cells
Processing Time..... 10 min.

***Quick-RNA*™ MidiPrep**
Format..... Spin Column
Binding Capacity..... 1 mg/prep.
Elution Volume..... ≥ 200 µl
Sample Size..... 10^3 - 10^8 cells
Processing Time..... 15 min.

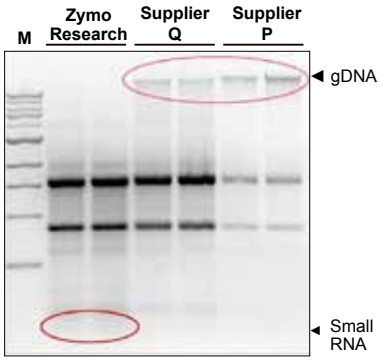
ZR-96 *Quick-RNA*™
Format..... 96-Well
Binding Capacity..... 10 µg/well
Elution Volume..... ≥ 25 µl
Sample Size..... ≤ 10^6 cells
Processing Time..... 30 min.

Highlights

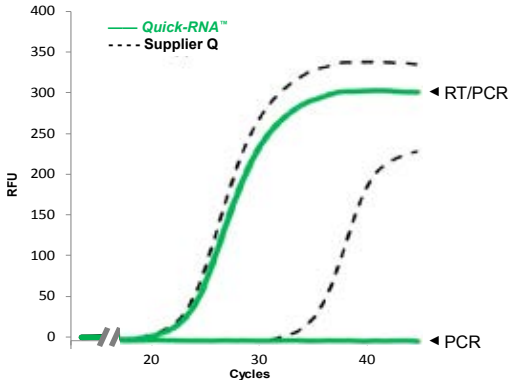
- High-quality total RNA from a wide range of samples – single to 10^7 cells.
- Isolate small and large RNAs into separate fractions (optional).
- DNA-free RNA for use in any downstream application. DNase I included.
- Samples in RNA Shield™ or RNA*later*® can be input directly without reagent removal.

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. The procedure combines a unique buffer system with *Fast-Spin* column and plate technology to yield high quality total RNA (including small RNAs 17-200 nt) in minutes. The procedure is simple: 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.



Broad range RNA with minimal amounts of genomic DNA contamination. The *Quick-RNA*™ MiniPrep compared to kits from Suppliers Q and P. 1% (w/v) agarose gel, M is a 1 kb DNA marker.



RNA isolated with the Quick-RNA™ MiniPrep 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*
Quick-RNA™ MicroPrep	R1050 R1051	50 preps. 200 preps.
Quick-RNA™ MiniPrep	R1054 R1055	50 preps. 200 preps.
Quick-RNA™ MidiPrep	R1056	25 preps.
ZR-96 *Quick-RNA*™	R1052 R1053	2 x 96 preps. 4 x 96 preps.

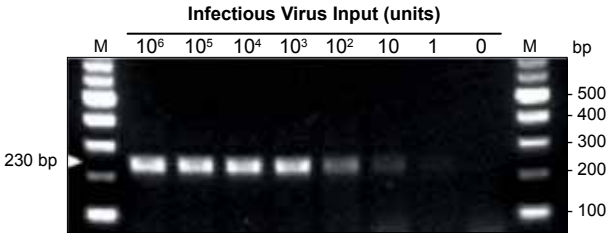
ZR Viral RNA Kits™

Highlights

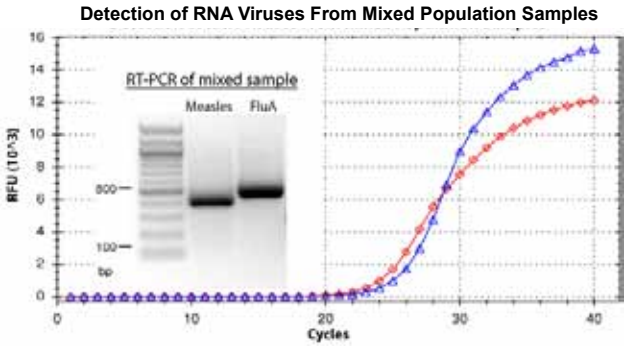
- Quick recovery of viral RNA from a wide range of sources using *Fast-Spin* column and plate technologies.
- Column and plate designs allow RNA to be eluted at high concentrations into minimal volumes of RNase-free water.
- Omits the use of organic denaturants and proteases.

Description

The ZR Viral RNA Kit™ and ZR-96 Viral RNA Kit™ are designed for the rapid isolation of high-quality viral RNA from a wide range of biological sources. The kits can be used to isolate viral RNA from cell-free body fluids and cellular suspensions at concentrations ≤ 10^5 cells/ml. The products have 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). Eluted RNA is suitable for use in subsequent procedures, including RT-PCR.



RT-PCR amplification of enterovirus cDNA. Human serum was spiked with different amounts of infectious enterovirus, then viral RNA was extracted using the ZR Viral RNA Kit™. The eluted RNA was used for one-tube RT-PCR amplification of a 230 bp amplicon. M is a 100 bp DNA Marker (Zymo Research).

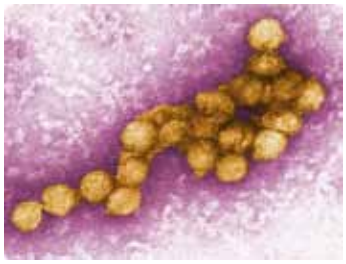


Viral RNA was isolated from liquid samples using the ZR Viral RNA Kit™. Isolated viral RNA was reverse transcribed/amplified using a coupled RT-real-time PCR system (Zymo Research). Ct values for measles and influenza type A (FluA) were 23.05 (blue), 24.56 (red), respectively.

Product	*Cat. No.*	*Size*
ZR Viral RNA Kit™	R1034 R1035	50 preps. 200 preps.
ZR-96 Viral RNA Kit™	R1040 R1041	2 x 96 preps. 4 x 96 preps.

Use

Cultured Cells..... ✓
Plasma..... ✓
Serum..... ✓
Culture Supernatant..... ✓
Urine..... ✓
Virus..... ✓



Specifications

Binding Capacity..... 10 µg/prep.
RNA Size Limits..... ≥ 200 nt

ZR Viral RNA Kit™
Format..... Spin Column
Elution Volume..... ≥ 6 µl
Processing Time..... 5 min.

ZR-96 Viral RNA Kit™
Format..... 96-Well
Elution Volume..... ≥ 10 µl
Processing Time..... 15 min.

Available Formats

Zymo-Spin™ IC R1034, R1035 (p. 160)

Zymo-Spin™ I-96 R1040, R1041 (p. 162)

ZR Whole-Blood RNA™ Kits

Use

Whole Blood: .....≤ 200 µl
Buffy Coat..... ✓
Plasma/Serum: ..... ≤ 200 µl

Specifications

Binding Capacity..... 10 µg/prep.
RNA Size Limits..... ≥ 17 nt

ZR Whole-Blood RNA Mini-Prep™
Format..... Spin Column
Elution Volume..... ≥ 6 µl
Processing Time..... 10 min.

ZR-96 Whole-Blood RNA™
Format..... 96-Well
Elution Volume..... ≥ 10 µl
Processing Time..... 45 min.

Available Formats

Zymo-Spin™ IC R1020, R1021 (p. 160)

Zymo-Spin™ IIIC R1020, R1021 (p. 160)

Zymo-Spin™ I-96 R1022 (p. 162)

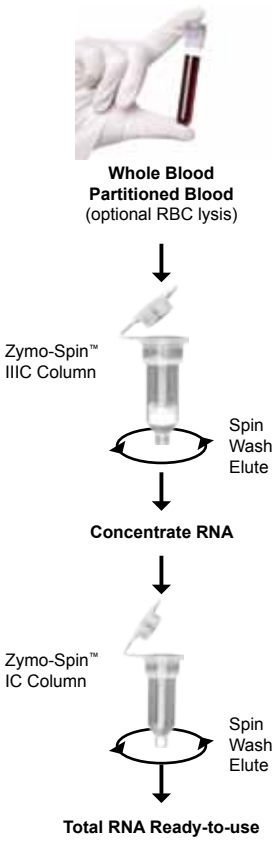
Zymo-Spin™ III-96 R1022 (p. 162)

Highlights

- Convenient, fast method for purifying total RNA from whole blood samples.
- Compatible with EDTA, heparin, and citrate anti-coagulants.
- Allows RNA to be eluted at high concentrations into minimal volumes of RNase-free water.

Description

The ZR Whole-Blood RNA MiniPrep™ and ZR-96 Whole-Blood RNA Kit™ provide streamlined methods for the rapid isolation of total RNA from whole and partitioned blood. The procedures are based on the use of a unique buffer system with *Fast-Spin* column and plate technologies. The procedure is easy: Just add the Blood RNA Buffer to a blood sample or cell pellet (post RBC lysis), filter the mixture, and then purify and concentrate the RNA using the provided column or plate. If required, the RNA can be DNase-treated during the purification procedure. RNA can be isolated immediately from fresh samples or at a later time from blood stored (stabilized) in Blood RNA Buffer. These products are designed for the isolation of blood RNA for subsequent RNA-based methods including RT-PCR, hybridization, etc. A diagram of the ZR Whole-Blood RNA MiniPrep™ (i.e., spin column format) procedure is illustrated below.



Product	*Cat. No.*	*Size*
ZR Whole-Blood RNA MiniPrep™	R1020 R1021	50 preps. 100 preps.
ZR-96 Whole-Blood RNA™	R1022	2 x 96 preps.

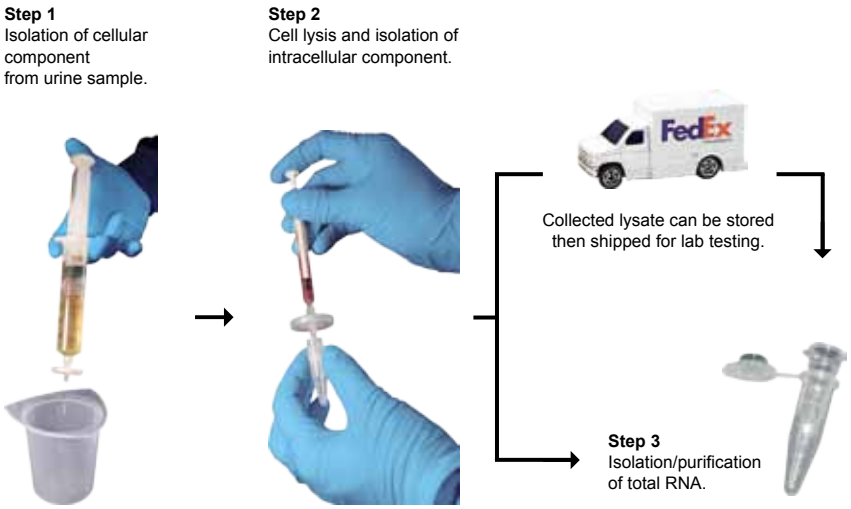
ZR Urine RNA Isolation Kit™

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

The ZR Urine RNA Isolation Kit™ is an innovative product designed for the easy, reliable, and rapid isolation of total RNA from cells and biological sediment in urine. The 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 less than 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.



Product	*Cat. No.*	*Size*
ZR Urine RNA Isolation Kit™	R1038 R1039	20 preps. 50 preps.

Use

Urine..... ✓
Cells..... ✓
Biological Sediment..... ✓
Microvesicles..... ✓
Exosomes..... ✓

Specifications

Format..... Spin Column
Binding Capacity..... 10 µg/prep.
Elution Volume..... ≥ 10 µl
RNA Size Limits..... ≥ 17 nt
Processing Time..... 10 min.

Available Format

Zymo-Spin™ IC R1038, R1039 (p. 160)

Pinpoint™ Slide RNA Isolation Systems

Use

Tissue Sections: .....Systems I & II
FFPE Tissue Sections: .....System II

Specifications

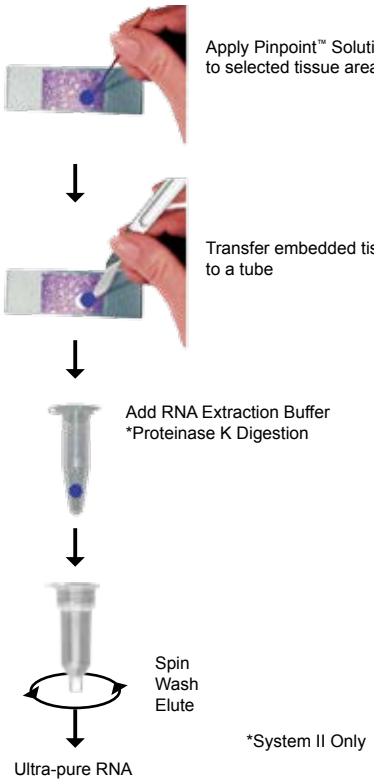
Format.....Spin Column
Binding Capacity.....10 µg/prep.
Elution Volume.....≥ 10 µl
RNA Size Limit.....≥ 17 nt
Processing Time:
System I.....1.5 hr.
System II.....5 hr.

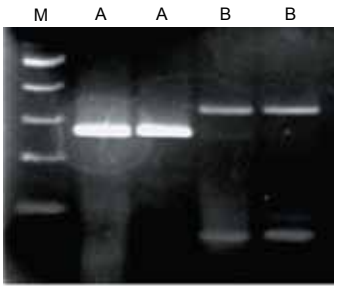
Highlights

- 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 *Fast-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).

Available Formats

Zymo-Spin™ IC R1003, R1007 (p. 160)

Product	*Cat. No.*	*Size*
Pinpoint™ Slide RNA Isolation System I Kit	R1003	50 preps.
Pinpoint™ Slide RNA Isolation System II Kit	R1007	50 preps.

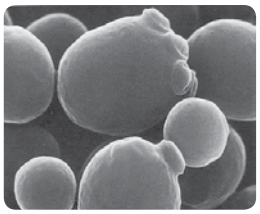
YeaStar™ RNA Kit

Highlights

- Recovery of purified RNA from a wide range of fungus species using *Fast-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 provides all the necessary reagents for 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*. Generally, the kit can be used 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 *Fast-Spin* column technology.



Digest Yeast
with Zymolyase Lytic Enzyme

Yeast Lysate

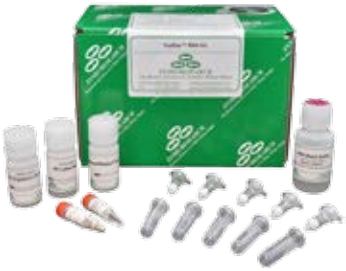
Spin
Wash
Elute

Ultra-pure RNA for...

✓ Reverse Transcription
✓ Northern Blotting, etc.

Use

Yeast..... ✓
Fungi sensitive to lysis with yeast lytic enzyme (i.e., Zymolyase)..... ✓



Specifications

Format.....Spin Column
Binding Capacity..... 25 µg/prep.
Elution Volume..... ≥ 60 µl
RNA Size Limits..... ≥ 200 nt
Processing Time..... 30 min.

Available Format

Zymo-Spin™ IIIC R1002 (p. 160)

Product	*Cat. No.*	*Size*
YeaStar™ RNA Kit	R1002	40 preps.

Product Guide: Environmental RNA Purification

Inhibitor-free RNA from Environmental Samples

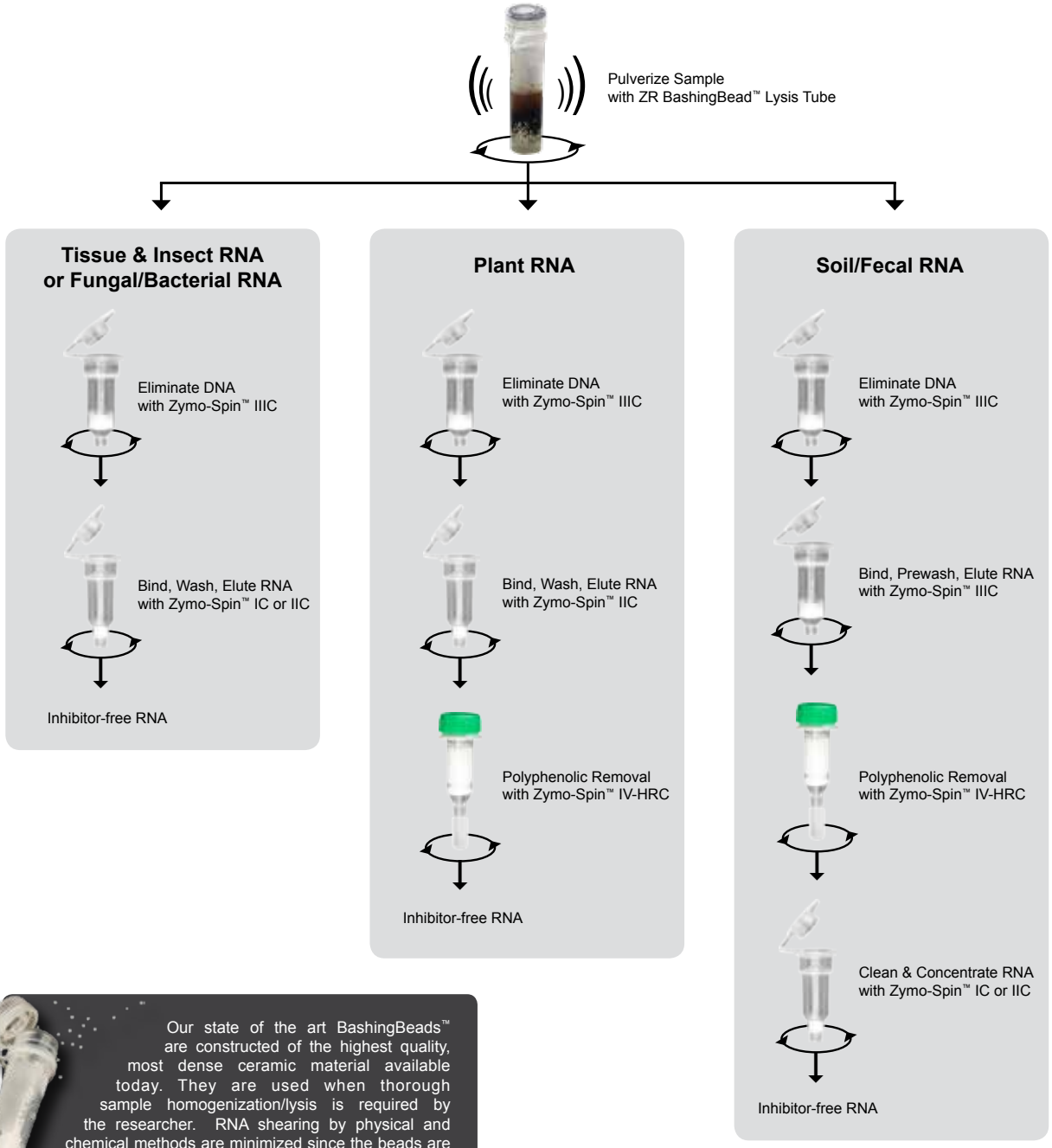
For isolating RNA from tough-to-lyse and environmental samples, Zymo Research provides several products featuring unique BashingBead™ lysis technology (pp. 124-125). With these kits, RNA can be isolated from samples otherwise resistant to conventional lysis procedures. These include many solid tissues, plants, seeds, food, arthropods, Gram (+) and Gram (-) bacteria, yeast, filamentous fungi, unicellular and filamentous algae, and protozoa. The result is high yield, high quality RNA that is suitable for downstream applications such as RT-PCR and more.

	ZR Soil/Fecal RNA Kit	ZR Fungal/Bacterial RNA Kits		ZR Tissue & Insect RNA Kit	ZR Plant RNA Kit
	MicroPrep	MicroPrep	MiniPrep	MicroPrep	MiniPrep
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 RT Inhibitors	✓	✓	✓	✓	✓
Removal of Polyphenolic RT Inhibitors	✓				✓
Processing Time	20 min.	15 min.	15 min.	15 min.	15 min.
Use	✓Soil ✓Sediment ✓Sludge ✓Feces ✓Bacteria ✓Fungi Unicellular Filamentous ✓Algae Unicellular Filamentous ✓Protists	✓Bacteria ✓Fungi Unicellular Filamentous ✓Algae Unicellular Filamentous ✓Protists ✓Food		✓Soft Tissues ✓Tough-to-Lyse Tissues ✓Tough-to-Lyse Organisms ✓Insects/Arthropods ✓Food	✓Plant Material ✓Seeds ✓Fruit
PAGE NO.	124	124	124	125	125

Technology Overview:
BashingBead™ Lysis & Environmental RNA Purification

The BashingBead™ RNA purification kits from Zymo Research are 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 (10 µg/prep) and MiniPrep (50 µg/prep) spin column formats (see illustrations below).

For processing, samples are simply transferred to the provided ZR BashingBead™ Lysis Tubes and then rapidly and efficiently processed by bead beating in specially formulated lysis buffers. Bead beating can be performed in any bead mill, pulverizer, or vortex that can accommodate standard 2.0 ml tubes. Following lysis, RNA is purified using innovative *Fast-Spin* column technology. Special filtration technologies are implemented for plant, fecal, and soil samples to remove polyphenolic inhibitors that can inhibit reverse transcriptase (RT). The isolation of inhibitor free RNA typically takes about 15 minutes.



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.

ZR Soil/Fecal RNA MicroPrep™

Use

Soil..... ✓
Sediment..... ✓
Sludge..... ✓
Feces..... ✓

Specifications

ZR BashingBead™ Lysis..... ✓
Removal of RT Inhibitors..... ✓
Removal of Polyphenolic RT Inhibitors..... ✓

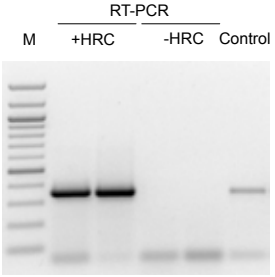
Format..... Spin Column
Binding Capacity..... 10 µg/prep.
Elution Volume..... ≥ 6 µl
Processing Time..... 20 min.

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

The ZR Soil/Fecal RNA MicroPrep™ is designed for the simple, reliable, and rapid 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. *Fast-Spin* column purification technologies allow for quick removal of genomic DNA and polyphenolic RT/PCR inhibitors (e.g., humic acids, polyphenols, tannins). The result is highly-concentrated, purified RNA that is suitable 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 ZR Soil/Fecal RNA MicroPrep™ protocol. M is a ZR 1 kb DNA Marker (Zymo Research).

Product	*Cat. No.*	*Size*
ZR Soil/Fecal RNA MicroPrep™	R2040	50 preps.

ZR Fungal/Bacterial RNA Kits™

Use

Gram (+) Bacteria..... ✓
Gram (-) Bacteria..... ✓
Yeast..... ✓
Filamentous Fungi..... ✓
Unicellular Algae..... ✓
Filamentous Algae..... ✓
Protists..... ✓
Soft Tissues (limited)..... ✓
Food..... ✓

Specifications

ZR BashingBead™ Lysis..... ✓
Removal of RT Inhibitors..... ✓

Format..... Spin Column
Processing Time..... 15 min.

ZR Fungal/Bacterial RNA MicroPrep™
Binding Capacity..... 10 µg/prep.
Elution Volume..... ≥ 6 µl

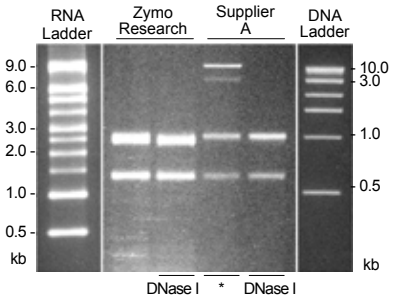
ZR Fungal/Bacterial RNA MiniPrep™
Binding Capacity.... 50 µg/prep.
Elution Volume..... ≥ 25 µl

Highlights

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

Description

The ZR Fungal/Bacterial RNA MicroPrep™ and MiniPrep™ provide for rapid isolation of total RNA from pelleted tough-to-lyse bacteria (e.g., Gram-positive), yeast, and/or fungal cells. Both kits employ ultra-high density BashingBeads™ for sample homogenization and a robust buffer system for total RNA purification (small RNAs included). Using *Fast-Spin* column technology, the RNA is eluted into volumes as little as 6 µl and suitable for subsequent procedures including RT-PCR. The entire RNA isolation procedure takes less than 15 minutes.



Total RNA was isolated from equal amounts of E.coli cells containing plasmid DNA (pGEM®) using the ZR Fungal/Bacterial RNA MicroPrep™ 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*
ZR Fungal/Bacterial RNA MicroPrep™	R2010	50 preps.
ZR Fungal/Bacterial RNA MiniPrep™	R2014	50 preps.

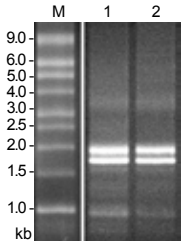
ZR Tissue & Insect RNA MicroPrep™

Highlights

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

Description

The ZR Tissue & Insect RNA MicroPrep™ provides for rapid 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 employs ultra-high density BashingBeads™ for sample homogenization and a robust buffer system delivering total RNA purification (small RNAs included). RNA eluted in DNase/RNase-free water is suitable for subsequent procedures including RT-PCR.



Analysis of ZR Tissue & Insect RNA MicroPrep™. 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.

Product	*Cat. No.*	*Size*
ZR Tissue & Insect RNA MicroPrep™	R2030	50 preps.

Use

Soft Tissues..... ✓
Solid Tissues..... ✓
Tough-to-Lyse Tissues..... ✓
Tough-to-Lyse Organisms..... ✓
Insects/Arthropods..... ✓
Food..... ✓

Specifications

ZR BashingBead™ Lysis..... ✓
Removal of RT Inhibitors..... ✓

Format: .....Spin Column
Binding Capacity: ..... 10 µg/prep.
Elution Volume: ..... ≥ 6 µl
Processing Time: ..... 15 min.

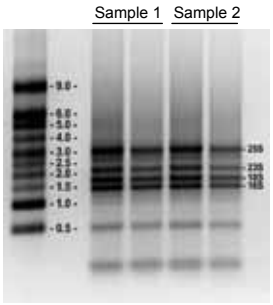
ZR Plant RNA MiniPrep™

Highlights

- Quick (15 minute) isolation of inhibitor-free total RNA from a variety of plant tissues.
- Efficient processing with ultra-high density BashingBeads™.
- Omits the use of organic denaturants and proteases.

Description

Total RNA from various plant samples (e.g., leaves, stems, buds, flowers, fruit, seeds, etc.) is efficiently purified using the ZR Plant RNA MiniPrep™. The kit allows for complete removal of DNA and polyphenolic inhibitors. The RNA is eluted into volumes as little as 25 µl and is suitable for use in various downstream procedures including RT-PCR. The entire RNA isolation procedure typically takes about 15 minutes.



Isolation of total RNA from 10 mg of a fresh leaf material (Nicotiana sp.) using the ZR Plant RNA MiniPrep™. 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*
ZR Plant RNA MiniPrep™	R2024	50 preps.

Use

Plant Material..... ✓
Seeds..... ✓
Fruit..... ✓

Specifications

ZR BashingBead™ Lysis..... ✓
Removal of RT Inhibitors..... ✓
Removal of Polyphenolic
RT Inhibitors..... ✓

Format..... Spin Column
Binding Capacity..... 50 µg/prep.
Elution Volume..... ≥ 25 µl
Processing Time..... 15 min.

RNA Shield™

Use

Sample Stabilization at Ambient Temperatures..... ✓
Infectious Agent Inactivation..... ✓

Specifications

Sample Stabilization...Up to 30 days
RNA Size Limits..... ≥ 17 nt

RNA Shield™ Purification Kit
Format..... Spin Column
RNA Size Limits..... ≥ 17 nt
Binding Capacity....10 µg/prep.
Elution Volume..... ≥ 6 µl
Processing Time..... 7 min.

RNA Shield™ is also compatible with RNA Clean & Concentrator™ (p.108), Direct-zol™ RNA (p. 114), and *Quick-RNA*™ (p. 116) kits.

Highlights

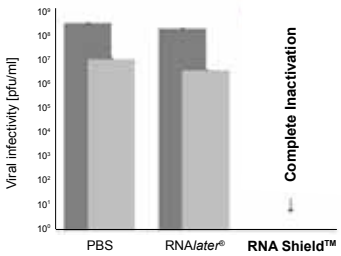
- RNA Shield™ is an all-in-one storage reagent for the stabilization/preservation of RNA at ambient temperature and effectively inactivates virus and other infectious agents.
- 5 minute, spin column purification of RNA directly from samples stored in RNA Shield™ reagent without the need for reagent removal.
- Efficient, broad range purification of high-quality total RNA (≥17 nt) from cells, swab samples, tissues, biological liquids, and more!

Description

RNA Shield™ reagent ensures RNA (and DNA) stability while preserving expression profiles during storage/transport at ambient temperatures. There is no need for refrigeration or specialized treatment. RNA Shield™ effectively lyses most cells and inactivates RNases, virus, and other infectious agents.

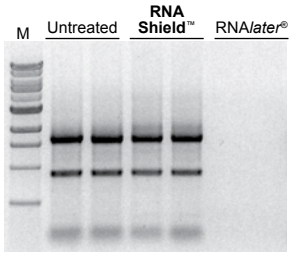
The RNA Shield™ Purification Kit is a spin column purification kit for high-quality RNA purification from samples (cells, swabs, tissues, microorganisms, and biological liquids) stored in RNA Shield™ reagent. There is no need for reagent removal. Simply add ethanol to an RNA Shield™ sample and then load the mixture directly into the provided spin column. Wash and then elute total RNA (≥ 17 nt).

Complete Viral Inactivation



Herpes Simplex Virus is completely inactivated in RNA Shield™. HSV-1 (dark grey) & HSV-2 (light grey) inactivation following a 5 minute incubation in RNA Shield™ reagent *(H. Oh, F. Diaz and D. Knipe; Harvard Medical School)*

Direct RNA Purification



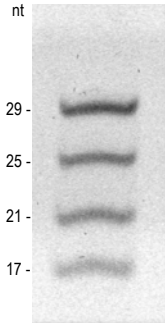
RNA can be purified directly from RNA Shield™ without reagent removal. Cellular RNA was extracted from samples stabilized in RNA Shield™ with TRIzol® and purified with the Direct-zol™ RNA MiniPrep. Conversely, RNA*later*® did not facilitate direct purification.

Product	*Cat. No.*	*Size*
RNA Shield™	R1100-50 R1100-250	50 ml 250 ml
RNA Shield™ Purification Kit	R1101	50 preps.
RNA Shield™ Purification Kit with 50 ml RNA Shield™	R1100	50 preps.

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.

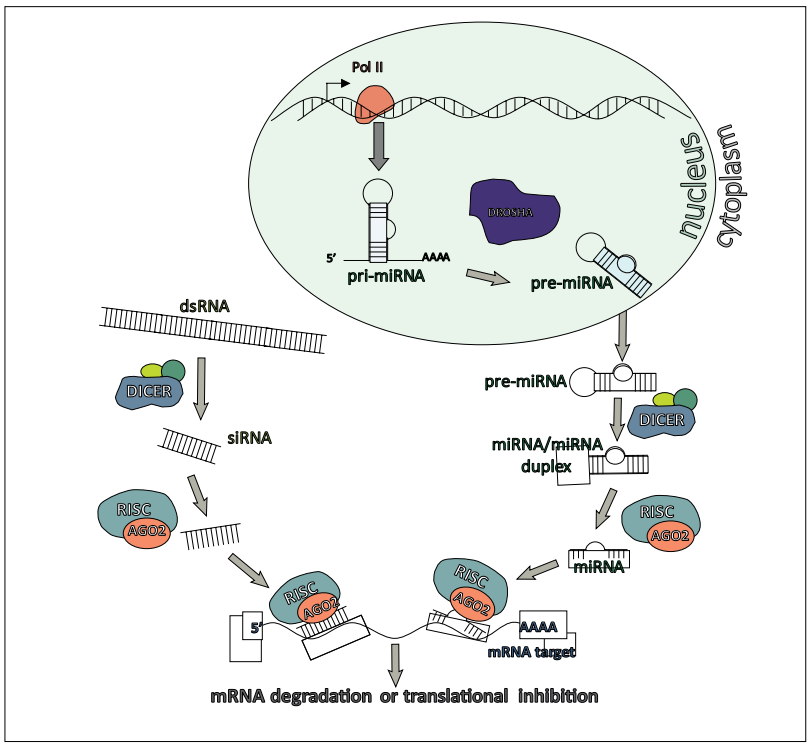
Product	*Cat. No.*	*Size*
ZR small-RNA™ Ladder	R1090	10 µg

Use

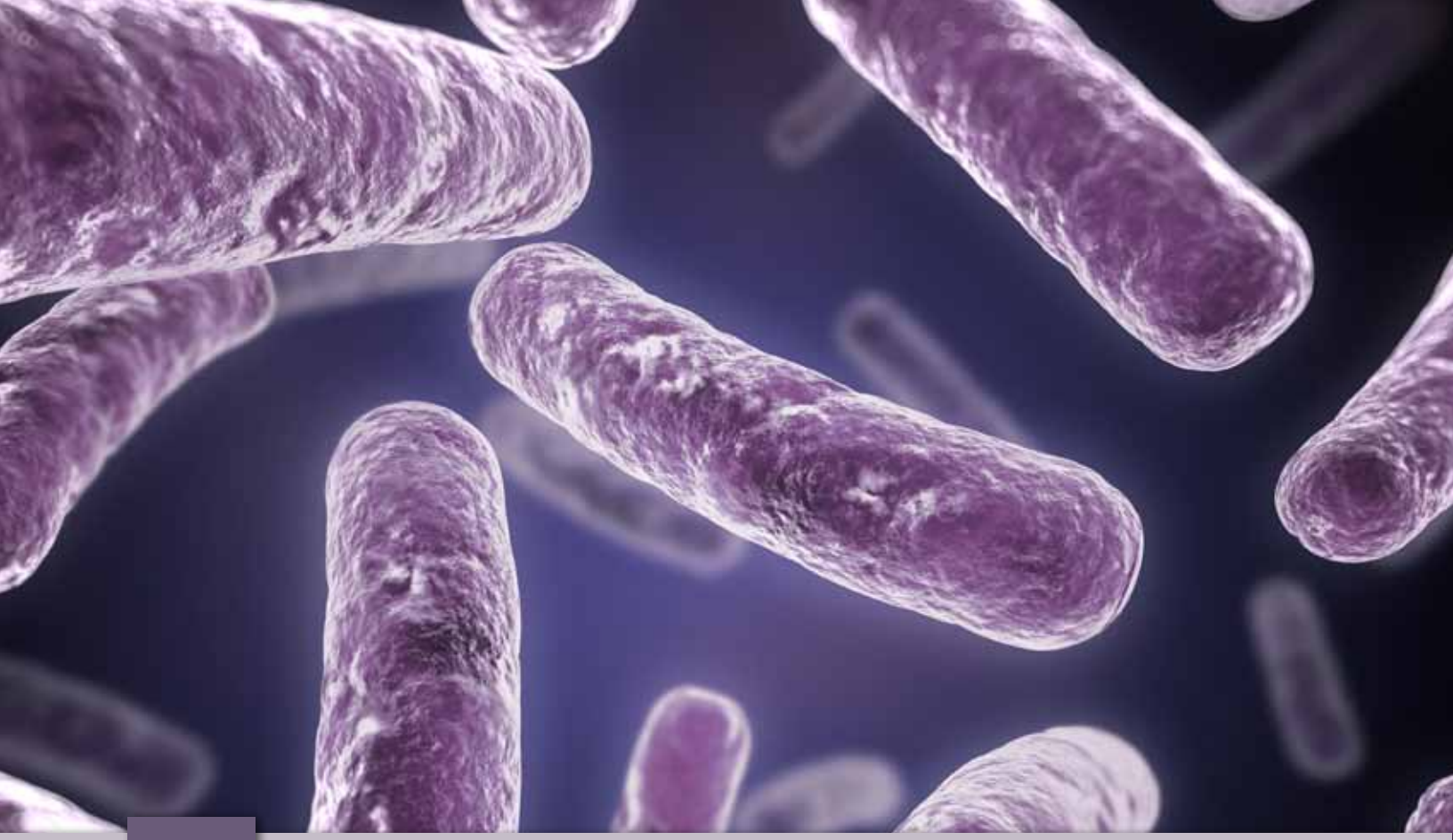
MicroRNA sized standard for size estimation of small RNAs in PAGE gels..... ✓

Specifications

Ladder of four microRNAs (17, 21, 25, 29 nt)
Concentration..... 20 ng/µl
Amount..... 10 µg
Storage.....-20°C



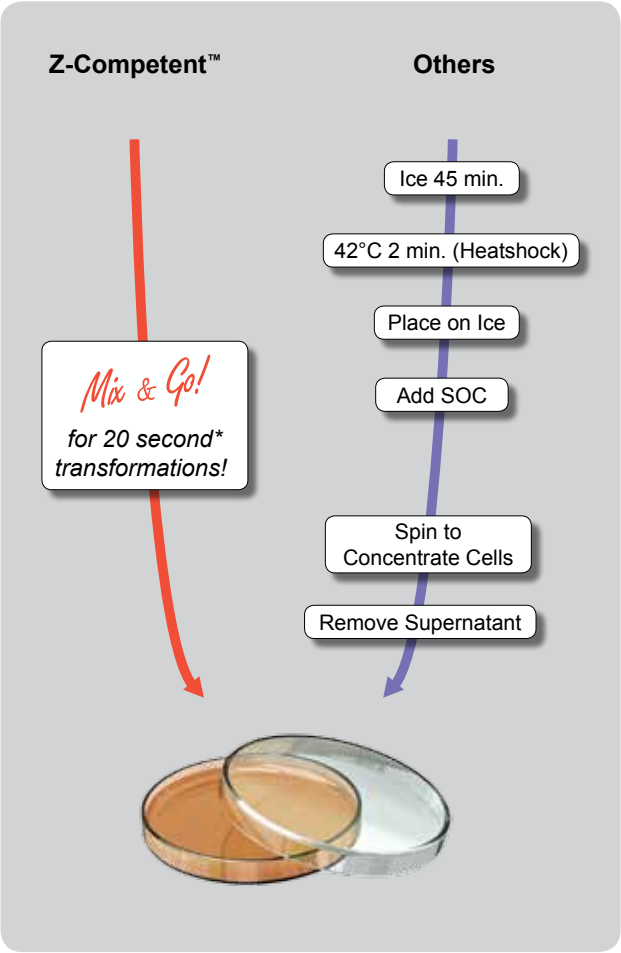
Schematic diagram of small RNA biogenesis. Adapted from He and Hannon (2004) Nat. Rev. Gen. 5, 522-531.



4 Competent *E. Coli* & Transformation

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 Z-Competent™ *E. coli* cells from Zymo Research, a scientist can transform cells in less than 20 seconds (p. 132). Zymo Research also provides reagents that enable researchers to make their own homemade Z-Competent™ *E. coli*. We have developed a specially formulated medium, ZymoBroth™ (p. 135), 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!

COMPETENT *E. COLI* & TRANSFORMATION



*Ampicillin selection only

Product Guide: Premade Z-Competent™ *E. coli* 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

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

Z-Competent™ *E. coli*

Use

Bacterial Transformations..... ✓
DNA Cloning..... ✓
Blue-white Screening..... ✓

Available Formats

10 x 100 µl Aliquots..... ✓
96 x 50 µl Aliquots..... ✓

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!

Description

The Z-Competent™ *E. coli* strains are premade, chemically competent cells for simple and highly efficient DNA transformation. Z-Competent™ *E. coli* 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 Z-Competent™ cells are highly efficient (> 10^8 transformants / µg pUC19) and can be used for cloning, sub-cloning, PCR fragment cloning, library construction, etc. Premade Z-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.


Single Tube Format


96-Tube Format

JM109

Genotype	F`[traD36 proA$^+$B$^+$ lacI^q Δ(lacZ)M15] Δ(lac-proAB) glnV44 (supE44) e14$^-$ (McrA$^-$) thi gyrA96 (Nal^R) e ndA1 hsdR17(r_k^- m_k^+) relA1 recA1	***Cat. No.***	***Size***
		T3003	10 x 100 µl aliquots (10 tubes)
		T3005	96 x 50 µl aliquots (96-well plate)

Zymo 5α

Genotype	F$^-$φ80lacZΔM15 Δ(lacZYA-argF)U169 deoR nupG recA1 endA1 hsdR17(r_K^- m_K^+) phoA glnV44 (supE44) thi-1 gyrA96 relA1, λ-	***Cat. No.***	***Size***
		T3007	10 x 100 µl aliquots (10 tubes)
		T3009	96 x 50 µl aliquots (96-well plate)

HB101

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

C600

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

TG1

Genotype	F'[traD36 lacI^q Δ(lacZ) M15 proA$^+$B$^+$] glnV (supE) thi-1 Δ(mcrB-hsdSM)5 (r_K^- m_K^- McrB$^-$) thi Δ(lac-proAB)	***Cat. No.***	***Size***
		T3017	10 x 100 µl aliquots (10 tubes)

Zymo 10B

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

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, and are also applicable for nucleic acid purification. They are also 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***
XJa Autolysis™	T5021	1 glycerol stock, 1 ml 500X L-Arabinose
	T3021	10 x 100 µl Z-Competent cells, 1 ml 500X L-Arabinose
XJa (DE3) Autolysis™	T5031	1 glycerol stock, 1 ml 500X L-Arabinose
	T3031	10 x 100 µl Z-Competent cells, 1 ml 500X L-Arabinose
XJb Autolysis™	T5041	1 glycerol stock, 1 ml 500X L-Arabinose
	T3041	10 x 100 µl Z-Competent cells, 1 ml 500X L-Arabinose
XJb (DE3) Autolysis™	T5051	1 glycerol stock, 1 ml 500X L-Arabinose
	T3051	10 x 100 µl Z-Competent cells, 1 ml 500X L-Arabinose

Use

Recombinant Protein Expression... ✓

Available Formats

Glycerol Stock..... ✓
10 x 100 µl Aliquots of Frozen Competent Cells..... ✓

Z-Competent™ *E. coli* Transformation Reagents

Use

Preparation of Competent *E. coli*.... ✓

Specifications

Reagents for Competent Cell Preparation..... ✓
ZymoBroth™ Growth Medium*..... ✓

*Not included in Z-Competent™ *E. coli* Transformation Buffer Set

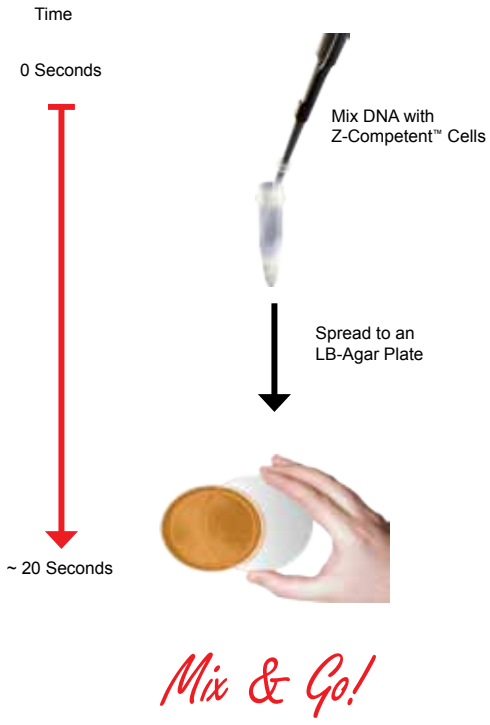
Highlights

- 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 Z-Competent™ *E. coli* Transformation Kit and Z-Competent™ *E. coli* Buffer Set are convenient methods for the preparation of competent *E. coli* cells for simple and highly efficient DNA transformation. The Z-Competent™ method completely eliminates the requirement for heat shocking and related procedures. Instead, *Mix & Go!* bacterial transformation can be performed by adding DNA to Z-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 Z-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 Z-Competent™ *E. coli* Transformation Kit includes all buffers and ZymoBroth™ medium to generate 20 ml of Z-Competent™ cells. The Z-Competent™ *E. coli* Transformation Buffer Set includes all buffers that are required to generate 60 ml of Z-Competent™ cells, and the medium (broth) is supplied by the user.



Product	*Cat. No.*	*Size*
Z-Competent™ *E. coli* Transformation Kit	T3001	up to 20 ml
Z-Competent™ *E. coli* Transformation Buffer Set	T3002	up to 60 ml

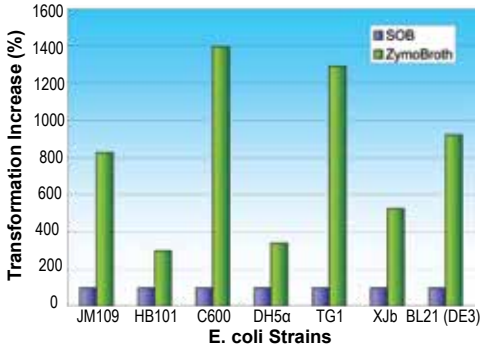
ZymoBroth™

Highlights

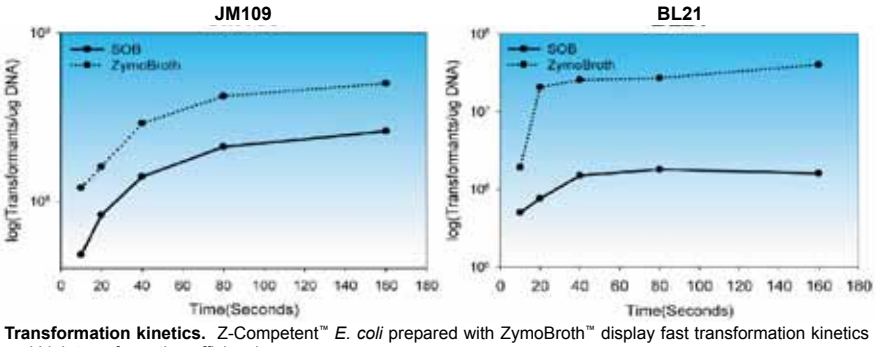
- Uniquely formulated growth medium for making highly competent *E. coli* for DNA transformation.
- Choice growth medium for difficult-to-transform *E. coli* strains.

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 Z-Competent™ *E. Coli* Transformation Kit, ZB enables researchers to generate their own homemade Z- Competent™ *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. Z-Competent™ *E. coli* prepared with ZymoBroth™ display fast transformation kinetics and high transformation efficiencies.

Product	*Cat. No.*	*Size*
ZymoBroth™	M3015-100	100 ml
	M3015-500	500 ml

Use

Chemically Competent *E. coli* Preparation..... ✓

Rattler™ Plating Beads

Use

Spreading Inocula on Solid Media (plates)..... ✓

Specifications

Material:
Solid, glass 4.5 mm be ads can be washed, autoclaved, and reused.

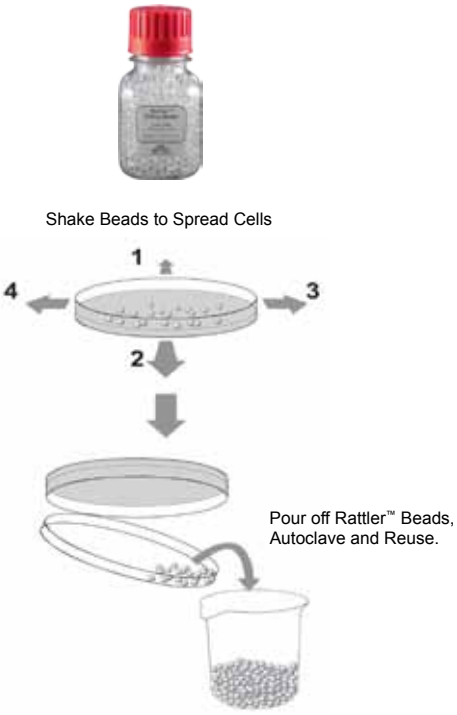
Packaging:
Polycarbonate, autoclavable wide mouth bottle. The bulk format is supplied non-sterile as a 25 kg bag.

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.



Product	*Cat. No.*	*Size*
Rattler™ Plating Beads - 230 g/bottle	S1001 S1001-5	1 bottle 5 bottles
Rattler™ Plating Beads - bulk format (non-sterile)	S1001-B	25 kg

FAQs about Z-Competent™ *E. coli*

Premade Z-Competent™ E. coli 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. 53) prior to transformation.

Z-Competent™ 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.

Antibiotic	Description	Resistance	Working Concentration (For *E. coli*)	Page
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	156
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	156
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	156
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	156

5 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 Mating Pheromone and 5-Fluoroorotic Acid. Our Zymolyase and Yeast Protein Kit remain important reagents for yeast lysis and protein purification, respectively.

YEAST RESEARCH

YEAST GROWTH & TRANSFORMATION

YEAST SPECIALTY PRODUCTS

YEAST DNA/RNA PURIFICATION

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Frozen EZ Yeast Transformation II Kit™

Use

Competent Yeast Cell Preparation..... ✓

Compatibility:

- *S. cerevisiae*
- *S. pombe*
- *C. albicans*
- *P. pastoris*

Specifications

Transformation Efficiency:
10^5 - 10^6 cfu/µg

Transformation DNA Input:
0.2 - 1.0 µg

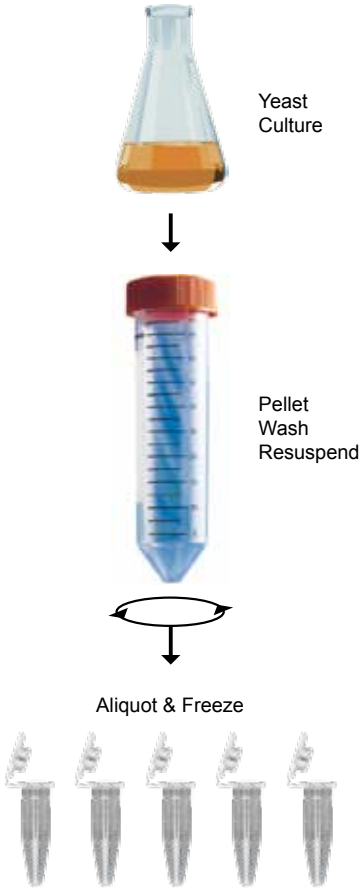
Competent Cell Stability:
≥1 year at -70°C

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*
Frozen EZ Yeast Transformation II Kit™	T2001	120 rxns.

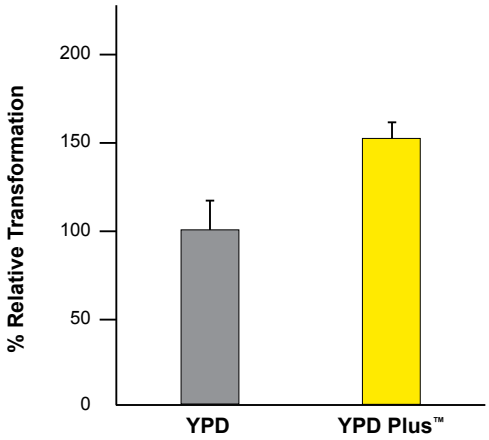
YPD Plus™

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.

Use

Yeast Transformation & Outgrowth..... ✓

Product	*Cat. No.*	*Size*
YPD Plus™	Y1003-50	50 ml
	Y1003-100	100 ml

Yeast Protein Kit

Use

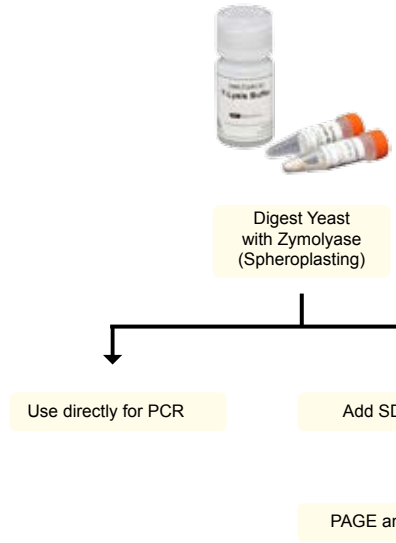
Yeast Cell Lysis..... ✓
Protein Analysis..... ✓
DNA Analysis..... ✓

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 generates spheroplasts of yeast cells, making them ideal for both protein and DNA analyses including Western blotting and PCR, respectively.



Product	*Cat. No.*	*Size*
Yeast Protein Kit	Y1002	200 preps.

5-Fluoroorotic Acid (5-FOA)

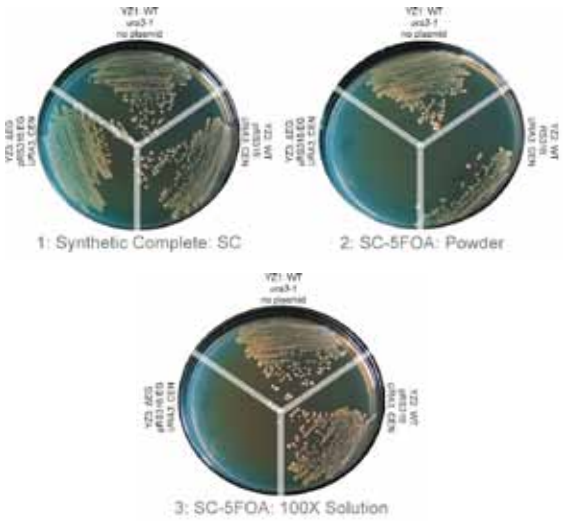
Highlights

- 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 $5\text{-}FOA^R$ 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).



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).

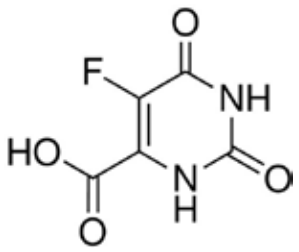
From left to right, top to bottom are synthetic complete glucose medium (SC): 1. SC, synthetic complete no 5FOA; 2. Standard - SC-5-FOA (SC-5-FOA made from ultra-pure 5-FOA powder, 1 g/liter) 3. SC-5-FOA made from 100X 5-FOA solution.

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 $5\text{-}FOA^R$ 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*
5-FOA (powder)	F9001-1 F9001-5	1 g 5 g
100X 5-FOA (liquid)	F9003	10 ml

Use

Yeast Counter-selection..... ✓
Yeast Two-hybrid Screen..... ✓
Plasmid Curing..... ✓
Plasmid Shuffling..... ✓
Allelic Replacement..... ✓



Specifications

Appearance:
White crystalline powder.

Molecular Weight.....174.0

Method for Determining Identity:
TLC, melting point and lot comparison.

Purity:
Estimated to be greater than 98% by TLC, melting point, and lot comparison.

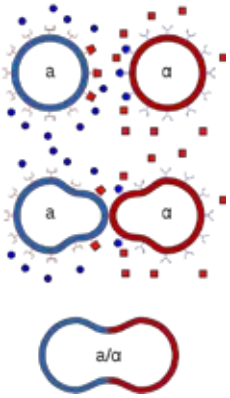
Solubility:
50 mg in 1 ml (1:1 NH_4OH: H_2O) with gentle heating, > 100 mg/ml DMSO.

Storage:
Store in freezer.

α-Factor Mating Pheromone

Use

Yeast Mating Induction..... ✓
G1 Phase Arrest..... ✓



Specifications

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.

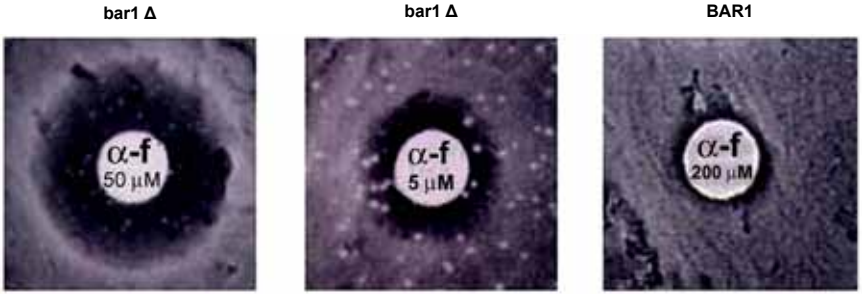
Highlights

- Aqueous solution of yeast α-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_1 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.

Product	*Cat. No.*	*Size*
α-Factor Mating Pheromone	Y1001	240 µl

Zymolyase - Yeast Lytic Enzyme

Highlights

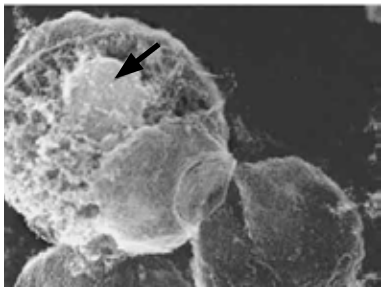
- Zymolyase (100T equivalent) prepared from *Arthrobacter luteus* (essential enzyme activities: β-1,3-glucan laminaripentao-hydrolase and β-1,3-glucanase).
- Provided lyophilized together with a buffer for reconstitution.
- Also available combined with RNase A (R-Zymolyase).

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*
Zymolyase	E1004 E1005	1,000 U 2,000 U
R-Zymolyase	E1006	1,000 U

Use

Spheroplast/Protoplast Formation... ✓
Yeast Cell Fusion..... ✓
Yeast Transformation..... ✓
Other Fungi..... ✓

Specifications

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 min.

6 Protein Expression & Enzymes

Although the expression of recombinant proteins in *E. coli* is now a routine procedure, high level expression or overexpression is not always attainable. However, those at Zymo Research have 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. 133) 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 *Fast-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 Chapter 1 (pp. 35-40), Zymo Research offers several others, including DNase I (RNase-free), Proteinase K, RNase A, and Zymolyase that are detailed in this chapter.

PROTEIN EXPRESSION & ENZYMES

CULTURE MEDIA & BACTERIAL STRAINS USED FOR PROTEIN EXPRESSION

HIS-TAGGED PROTEIN PURIFICATION

ENZYMES

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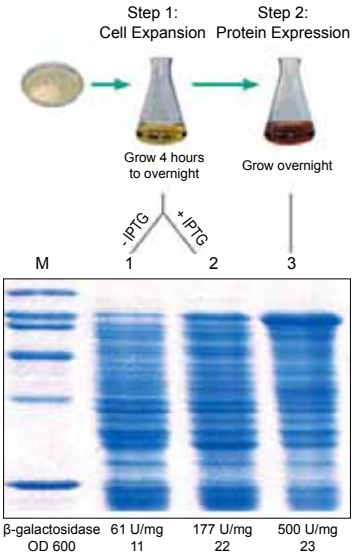
Dual Media Set™

Use

Recombinant Protein Expression...✓



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).

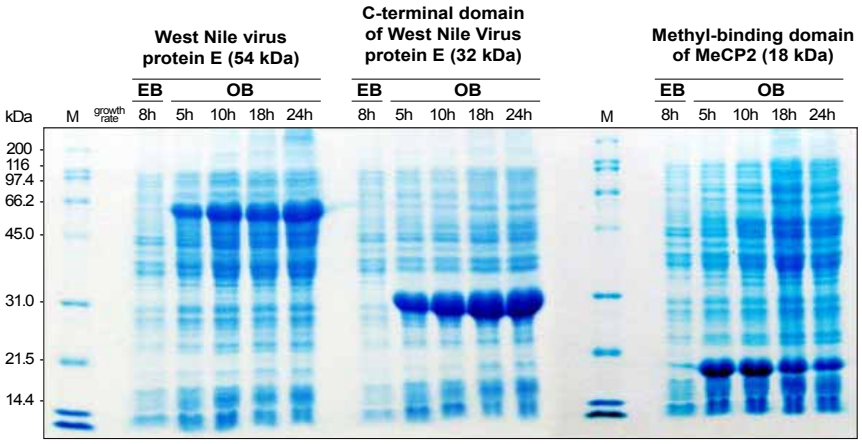
Highlights

- 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 below). 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 on left).



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*
Dual Media Set™ (EB + OB)	M3011	100 ml EB + 500 ml OB
Expansion Broth (EB)	M3012-100 M3012-500	100 ml 500 ml
Overexpression Broth (OB)	M3013-100 M3013-500	100 ml 500 ml

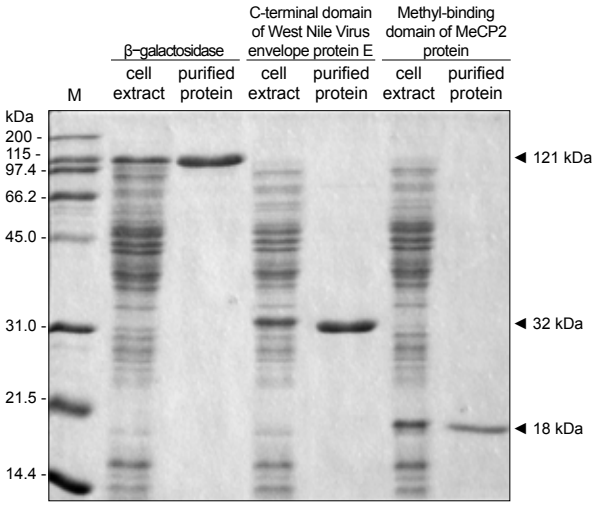
His-Spin Protein Miniprep™

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 *Fast-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*
His-Spin Protein Miniprep™	P2001 P2002	10 preps. 50 preps.
His-Affinity Gel	P2003-2	14 ml

Use

His-tagged Protein Purification..... ✓

Specifications

Format..... Spin Column
His-affinity Gel..... ✓
Protein Binding Capacity.. 1 mg/prep

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. 36 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

Cat. No.	*Size*
E2026	100 U
E2027	200 U

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.

Atlantis dsDNase

Atlantis dsDNase is a double-strand DNA specific endonuclease that cleaves phosphodiester bonds in DNA to yield homogeneous populations of core nucleosomes. See p. 34 for details.

Specifications: Typical buffer consists of 20 mM Tris-HCl (pH 7.5) and 5 mM $MgCl_2$.

Enzyme Concentration: 0.1 U/µl

Inactivation: 5X MN Stop Buffer or EDTA.

Optimum Reaction Temperature: 42°C

Cat. No.	*Size*
E2030	12.5 U

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 $MgCl_2$ (Kunitz, 1950).

Standard Reaction Time: 20 min.

CpG Methylase (M. SssI)

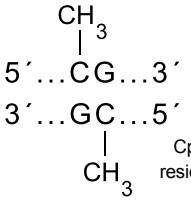
The CpG Methylase from Zymo Research completely methylates all cytosine bases at the C^5 position in double-stranded, non-methylated and hemi-methylated DNA having the dinucleotide sequence 5′…CpG…3′. The reaction conditions are optimized to maximize the processivity of the enzyme to ensure rapid, complete, and reproducible methylation of DNA for accurate DNA methylation analysis. See p. 35 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 1 µg of λ DNA from cleavage by BstUI restriction endonuclease in a total reaction volume of 20 µl for 1 hour at 37°C.



CpG Methylase methylates all cytosine residues in double-stranded, CpG context.

Cat. No.	*Size*
E2010	200 U
E2011	400 U

DNase I (RNase-Free)

Pancreatic 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 10X Reaction Buffer.

Source: Bovine Pancreas

Heat Inactivation: 65°C for 10 min.

Cat. No.	*Size*
E1009	250 U

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 $MgCl_2$, and 10 mM $CaCl_2$). One unit of enzyme is equivalent to one Kunitz unit under these assay conditions.

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. 39 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. 40 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

GpC Methylase (M. CviPI)

The GpC Methylase from Zymo Research completely methylates all cytosine bases at the C^5 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. 35 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

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. See p. 34 for details.

Specifications: Typical buffer consists of 20 mM Tris-HCl, (pH 8.8), 1 mM $CaCl_2$. $CaCl_2$ is essential for activity.

Enzyme Commission Number: (E.C. 3.1.31.1)

Enzyme Concentration: 0.1 U/µl

Enzyme Inactivation: EDTA or EGTA in molar excess of $CaCl_2$

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-hydroxymethylctosine (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. 38 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.

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*
E1008-2	2 mg
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.

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 (OD_{800}) 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. 37 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

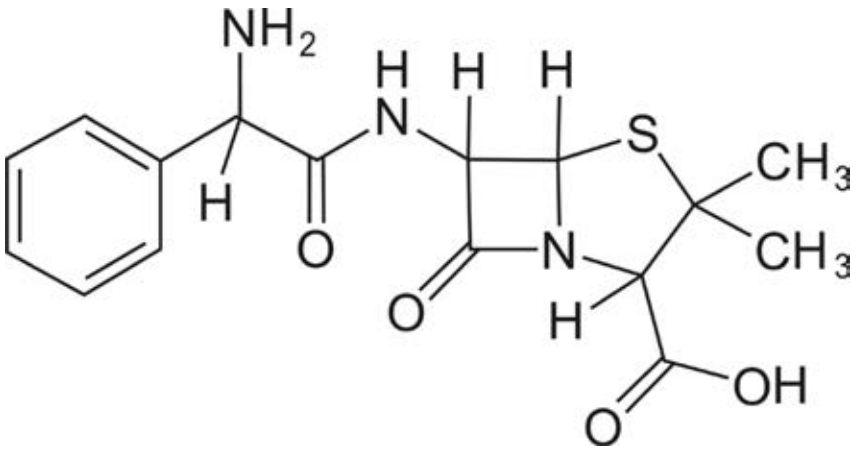
Optimum Reaction Temperature: 72°C

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.

7 Antiobiotics & 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.



ANTIOBIOTICS & CHEMICALS

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

Chemicals

5-FOA (5-Fluoroorotic Acid)

Description Synthetic 5-FOA monohydrate powder or 100X (100 mg/ml) solution in DMSO. See p. 143 for details.

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

Cat. No.	*Size*
F9001-1	5-FOA 1 g (Powder)
F9001-5	5-FOA 5 g (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 $MgCl_2$.
Storage -20° C

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

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. 149.

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

8 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, and 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 that are optimized for maximal adsorption of DNA and/or RNA and efficiently remove contaminants during the purification process. Our *Fast-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 DNA/RNA in either centrifugation or vacuum 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 (p. 92-97) and RNA (p. 124-125) 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.

COLUMNS, PLATES, INSTRUMENTS & ACCESSORIES

Technology Overview: *Fast-Spin* Columns

Zymo-Spin™ I Columns




Name	Zymo-Spin™ I	Zymo-Spin™ IC	Zymo-Spin™ IC-XL	Zymo-Spin™ IB
Format	DNA/RNA binding	DNA/RNA binding	DNA/RNA binding	DNA/RNA binding
Binding Capacity / Elution	5 µg / ≥ 6 µl	5 µg / ≥ 6 µl	10 µg / ≥ 10 µl	5 µg / ≥ 6 µl
Compatibility	microcentrifuge, vacuum manifolds	microcentrifuge, vacuum manifolds	microcentrifuge, vacuum manifolds	microcentrifuge, vacuum manifolds
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	C1014-50 — 50 pack C1014-250 — 250 pack

Zymo-Spin™ II Columns



Name	Zymo-Spin™ II	Zymo-Spin™ IIC	Zymo-Spin™ IIN
Format	DNA/RNA binding	DNA/RNA binding	DNA/RNA binding
Binding Capacity / Elution	25 µg / ≥ 25 µl	25 µg / ≥ 25 µl	25 µg / ≥ 25 µl
Compatibility	microcentrifuge	microcentrifuge, vacuum manifolds	microcentrifuge, vacuum manifolds
Matrix / Construction	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

Zymo-Spin™ III Columns



Name	Zymo-Spin™ III	Zymo-Spin™ IIIC	Zymo-Spin™ IIICG
Format	DNA/RNA binding	DNA/RNA binding	DNA/RNA binding
Binding Capacity / Elution	25 µg / ≥ 35 µl	25 µg / ≥ 35 µl	25 µg / ≥ 35 µl
Compatibility	microcentrifuge, vacuum manifolds	microcentrifuge, vacuum manifolds	microcentrifuge, vacuum manifolds
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

Zymo-Spin™ IV Columns


Orange Cap


Green Cap


Yellow Cap

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 manifolds	microcentrifuge, vacuum manifolds	microcentrifuge, vacuum manifolds
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
Binding Capacity / Elution	100 µg / ≥ 100 µl	125 µg / ≥ 100 µl
Compatibility	microcentrifuge, centrifuge, vacuum manifolds, syringe (luer-lok top)	microcentrifuge, centrifuge, vacuum manifolds, 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
Format	DNA/RNA binding
Binding Capacity / Elution	500 µg / ≥ 1 ml
Compatibility	centrifuge, vacuum manifolds, luer-lok bottom assembly
Matrix / Construction	silica-based / polypropylene
Cat. No. / Size	C1013-10 — 10 pack C1013-20 — 20 pack

Technology Overview: *Fast-Spin* Plates

Silicon-A™ Plates

Name	Silicon-A™ Plate	Silicon-A™-HRC Plate
Format	DNA/RNA binding - up to 5 µg 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, vacuum manifolds	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 Plates

Name	Zymo-Spin™ I-96 Plate	Zymo-Spin™ I-96 Shallow Well Plate
Format	DNA/RNA binding - up to 5 µg per well	DNA/RNA binding - up to 5 µg 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, vacuum manifolds	centrifuge, vacuum manifolds
Matrix / Construction	silica-based / polypropylene	silica-based / polypropylene
Cat. No. / Size	C2004 – 2 plates	C2004-SW – 2 plates

Zymo-Spin™ I Plates

Zymo-Spin™ III Plate

Name	Zymo-Spin™ IB-96 Plate	Zymo-Spin™ III-96 Plate
Format	DNA/RNA binding - up to 5 µg per well	DNA/RNA binding - up to 25 µg 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, vacuum manifolds	centrifuge, vacuum manifolds
Matrix / Construction	silica-based / polypropylene	silica-based / polypropylene
Cat. No. / Size	C2006 – 2 plates	C2010 – 2 plates

Zymo-Spin™ I

The Zymo-Spin™ I *Fast-Spin* 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 DNA or RNA in ≥ 6 µl eluate. Capacity is 800 µl.

Cat. No.	*Qty.*
C1003-50	50 pack
C1003-250	250 pack

Zymo-Spin™ IC

Capped version of the Zymo-Spin™ I column. The Zymo-Spin™ IC *Fast-Spin* 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 DNA or RNA in ≥ 6 µl eluate. Capacity is 800 µl.

Cat. No.	*Qty.*
C1004-50	50 pack
C1004-250	250 pack

Zymo-Spin™ IC XL

The Zymo-Spin™ IC XL *Fast-Spin* 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 DNA or RNA in ≥ 10 µl eluate. Capacity is 1 ml.

Cat. No.	*Qty.*
C1002-25	25 pack
C1002-50	50 pack

Zymo-Spin™ IB

The black, opaque Zymo-Spin™ IB *Fast-Spin* 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 DNA or RNA in ≥ 6 µl eluate. Capacity is 800 µl.

Cat. No.	*Qty.*
C1014-50	50 pack
C1014-250	250 pack

Zymo-Spin™ PI

The Zymo-Spin™ PI *Fast-Spin* column features durable polypropylene construction and is the same column featured in the His-Spin Protein Miniprep™ (p. 149). Capacity is 800 µl. Note: Column only, does not contain His-Affinity gel.

Cat. No.	*Qty.*
P2003-1	50 pack

Zymo-Spin™ II

The Zymo-Spin™ II *Fast-Spin* column features durable polypropylene construction and contains a unique silica-based matrix that allows purification of up to 25 µg DNA or RNA in ≥ 25 µl eluate. Capacity is 800 µl.

Cat. No.	*Qty.*
C1008-50	50 pack
C1008-250	250 pack

Zymo-Spin™ IIC

The Zymo-Spin™ IIC *Fast-Spin* 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 DNA or RNA in ≥ 25 µl eluate. Capacity is 900 µl.

Cat. No.	*Qty.*
C1011-50	50 pack
C1011-250	250 pack

Zymo-Spin™ IIN

The Zymo-Spin™ IIN *Fast-Spin* 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 DNA or RNA in ≥ 25 µl eluate. Capacity is 900 µl.

Cat. No.	*Qty.*
C1019-50	50 pack
C1019-250	250 pack

Zymo-Spin™ III

The Zymo-Spin™ III *Fast-Spin* 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 DNA or RNA in ≥ 35 µl eluate. Capacity is 800 µl.

Cat. No.	*Qty.*
C1005-50	50 pack
C1005-250	250 pack

Zymo-Spin™ IIIC

Capped version of the Zymo-Spin™ III column. The Zymo-Spin™ IIIC *Fast-Spin* 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 DNA or RNA in ≥ 35 µl eluate. Capacity is 800 µl.

Cat. No.	*Qty.*
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 *Fast-Spin* 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 DNA or RNA in ≥ 35 µl eluate. Capacity is 800 µl.

Cat. No.	*Qty.*
C1006-50-G	50 pack
C1006-250-G	250 pack

Zymo-Spin™ IV

The Zymo-Spin IV™ is a durable polypropylene *Fast-Spin* 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.	*Qty.*
C1007-50	50 pack
C1007-250	250 pack

Zymo-Spin™ IV-HRC

The Zymo-Spin™ IV-HRC is a durable polypropylene *Fast-Spin* 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.	*Qty.*
C1010-50	50 pack

Zymo-Spin™ IV-µHRC

The Zymo-Spin™ IV-µHRC is a durable polypropylene *Fast-Spin* 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.	*Qty.*
C1022-50	50 pack

Zymo-Spin™ V

The versatile Zymo-Spin™ V *Fast-Spin* 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.	*Qty.*
C1012-25	25 pack
C1012-50	50 pack

Zymo-Spin™ V-E

The versatile Zymo-Spin™ V-E *Fast-Spin* 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.	*Qty.*
C1024-25	25 pack
C1024-50	50 pack

Zymo Spin™ VI

The versatile Zymo-Spin™ VI spin 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.	*Qty.*
C1013-10	10 pack
C1013-20	20 pack

Collection/Filter Assemblies

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. The spin column 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.	*Qty.*
C1016-25	25 pack
C1016-50	50 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.	*Qty.*
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.	*Qty.*
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.	*Qty.*
C1017-10	10 pack
C1017-20	20 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.	*Qty.*
C1009-20	20 pack
C1009-50	50 pack

Tubes

Collection Tube (2.0 ml)

Durable polypropylene collection tube that is used in conjunction with the *Fast-Spin* line of spin columns (i.e., Zymo-Spin™ I through Zymo-Spin™ V). Capacity is 2 ml.

Cat. No.	*Qty.*
C1001-50	50 tubes
C1001-500	500 tubes
C1001-1000	1,000 tubes

DNase/RNase-free Tubes (1.5 ml)

DNase/RNase-free 1.5 ml microcentrifuge tubes made of durable polypropylene construction.

Cat. No.	*Qty.*
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.	*Qty.*
V-bottom	C1025-50	50 tubes
	C1025-500	500 tubes
U-bottom	C1027-50	50 tubes
	C1027-50	500 tubes

Amber 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.	Qty.
V-bottom	C1026-50	50 tubes
	C1026-500	500 tubes
U-bottom	C1028-50	50 tubes
	C1028-50	500 tubes

ZR BashingBead™ Lysis Tubes (0.5 mm)

Each impact resistant 2.0 ml tube contains 0.7 ml (dry volume) of 0.5 mm ZR BashingBead™ lysis matrix. These state of the art, ultra-high density beads are fracture resistant, chemically inert, and ideal for disrupting tough-to-lyse bacteria, yeast, fungi, and algae.

Cat. No.	Qty.
S6002-50	50 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.	Qty.
S6003-50	50 tubes

DNA Affinity Beads

ZymoBeads™

DNA affinity matrix, made of silica beads, featured in ZymoBead™ Genomic DNA Kit (p. 81) and ZR Serum DNA Kit™ (p. 83).

Cat. No.	Qty.
D3004-3-1	1 ml
D3004-3-4	4 x 1 ml

MagBinding Beads

Paramagnetic DNA affinity matrix. Featured in Zyppy™-96 Plasmid MagBead MiniPrep (p. 89) and EZ DNA Methylation™ MagPreps (p. 13-16).

Cat. No.	Qty.
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

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 DNA or RNA in ≥ 30 µl eluate per well. Capacity is 600 µl per well.

Cat. No.	*Qty.*
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.	*Qty.*
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 deep-well, durable polypropylene construction and unique silica-based matrix make it perfect for purifying up to 5 µg DNA or RNA in ≥ 10 µl eluate per well. Capacity is 1.1 ml (C2004) or 600 µl (C2004-SW) per well.

Cat. No.	*Qty.*
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 DNA or RNA in ≥ 15 µl/well elution buffer or water. Opaque black in color. Capacity is 600 µl per well.

Cat. No.	*Qty.*
C2006	2 plates

Zymo-Spin™ III-96 Plate

The Zymo-Spin III-96™ Plate can be used in centrifuges for the large-scale (i.e., 96-well) purification of DNA and/or RNA. Its deep-well, durable polypropylene construction and unique silica-based matrix make it perfect for purifying up to 25 µg DNA or RNA in ≥ 50 µl eluate per well. Capacity is 1.1 ml per well.

Cat. No.	*Qty.*
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™ III-96 plates. Capacity is 2 ml per round bottom well.

Cat. No.	*Qty.*
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.	*Qty.*
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.	*Qty.*
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.

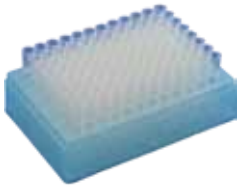
Cat. No.	*Qty.*
P1001-2	2 blocks
P1001-10	10 blocks

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.	*Qty.*
P1002-2	2 blocks/foils

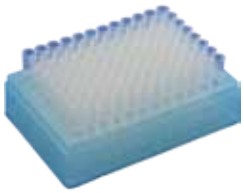
ZR-96 BashingBead™ Lysis Rack (0.5 mm)



Each impact resistant 1.1 ml tube contains 0.5 ml dry volume 0.5 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.	*Qty.*
S6002-96-1	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.	*Qty.*
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.	*Qty.*
C2007-2	2 foils
C2007-6	6 foils

Cell Disrupters & Accessories

Xpedition™ Sample Processor

The *Xpedition*™ Sample Processor (XSP) is a portable homogenizer/cell disruptor. It can be used at any remote location and in most weather conditions when immediate sample collection and processing are required by the researcher. The device is compatible with most 2.0 ml tubes containing a lysis matrix, though ZR BashingBead™ Tubes should be considered for obtaining maximum yields from tough-to-lyse and environmental sample sources (p. 97).

Description	*Cat. No.*	*Qty.*
Xpedition™ Sample Processor	S6020	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.*	*Qty.*
120V	S6001-2-120	1 unit
230V, European Plug	S6001-2-230	1 unit

Bullet Blender™

Homogenize tissue or disrupt/lyse cells in minutes. The Bullet Blender™ is a vortexer (at a low setting), a cell disrupter, and a tissue homogenizer (at a high setting) all in one unit. No parts contact the samples, eliminating the possibility of cross contamination. Available in 1.5 - 2 ml and 50 ml tube formats.

Description	*Cat. No.*	*Qty.*
BBX24 Bullet Blender™ (24 x 1.5 - 2.0 ml tubes)	S6007-1	1 unit
BBX24B Bullet Blender™ Blue (24 x 1.5 - 2.0 ml tubes) with cooling fan	S6007-2	1 unit
BBX50B Bullet Blender™ Blue 50 (9 x 50 ml tubes) with cooling fan	S6007-3	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.	*Qty.*
S6005	1 unit

FastPrep® Accessories

A.

B.

C.

D.

Description	*Cat. No.*	*Qty.*
A. HiPrep™ Attachment (48 x 2 ml tubes)	S6005-1	1 unit
B. CoolPrep™ Attachment (24 x 2 ml tubes)	S6005-2	1 unit
C. TeenPrep™ Attachment (12 x 15 ml tubes)	S6005-3	1 unit
D. BigPrep™ Attachment (2 x 50 ml tubes)	S6005-4	1 unit
E. FastPrep® European AC Cord	S6005-5	1 unit

2010 Geno/Grinder®

Next generation high throughput tissue homogenizer and cell lyser. Accommodates a variety of formats ranging from deep-well titer plates to centrifuge tubes. Specifically designed for rapid cell disruption, lysis, and tissue homogenization while preserving temperature sensitive samples. Typical samples include plant and animal tissues, cell cultures, seeds, yeast, and bacteria. (For sale to US customers only).

Cat. No.	*Qty.*
S6006	1 unit

2010 Geno/Grinder® Accessories

A.

B.

C.

D.

Description	*Cat. No.*	*Qty.*
A. 2 ml Tube Holder/Cryo Block Assembly (48 x 2.0 ml tubes/block)	S6006-1	2 blocks
B. 15 ml Tube Holder/Cryo Block Assembly (15 x 15 ml tubes/block)	S6006-2	2 blocks
C. 50 ml Tube Holder/Cryo Block Assembly (6 x 50 ml tubes/block)	S6006-3	2 blocks
D. Large Capacity Clamp Assembly	S6006-10	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.	*Qty.*
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.	*Qty.*
H1002-5	5 pk / 1 block
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.	*Qty.*
H1004-2	2 pk / 2 blocks
H1004-5	5 pk / 5 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. 136 for more details.

Cat. No.	*Qty.*
S1001	1 bottle
S1001-5	5 bottles
S1001-B	25 kg 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 next page.

Description	*Cat. No.*	*Qty.*
120V	S5001	1 unit
230V, European plug	S5002	1 unit

Digital Vortex-Genie® 2

The Digital Vortex-Genie® 2 has the same great features as Vortex-Genie® 2 with digital control and display of time. The digital display provides accuracy, reproducibility, and repeatability. Timer functions include Touch On (1-99 seconds) and Hands-free (1-99 minutes or continuous). May be used in cold rooms and incubators.

Description	*Cat. No.*	*Qty.*
120V	S5003	1 unit
230V, European plug	S5004	1 unit

Vortex-Genie® Family Accessories

A. & B.

C.

D.

Description	*Cat. No.*	*Qty.*
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.*	*Qty.*
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 product.	S5001-6	1 unit
G. Horizontal Microtube Holder: Holds 24 microtubes. Use with any Vortex-Genie® 2.	S5001-7	1 unit

MicroPlate Genie®

The MicroPlate Genie® has a small vortexing orbit of 1.0 mm for thorough mixing regardless of sample viscosity. The high speed and small orbit combine to offer true vortexing action in each well of the microplate. It accepts most microplate types within the recommendations of the Society for Biomolecular Screening (SGBS), even 384-well formats.

Description	*Cat. No.*	*Qty.*
120V	S5005	1 unit
230V, European plug	S5006	1 unit

Roto-Shake Genie®

Roto-Shake Genie® combines rotating and rocking in one compact unit. The magnetic platform and various accessories securely holds almost any sample. A variety of attachments/accessories are available to provide maximum application versatility and it maintains a set speed between 0 - 38°C for use in cold rooms or incubators.

Description	*Cat. No.*	*Qty.*
120V	S5007	1 unit
230V, European plug	S5008	1 unit

MagStir Genie®

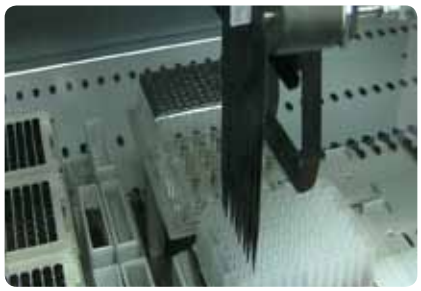
The MagStir Genie® allows programmable high/low speed stirring. High and low speed range including reverse and interval stirring for applications ranging from gentle stirring for cell culture to aggressive mixing for viscous polymers. There are three power levels for various sample viscosities. The low-profile magnetic stirrers use microprocessor control for precise and reproducible operation without heat build-up from internal friction.

Description	*Cat. No.*	*Qty.*
120V	S5009	1 unit
230V, European plug	S5010	1 unit

Automation with Zymo Research

Zymo Research has adapted a number of technologies for high-throughput automation needs.

A summary of those currently available is listed here. Scripts are also available by contacting us at: tech@zymoresearch.com. Include "Automation Scripts" in the subject line and provide kit catalog number and the automation platform desired. If the product you are using is not listed here, don't despair; just contact us with your requirements, we are continually working toward additional product offerings.

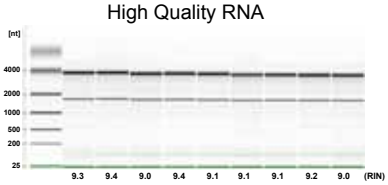


RNA Directly from TRI Reagent® – Now Automated!

Reproducible Sample Processing

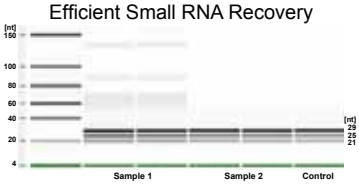
Comparison between manual and automated (Freedom EVO®, Tecan) sample processing with the Direct-zol™-96 MagBead RNA across a 96-Well plate. RNA was purified from human epithelial cells (5 x 10^5/well).

High Quality RNA



RNA quality assessed using a Bioanalyzer. RNA was purified from human epithelial cells using the Direct-zol™-96 MagBead RNA on Freedom EVO® (Tecan).

Efficient Small RNA Recovery



Small RNA recovery with the Direct-zol™-96 MagBead RNA. Bioanalyzer (Small RNA Chip) gel image shown.

Product	*Cat. No.*	*Size*	*Page*
EZ-96 DNA Methylation™ MagPrep	D5040 D5041	4 x 96 8 x 96	13
EZ-96 DNA Methylation-Gold™ MagPrep	D5042 D5043	4 x 96 8 x 96	14
EZ-96 DNA Methylation-Direct™ MagPrep	D5044 D5045	4 x 96 8 x 96	15
EZ-96 DNA Methylation-Lightning™ MagPrep	D5046 D5047	4 x 96 8 x 96	16
Zyppy™-96 Plasmid MagBead Miniprep	D4100 D4101 D4102	2 x 96 4 x 96 8 x 96	69
ZR-96 *Quick-gDNA*™ MagPrep	D3080 D3081	2 x 96 4 x 96	78
ZR-96 Genomic-DNA™ Tissue MagPrep	D3083 D3084	2 x 96 4 x 96	79
Direct-zol-96™ RNA MagPrep (*TRI-Reagent*® not included)	R2100 R2102 R2104	2 x 96 4 x 96 8 x 96	115
Direct-zol-96™ RNA MagPrep (supplied with *TRI-Reagent*®)	R2101 R2103 R2105	2 x 96 4 x 96 8 x 96	115

Requesting a free sample kit has never been easier.

Sample-sized kits of some of our DNA / RNA purification and epigenetics technologies are available for your evaluation. Below is a list of our current offerings. Sample kits must be shipped to a valid *business or institution address*. For sample requests outside the US, please contact your nearest distributor.

Cat. No.	Kit	Size	Page
Epigenetics			
D5005S	EZ DNA Methylation-Gold™ Kit	10 rxns.	14
D5020S	EZ DNA Methylation-Direct™ Kit	10 rxns.	15
D5030S	EZ DNA Methylation-Lightning™ Kit	10 rxns.	16
DNA Purification			
D4003S	DNA Clean & Concentrator™-5	10 preps.	53
D4001S	Zymoclean™ Gel DNA Recovery Kit	10 preps.	62
D4036S	Zyppy™ Plasmid Miniprep Kit	10 preps.	68
D3024S	*Quick-gDNA*™ MiniPrep	10 preps.	78
D6005S	ZR Fungal/Bacterial DNA MiniPrep™	5 preps.	93
D6010S	ZR Fecal DNA MiniPrep™	5 preps.	94
D6030S	OneStep™ PCR Inhibitor Removal Kit	5 preps.	61
RNA Purification			
R1015S	RNA Clean & Concentrator™-5	5 preps.	108
R1054S	*Quick-RNA*™ MiniPrep	5 preps.	116
R2050S	Direct-zol™ RNA MiniPrep	10 preps.	114
R1100-8-S	RNA Shield™	8 ml	126

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A1001-25	Ampicillin Sodium	5 x 5 ml	156
A1002-5	Chloramphenicol	5 ml	156
A1002-25	Chloramphenicol	5 x 5 ml	156
A1003-5	Kanamycin Sulfate	5 ml	156
A1003-25	Kanamycin Sulfate	5 x 5 ml	156
A1004-5	Tetracycline Hydrochloride	5 ml	156
A1004-25	Tetracycline Hydrochloride	5 x 5 ml	156
A2001-1	Arabinose	1 ml	157
A2001-10	Arabinose	10 x 1 ml	157
A3001-15	Anti-5-Methlycytosine	15 µg/15 µl	23
A3001-30	Anti-5-Methlycytosine	30 µg/30 µl	23
A3001-50	Anti-5-Methylcytosine (clone 10G4)	50 µg/50 µl	23
A3001-200	Anti-5-Methylcytosine (clone 10G4)	200 µg/200 µl	23
A4001-25	Anti-5-Hydroxymethylcytosine Antibody	25 µg/25 µl	30
A4001-50	Anti-5-Hydroxymethylcytosine Antibody	50 µg/50 µl	30
A4001-200	Anti-5-Hydroxymethylcytosine Antibody	200 µg/200 µl	30
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C1003-250	Zymo-Spin™ I Columns	250 pack	163
C1004-50	Zymo-Spin™ IC Columns	50 pack	163
C1004-250	Zymo-Spin™ IC Columns	250 pack	163
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C1005-250	Zymo-Spin™ III Columns	250 pack	164
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C1006-50-F	Spin-Away™ Filters	50 pack	165
C1006-50-G	Zymo-Spin™ IIICG Columns	50 pack	164
C1006-250	Zymo-Spin™ IIIC Columns	250 pack	164
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C1009-50	ZRC-GF Filter™	50 pack	166
C1010-50	Zymo-Spin™ IV-HRC Columns	50 pack	164
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C1011-250	Zymo-Spin™ IIC Columns	250 pack	163
C1012-25	Zymo-Spin™ V Columns	25 pack	165
C1012-50	Zymo-Spin™ V Columns	50 pack	165
C1013-10	Zymo-Spin™ VI Columns	10 pack	165
C1013-20	Zymo-Spin™ VI Columns	20 pack	165
C1014-50	Zymo-Spin™ IB Columns	50 pack	163
C1014-250	Zymo-Spin™ IB Columns	250 pack	163
C1016-25	Zymo-Spin™ V Columns with Reservoir	25 pack	165
C1016-50	Zymo-Spin™ V Columns with Reservoir	50 pack	165
C1017-10	Zymo-Spin™ VI Columns with Zymo -Maxi Filter™	10 pack	166
C1017-20	Zymo-Spin™ VI Columns with Zymo -Maxi Filter™	20 pack	166
C1018-10	Zymo-Spin™ VI Columns with Reservoir	10 pack	166
C1018-20	Zymo-Spin™ VI Columns with Reservoir	20 pack	166
C1019-50	Zymo-Spin™ IIN Columns	50 pack	164
C1019-250	Zymo-Spin™ IIN Columns	250 pack	164
C1021-25	Zymo-Spin™ V-E Columns & Zymo Midi Filter™	25 pack	165
C1022-50	Zymo-Spin™ IV-µHRC	50 pack	165
C1024-25	Zymo-Spin™ V-E Columns	25 pack	165
C1024-50	Zymo-Spin™ V-E Columns	50 pack	165
C1025-50	2.0 mL V-bottom Clear Tube, with caps	50 pack	166
C1025-500	2.0 mL V-bottom Clear Tube, with caps	500 pack	166
C1026-50	2.0 mL V-bottom Amber Tube, with caps	50 pack	167
C1026-500	2.0 mL V-bottom Amber Tube, with caps	500 pack	167
C1027-50	2.0 mL U-bottom Clear Tube, with caps	50 pack	166
C1027-500	2.0 mL U-bottom Clear Tube, with caps	500 pack	166
C1028-50	2.0 mL U-bottom Amber Tube, with caps	50 pack	167
C1028-500	2.0 mL U-bottom Amber Tube, with caps	500 pack	167
C2001	Silicon-A™ Plate	2 plates	168
C2001-50	DNase/RNase-free Tubes (1.5 ml)	50 tubes	166
C2001-100	DNase/RNase-free Tubes (1.5 ml)	100 tubes	166
C2002	Collection Plate	2 plates	168
C2003	Elution Plate	2 plates	169
C2004	Zymo-Spin™ I-96 Plate (deep-well)	2 plates	168
C2004-SW	Zymo-Spin™ I-96 Plate (shallow-well)	2 plates	168
C2005	96-Well PCR/Conversion Plate with Cover Foil	2 plates/foils	169
C2006	Zymo-Spin™ IB-96 Plate (shallow-well)	2 plates	168
C2007-2	96-Well Plate Cover Foil	2 foils	169
C2007-4	96-Well Plate Cover Foil	4 foils	169
C2007-6	96-Well Plate Cover Foil	6 foils	169
C2007-8	96-Well Plate Cover Foil	8 foils	169
C2007-12	96-Well Plate Cover Foil	12 foils	169
C2007-24	96-Well Plate Cover Foil	24 foils	169
C2008	96-Well PCR/Conversion Plate	2 plates	169
C2009	Silicon-A™-HRC Plate	2 plates	168
C2010	Zymo-Spin™ III-96 Plate	2 plates	168
C2011-2	Air Permeable Sealing Cover	2 pack	
C2011-4	Air Permeable Sealing Cover	4 pack	
C2011-8	Air Permeable Sealing Cover	8 pack	
C2020	96-Well ELISA Plate, 12 x 8-well strips	1 Plate	
D1000	dNTP Mix [10 mM]	500 µl	41
D1000-1	dNTP Mix [10 mM]	100 µl	41

Cat. No.	Description	Size	Page
D1005	dATP [100 mM]	250 µl	41
D1010	dTTP [100 mM]	250 µl	41
D1015	dGTP [100 mM]	250 µl	41
D1020	dCTP [100 mM]	250 µl	41
D1030	5-Methylcytosine dNTP Mix [10 mM]	250 µl	41
D1035	5-Methyl dCTP [10 mM]	100 µl	41
D1040	5-Hydroxymethylcytosine dNTP Mix [10 mM]	250 µl	41
D1045	5-Hydroxymethyl dCTP [100 mM]	100 µl	41
D2001	Zymoprep™ Yeast Plasmid Miniprep I	100 preps.	
D2001-1-15	Solution 1, Digestion Buffer	15 ml	
D2001-2-15	Solution 2, Lysis Buffer	15 ml	
D2001-3-15	Solution 3, Neutralizing Buffer	15 ml	
D2002	YeaStar™ Genomic DNA Kit	40 preps.	86
D2002-1	YD Digestion Buffer	4.8 ml	
D2002-2	YD Lysis Buffer	4.8 ml	
D2004	Zymoprep™ Yeast Plasmid Miniprep II	50 preps.	75
D2004-1-10	Solution 1, Digestion Buffer	10 ml	
D2004-2-10	Solution 2, Lysis Buffer	10 ml	
D2004-3-20	Solution 3, Neutralizing Buffer	20 ml	
D3001	Pinpoint™ Slide DNA Isolation System	50 preps.	85
D3001-1	Pinpoint™ Solution	1 ml	
D3001-2-5	Proteinase K with Storage Buffer	5 mg	152
D3001-2-20	Proteinase K with Storage Buffer	20 mg	152
D3001-3	Pinpoint™ Extraction Buffer	2.5 ml	
D3001-4	Pinpoint™ Binding Buffer	6 ml	
D3001-5	Pinpoint™ Wash Buffer	2.4 ml	
D3004	ZymoBead™ Genomic DNA Kit	~100 preps.	
D3004-1-50	Genomic Lysis Buffer	50 ml	
D3004-1-100	Genomic Lysis Buffer	100 ml	
D3004-1-150	Genomic Lysis Buffer	150 ml	
D3004-1-200	Genomic Lysis Buffer	2 x 100 ml	
D3004-1-250	Genomic Lysis Buffer	250 ml	
D3004-1-1000	Genomic Lysis Buffer	1000 ml	
D3004-2-50	g-DNA Wash Buffer	50 ml	
D3004-2-100	g-DNA Wash Buffer	100 ml	
D3004-2-200	g-DNA Wash Buffer	200 ml	
D3004-2-250	g-DNA Wash Buffer	250 ml	
D3004-2-400	g-DNA Wash Buffer	4 x 100 ml	
D3004-3-1	ZymoBeads™	1 ml	167
D3004-3-4	ZymoBeads™	4 x 1 ml	167
D3004-4-1	DNA Elution Buffer	1 ml	
D3004-4-4	DNA Elution Buffer	4 ml	
D3004-4-10	DNA Elution Buffer	10 ml	
D3004-4-16	DNA Elution Buffer	16 ml	
D3004-4-50	DNA Elution Buffer	50 ml	
D3004-5-15	DNA Pre-wash Buffer	15 ml	
D3004-5-30	DNA Pre-wash Buffer	30 ml	
D3004-5-50	DNA Pre-wash Buffer	50 ml	
D3004-5-250	DNA Pre-wash Buffer	250 ml	
D3005	ZymoBead™ Genomic DNA Kit	~400 preps.	81
D3006	*Quick-gDNA*™ MiniPrep (uncapped)	50 preps.	78
D3007	*Quick-gDNA*™ MiniPrep (uncapped)	200 preps.	78

Cat. No.	Description	Size	Page
D3010	ZR-96 *Quick-gDNA*™	2 x 96 preps.	78
D3011	ZR-96 *Quick-gDNA*™	4 x 96 preps.	78
D3012	ZR-96 *Quick-gDNA*™	10 x 96 preps.	78
D3013	ZR Serum DNA Kit™	< 80 ml serum	83
D3015	ZR Viral DNA Kit™	50 preps.	87
D3015-1-50	ZR Viral DNA Buffer	50 ml	
D3016	ZR Viral DNA Kit™	200 preps.	87
D3016-1-100	ZR Viral DNA Buffer	100 ml	
D3017	ZR-96 Viral DNA Kit™	2 x 96 preps.	87
D3018	ZR-96 Viral DNA Kit™	4 x 96 preps.	87
D3020	*Quick-gDNA*™ MicroPrep	50 preps.	78
D3021	*Quick-gDNA*™ MicroPrep	200 preps.	78
D3024	*Quick-gDNA*™ MiniPrep (capped)	50 preps.	78
D3025	*Quick-gDNA*™ MiniPrep (capped)	200 preps.	78
D3040	ZR Genomic DNA™-Tissue MicroPrep	50 preps.	79
D3041	ZR Genomic DNA™-Tissue MicroPrep	200 preps.	79
D3050	ZR Genomic DNA™-Tissue MiniPrep	50 preps.	79
D3050-1-5	2X Digestion Buffer	5 ml	
D3050-1-20	2X Digestion Buffer	20 ml	
D3050-1-80	2X Digestion Buffer	80 ml	
D3051	ZR Genomic DNA™-Tissue MiniPrep	200 preps.	79
D3055	ZR-96 Genomic DNA™-Tissue MiniPrep	2 x 96 preps.	79
D3056	ZR-96 Genomic DNA™-Tissue MiniPrep	4 x 96 preps.	79
D3057	ZR-96 Genomic DNA™-Tissue MiniPrep	10 x 96 preps.	
D3060	ZR Urine DNA Isolation Kit™	20 preps.	82
D3065	ZR FFPE DNA MiniPrep™	50 preps.	84
D3066	ZR FFPE DNA MiniPrep™	200 preps.	84
D3070	*Quick-gDNA*™ Blood MicroPrep	50 preps.	80
D3071	*Quick-gDNA*™ Blood MicroPrep	200 preps.	80
D3072	*Quick-gDNA*™ Blood MiniPrep	50 preps.	80
D3073	*Quick-gDNA*™ Blood MiniPrep	200 preps.	80
D3074	*Quick-gDNA*™ Blood MidiPrep	25 preps.	80
D3075	ZR-96 *Quick-gDNA*™ Blood	2 x 96 preps.	80
D3076	ZR-96 *Quick-gDNA*™ Blood	4 x 96 preps.	80
D3077	ZR-96 *Quick-gDNA*™ Blood	10 x 96 preps.	80
D3080	ZR-96 *Quick-gDNA*™ MagPrep	2 x 96 preps.	78
D3081	ZR-96 *Quick-gDNA*™ MagPrep	4 x 96 preps.	78
D3083	ZR-96 Genomic DNA™-Tissue MagPrep	2 x 96 preps.	79
D3084	ZR-96 Genomic DNA™-Tissue MagPrep	4 x 96 preps.	79
D3100	*Quick-gDNA*™ MidiPrep	25 preps.	78
D3110	ZR Genomic DNA™-Tissue MidiPrep	25 preps.	79
D4001	Zymoclean™ Gel DNA Recovery Kit (uncapped)	50 preps.	62
D4001-1-50	ADB (Agarose Dissolving Buffer)	50 ml	
D4001-1-100	ADB (Agarose Dissolving Buffer)	100 ml	
D4002	Zymoclean™ Gel DNA Recovery Kit (uncapped)	200 preps.	62
D4003	DNA Clean & Concentrator™-5 (uncapped)	50 preps.	53
D4003-1-L	DNA Binding Buffer	50 ml	
D4003-1-25	DNA Binding Buffer	25 ml	
D4003-2-6	DNA Wash Buffer	6 ml	
D4003-2-24	DNA Wash Buffer	24 ml	
D4003-2-48	DNA Wash Buffer	48 ml	

Cat. No.	Description	Size	Page
D4004	DNA Clean & Concentrator™-5 (uncapped)	200 preps.	53
D4004-1-L	DNA Binding Buffer	100 ml	
D4005	DNA Clean & Concentrator™-25 (uncapped)	50 preps.	54
D4006	DNA Clean & Concentrator™-25 (uncapped)	200 preps.	54
D4007	Zymoclean™ Gel DNA Recovery Kit (capped)	50 preps.	62
D4008	Zymoclean™ Gel DNA Recovery Kit (capped)	200 preps.	62
D4010	Genomic DNA Clean & Concentrator™	25 preps.	59
D4011	Genomic DNA Clean & Concentrator™	100 preps.	59
D4013	DNA Clean & Concentrator™-5 (capped)	50 preps.	53
D4014	DNA Clean & Concentrator™-5 (capped)	200 preps.	53
D4015	ZR Plasmid Miniprep™-*Classic*	100 preps.	72
D4016	ZR Plasmid Miniprep™-*Classic*	400 preps.	72
D4017	ZR-96 DNA Clean-up Kit™	2 x 96 preps.	57
D4018	ZR-96 DNA Clean-up Kit™	4 x 96 preps.	57
D4019	Zyppy ™ Plasmid Miniprep Kit	100 preps.	68
D4020	Zyppy ™ Plasmid Miniprep Kit	400 preps.	68
D4021	ZR-96 Zymoclean™ Gel DNA Recovery Kit	2 x 96 preps.	62
D4022	ZR-96 Zymoclean™ Gel DNA Recovery Kit	4 x 96 preps.	62
D4023	ZR-96 DNA Clean & Concentrator™-5	2 x 96 preps.	53
D4024	ZR-96 DNA Clean & Concentrator™-5	4 x 96 preps.	53
D4025	Zyppy™ Plasmid Midiprep Kit	25 preps.	70
D4026	Zyppy™ Plasmid Midiprep Kit	50 preps.	70
D4027	Zyppy™ Plasmid Maxiprep Kit	10 preps.	71
D4027-1-10	Buffer P1	10 ml	
D4027-1-20	Buffer P1	20 ml	
D4027-1-80	Buffer P1	80 ml	
D4027-1-160	Buffer P1	160 ml	
D4027-1-320	Buffer P1	320 ml	
D4027-2-10	Buffer P2	10 ml	
D4027-2-20	Buffer P2	20 ml	
D4027-2-80	Buffer P2	80 ml	
D4027-2-160	Buffer P2	160 ml	
D4027-2-250	Buffer P2	250 ml	
D4027-2-320	Buffer P2	320 ml	
D4027-3-12	Buffer P3	12 ml	
D4027-3-50	Buffer P3	50 ml	
D4027-3-220	Buffer P3	220 ml	
D4027-3-440	Buffer P3	440 ml	
D4027-4-6	Plasmid Wash Buffer (concentrate)	6 ml	
D4027-4-12	Plasmid Wash Buffer (concentrate)	12 ml	
D4027-4-24	Plasmid Wash Buffer (concentrate)	24 ml	
D4027-4-48	Plasmid Wash Buffer (concentrate)	48 ml	
D4028	Zyppy™ Plasmid Maxiprep Kit	20 preps.	71
D4029	DNA Clean & Concentrator™-100	25 preps.	55
D4030	DNA Clean & Concentrator™-100	50 preps.	55
D4031	DNA Clean & Concentrator™-500	10 preps.	56
D4032	DNA Clean & Concentrator™-500	20 preps.	56
D4033	DNA Clean & Concentrator™-25 (capped)	50 preps.	54
D4034	DNA Clean & Concentrator™-25 (capped)	200 preps.	54
D4036	Zyppy™ Plasmid Miniprep Kit	50 preps.	68
D4036-1-6	7X Lysis Buffer	6 ml	
D4036-1-12	7X Lysis Buffer	12 ml	

Cat. No.	Description	Size	Page
D4036-1-30	7X Lysis Buffer	30 ml	
D4036-1-48	7X Lysis Buffer	48 ml	
D4036-1-60	7X Lysis Buffer	60 ml	
D4036-2-20	Neutralization Buffer	20 ml	
D4036-2-40	Neutralization Buffer	40 ml	
D4036-2-100	Neutralization Buffer	100 ml	
D4036-2-160	Neutralization Buffer	160 ml	
D4036-2-200	Neutralization Buffer	200 ml	
D4036-3-6	Endo-Wash Buffer	6 ml	
D4036-3-15	Endo-Wash Buffer	15 ml	
D4036-3-30	Endo-Wash Buffer	30 ml	
D4036-3-60	Endo-Wash Buffer	60 ml	
D4036-3-120	Endo-Wash Buffer	120 ml	
D4036-3-240	Endo-Wash Buffer	240 ml	
D4036-4-6	Zyppy™ Wash Buffer	6 ml	
D4036-4-12	Zyppy™ Wash Buffer	12 ml	
D4036-4-24	Zyppy™ Wash Buffer	24 ml	
D4036-4-48	Zyppy™ Wash Buffer	48 ml	
D4036-5-5	Zyppy™ Elution Buffer	5 ml	
D4036-5-10	Zyppy™ Elution Buffer	10 ml	
D4036-5-20	Zyppy™ Elution Buffer	20 ml	
D4036-5-30	Zyppy™ Elution Buffer	30 ml	
D4036-5-60	Zyppy™ Elution Buffer	60 ml	
D4036-5-100	Zyppy™ Elution Buffer	100 ml	
D4037	Zyppy™ Plasmid Miniprep Kit	800 preps.	68
D4041	Zyppy-96™ Plasmid Miniprep	2 x 96 Preps	69
D4041-1-30	Deep Blue Lysis Buffer	30 ml	
D4041-1-48	Deep Blue Lysis Buffer	48 ml	
D4041-4-100	Neutralization/Clearing Buffer	100 ml	
D4041-4-200	Neutralization/Clearing Buffer	200 ml	
D4042	Zyppy-96™ Plasmid Miniprep	4 x 96 Preps	69
D4043	Zyppy-96™ Plasmid Miniprep	8 x 96 Preps	69
D4045	Zymoclean™ Large Fragment DNA Recovery Kit	25 preps.	63
D4046	Zymoclean™ Large Fragment DNA Recovery Kit	100 preps.	63
D4048	ZR BAC DNA Miniprep Kit	25 preps.	74
D4049	ZR BAC DNA Miniprep Kit	100 preps.	74
D4050	ZR DNA Sequencing Clean-up Kit™	50 preps.	60
D4050-1-14	Sequencing Binding Buffer	14 ml	
D4050-1-55	Sequencing Binding Buffer	55 ml	
D4050-1-500	Sequencing Binding Buffer	500 ml	
D4050-2-20	Sequencing Wash Buffer	20 ml	
D4050-2-70	Sequencing Wash Buffer	70 ml	
D4050-2-500	Sequencing Wash Buffer	500 ml	
D4051	ZR DNA Sequencing Clean-up Kit™	200 preps	60
D4052	ZR-96 DNA Sequencing Clean-up Kit™	2 x 96 preps	60
D4053	ZR-96 DNA Sequencing Clean-up Kit™	4 x 96 preps	60
D4054	ZR Plasmid Miniprep™-*Classic*	800 preps	72
D4056	ZR Plasmid Gigaprep Kit	5 preps	73
D4057	ZR Plasmid Gigaprep Kit	10 preps	73
D4060	Oligo Clean & Concentrator™	50 Preps	58

Cat. No.	Description	Size	Page
D4060-1-10	Oligo Binding Buffer	10 ml	
D4060-1-140	Oligo Binding Buffer	40 ml	
D4061	Oligo Clean & Concentrator™	200 Preps	58
D4062	ZR-96 Oligo Clean & Concentrator	2 x 96 preps	58
D4063	ZR-96 Oligo Clean & Concentrator	4 x 96 preps	58
D4100	Zyppy-96™ Plasmid MagPrep Kit	2 x 96 preps	69
D4100-1-10	MagClearing Beads	10 ml	167
D4100-1-20	MagClearing Beads	20 ml	167
D4100-1-40	MagClearing Beads	40 ml	167
D4100-2-6	MagBinding Beads	6 ml	167
D4100-2-8	MagBinding Beads	8 ml	167
D4100-2-12	MagBinding Beads	12 ml	167
D4100-2-16	MagBinding Beads	16 ml	167
D4100-2-24	MagBinding Beads	24 ml	167
D4101	Zyppy-96™ Plasmid MagPrep Miniprep	4 x 96 Preps	69
D4102	Zyppy-96™ Plasmid MagPrep Miniprep	8 x 96 Preps	69
D5001	EZ DNA Methylation™ Kit	50 rxns.	13
D5001-1	CT Conversion Reagent (10 conversions)	1 tube	
D5001-1-50	CT Conversion Reagent (5 x 10 conversions)	5 tubes	
D5001-2	M-Dilution Buffer	1.3 ml	
D5001-3	M-Binding Buffer	20 ml	
D5001-4	M-Wash Buffer	6 ml	
D5001-5	M-Desulphonation Buffer	10 ml	
D5001-6	M-Elution Buffer	1 ml	
D5002	EZ DNA Methylation™ Kit	200 rxns.	13
D5002-2	M-Dilution Buffer	5.2 ml	
D5002-3	M-Binding Buffer	80 ml	
D5002-4	M-Wash Buffer	24 ml	
D5002-5	M-Desulphonation Buffer	40 ml	
D5002-6	M-Elution Buffer	4 ml	
D5003	EZ-96 DNA Methylation™ Kit (shallow-well)	2 x 96 rxns.	13
D5003-1	CT Conversion Reagent (96 conversions)	1 Bottle	
D5004	EZ-96 DNA Methylation™ Kit (deep-well)	2 x 96 rxns.	13
D5005	EZ DNA Methylation-Gold™ Kit	50 rxns.	14
D5005-2	M-Dilution Buffer	1.5 ml	
D5005-3	M-Binding Buffer	30 ml	
D5005-6	M-Dissolving Buffer	500 µl	
D5006	EZ DNA Methylation-Gold™ Kit	200 rxns.	14
D5006-2	M-Dilution Buffer	7 ml	
D5006-3	M-Binding Buffer	125 ml	
D5006-6	M-Dissolving Buffer	1.2 ml	
D5007	EZ-96 DNA Methylation-Gold™ Kit (shallow-well)	2 x 96 rxns.	14
D5007-4	M-Wash Buffer	36 ml	
D5007-6	M-Elution Buffer	8 ml	
D5008	EZ-96 DNA Methylation-Gold™ Kit (deep-well)	2 x 96 rxns.	14
D5009	Bisulfite-Converted Human Methylated & Non-Methylated DNA Set (DNA with primers)	1 set	20
D5009-1	Bisulfite-Converted Human HCT116 DKO Non-Methylated DNA	1 µg / 50 µl	20
D5009-2	Bisulfite-Converted Human HCT116 DKO Methylated DNA	1 µg / 50 µl	20
D5010	Universal Methylated DNA Standard	1 set	21

Cat. No.	Description	Size	Page
D5011	Universal Methylated Human DNA Standard	1 set	21
D5012	Universal Methylated Mouse DNA Standard	1 set	21
D5013	Human Methylated & Non-methylated (WGA) DNA Set (DNA with primers)	1 set	20
D5013-1	Human WGA Non-methylated DNA	5 µg / 20 µl	20
D5014	Human Methylated & Non-methylated DNA Set (DNA with primers)	1 set	20
D5014-1	Human HCT116 DKO Non-methylated DNA	5 µg / 20 µl	20
D5014-2	Human HCT116 DKO Methylated DNA	5 µg / 20 µl	20
D5015	Bisulfite-converted Universal Methylated Human DNA Standard	1 set	21
D5016	E. coli Non-methylated Genomic DNA	5 µg / 20 µl	21
D5017	Methylated & Non-methylated pUC19 DNA Set	1 set	21
D5018	Human Matched DNA Set	1 set	32
D5018-1	Human Brain DNA	5 µg	
D5018-2	Human Spleen DNA	5 µg	
D5019	Mouse 5hmC & 5-mC DNA Set	1 set	32
D5019-1	Mouse Brain DNA	5 µg	
D5019-2	Mouse Kidney DNA	5 µg	
D5019-3	Mouse Liver DNA	5 µg	
D5019-4	Mouse Thymus DNA	5 µg	
D5020	EZ DNA Methlyation-Direct™ Kit	50 rxns.	15
D5020-7	M-Solubilization Buffer	4.5 ml	
D5020-8	M-Reaction Buffer	1 ml	
D5020-9	M-Digestion Buffer (2X)	4 ml	
D5021	EZ DNA Methlyation-Direct™ Kit	200 rxns.	15
D5021-7	M-Solubilization Buffer	18 ml	
D5021-8	M-Reaction Buffer	4 ml	
D5021-9	M-Digestion Buffer (2X)	15 ml	
D5022	EZ-96 DNA Methylation-Direct™ Kit (shallow-well)	2 x 96 rxns.	15
D5023	EZ-96 DNA Methylation-Direct™ Kit (deep-well)	2 x 96 rxns.	15
D5024	EZ DNA Methylation -Startup™ Kit	50 rxns.	17
D5030	EZ DNA Methylation-Lightning™ Kit	50 rxns.	16
D5030-1	Lightning Conversion Reagent	1.5 ml	
D5030-5	L-Desulphonation Buffer	10 ml	
D5031	EZ DNA Methlyation-Lightning™ Kit	200 rxns.	16
D5031-5	L-Desulphonation Buffer	40 ml	
D5032	EZ-96 DNA Methylation-Lightning™ Kit	2 x 96 rxns.	16
D5032-1	Lightning Conversion Reagent, 1 bottle	15 ml	
D5033	EZ-96 DNA Methylation-Lightning™ Kit (deep-well)	2 x 96 rxns.	16
D5040	EZ-96 DNA Methylation™ MagPrep	4 x 96 rxns.	13
D5040-3	M-Binding Buffer	250 ml	
D5040-4	M-Wash Buffer	72 ml	
D5040-5	M-Desulphonation Buffer	80 ml	
D5041	EZ-96 DNA Methylation™ MagPrep	8 x 96 rxns.	13
D5041-6	M-Elution Buffer	40 ml	
D5042	EZ-96 DNA Methylation-Gold™ MagPrep	4 x 96 rxns.	14
D5043	EZ-96 DNA Methylation-Gold™ MagPrep	8 x 96 rxns.	14
D5044	EZ-96 DNA Methylation-Direct™ MagPrep	4 x 96 rxns.	15
D5045	EZ-96 DNA Methylation-Direct™ MagPrep	8 x 96 rxns.	15
D5046	EZ-96 DNA Methylation-Lightning™ MagPrep	4 x 96 rxns.	16
D5046-5	L-Desulphonation Buffer	80 ml	

Cat. No.	Description	Size	Page
D5047	EZ-96 DNA Methylation-Lightning™ MagPrep	8 x 96 rxns.	16
D5101	Methylated-DNA IP Kit	10 rxns.	24
D5101-2	Methylated/Non-methylated Control DNA & Primer Set	1 Set	
D5101-3-20	MIP Buffer	20 ml	
D5101-4-1	DNA Denaturing Buffer	1 ml	
D5101-5-6	IP DNA Binding Buffer	6 ml	
D5201	ChIP DNA Clean & Concentrator™ (uncapped)	50 preps.	33
D5201-1-50	ChIP DNA Binding Buffer	50 ml	
D5205	ChIP DNA Clean & Concentrator™ (capped)	50 preps.	33
D5206	ZR-96 ChIP DNA Clean & Concentrator™	2 x 96 rxns.	33
D5207	ZR-96 ChIP DNA Clean & Concentrator™	4 x 96 preps.	33
D5220	EZ Nucleosomal DNA Prep Kit	20 preps.	34
D5220-1	Micrococcal Nuclease	10 U / 100 µl	34, 152
D5220-2	Nuclei Prep Buffer	50 ml	152
D5220-3	MN Digestion Buffer	50 ml	
D5220-4	5X MN Stop Buffer	6 ml	
D5310	*OneStep* qMethyl™ Kit	44 tests	25
D5310-1	2X Test Reaction PreMix	0.5 ml	
D5310-2	2X Reference Reaction PreMix	0.5 ml	
D5311	*OneStep* qMethyl™-Lite	44 tests	25
D5311-1	2X Test Reaction-Lite PreMix	0.5 ml	
D5311-2	2X Reference Reaction-Lite PreMix	0.5 ml	
D5312-1-A	*OneStep* qMethyl™ Array RASSF1- Roche	44 tests	26
D5312-1-B	*OneStep* qMethyl™ Array RASSF1 -BioRad	44 tests	26
D5312-1-C	*OneStep* qMethyl™ Array RASSF1-ABI	44 tests	26
D5312-2-A	*OneStep* qMethyl™ Array - RARB- Roche	44 tests	26
D5312-2-B	*OneStep* qMethyl™ Array - RARB- BioRad	44 tests	26
D5312-2-C	*OneStep* qMethyl™ Array - RARB-ABI	44 tests	26
D5312-3-A	*OneStep* qMethyl™ Array - CDKN2A- Roche	44 tests	26
D5312-3-B	*OneStep* qMethyl™ Array - CDKN2A- BioRad	44 tests	26
D5312-3-C	*OneStep* qMethyl™ Array - CDKN2A- ABI	44 tests	26
D5312-4-A	*OneStep* qMethyl™ Array - MGMT- Roche	44 tests	26
D5312-4-B	*OneStep* qMethyl™ Array - MGMT- BioRad	44 tests	26
D5312-4-C	*OneStep* qMethyl™ Array - MGMT- ABI	44 tests	26
D5312-5-A	*OneStep* qMethyl™ Array - CCND2- Roche	44 tests	26
D5312-5-B	*OneStep* qMethyl™ Array - CCND2- BioRad	44 tests	26
D5312-5-C	*OneStep* qMethyl™ Array - CCND2 - ABI	44 tests	26
D5313-1-A	*OneStep* qMethyl™ Panel- Roche	1 x 96 well	27
D5313-1-B	*OneStep* qMethyl™ Panel- BioRad	1 x 96 well	27
D5313-1-C	*OneStep* qMethyl™ Panel- ABI	1 x 96 well	27
D5313-1-D	*OneStep* qMethyl™ Panel- tube format	44 tests	27
D5325	5-mC DNA ELISA Kit	1 x 96 rxns.	22
D5325-1-15	5-mC Coating Buffer	15 ml	
D5325-1-30	5-mC Coating Buffer	30 ml	
D5325-2-250	5-mC ELISA Buffer	250 ml	
D5325-3-15	Secondary Antibody	15 µl	
D5325-3-30	Secondary Antibody	30 µl	
D5325-5-1	Negative Control	50 µl	
D5325-5-2	Positive Control	50 µl	
D5326	5-mC DNA ELISA Kit	1 x 96 rxns.	22

Cat. No.	Description	Size	Page
D5405	5-Methylcytosine & 5-Hydroxymethylcytosine DNA Standard Set	1 set	32
D5405-1	Cytosine DNA Standard	2 µg	
D5405-2	5-Methylcytosine DNA Standard	2 µg	
D5405-3	5-Hydroxymethylcytosine DNA Standard	2 µg	
D5410	Quest 5-hmC Detection Kit™	25 preps.	29
D5411	Quest 5-hmC Detection Kit™	50 preps.	29
D5415	Quest 5-hmC Detection Kit™ -Lite	25 preps.	29
D5416	Quest 5-hmC Detection Kit™ -Lite	50 preps.	29
D5420	Quest 5-hmC™ DNA Enrichment Kit	25 rxns.	31
D5420-1-50	JBP Binding Buffer	50 ml	
D5420-2	5-hmC DNA Elution Buffer	1.5 ml	
D5420-3-250	JBP Capture MagBeads	250 µl	
D5420-3-500	JBP Capture MagBeads	500 µl	
D5420-4	Magnetic Rods	4 rods	
D5420-5	5-hmC Control DNA	25 µl	
D5420-6	Control Primers	20 µM	
D5421	Quest 5-hmC™ DNA Enrichment Kit	50 rxns.	31
D5425	Quest 5-hmC™ DNA ELISA Kit	1 x 96 rxns.	30
D5425-1-15	Coating Buffer	15 ml	
D5425-1-30	Coating Buffer	30 ml	
D5425-2-30	10X ELISA Buffer	30 ml	
D5425-2-60	10X ELISA Buffer	60 ml	
D5425-3-100	Anti-DNA HRP Antibody	100 µl	
D5425-3-200	Anti-DNA HRP Antibody	200 µl	
D5425-4-15	HRP Developer	15 ml	
D5425-4-30	HRP Developer	30 ml	
D5425-5-1	Control A	4 µg	
D5425-5-2	Control B	4 µg	
D5425-5-3	Control C	4 µg	
D5425-5-4	Control D	4 µg	
D5425-5-5	Control E	4 µg	
D5425-5-C	Control DNA Set	5 x 40 µl	
D5426	Quest 5-hmC™ DNA ELISA Kit	2 x 96 rxns.	30
D6001	ZR Soil Microbe DNA MiniPrep™	50 preps.	92
D6001-1-100	Soil DNA Binding Buffer	100 ml	
D6001-1-150	Soil DNA Binding Buffer	150 ml	
D6001-1-500	Soil DNA Binding Buffer	500 ml	
D6001-2-50	Soil DNA Wash Buffer	50 ml	
D6001-2-100	Soil DNA Wash Buffer	100 ml	
D6001-3-40	Lysis Solution	40 ml	
D6001-3-150	Lysis Solution	150 ml	
D6002	ZR-96 Soil Microbe DNA Kit™	2 x 96 preps.	92
D6003	ZR Soil Microbe DNA MicroPrep™	50 preps.	92
D6005	ZR Fungal/Bacterial DNA MiniPrep™	50 preps.	93
D6005-1-100	Fungal/Bacterial DNA Binding Buffer	100 ml	
D6005-1-150	Fungal/Bacterial DNA Binding Buffer	150 ml	
D6005-2-50	Fungal/Bacterial DNA Wash Buffer	50 ml	
D6005-2-100	Fungal/Bacterial DNA Wash Buffer	100 ml	
D6006	ZR-96 Fungal/Bacterial DNA Kit™	2 x 96 preps.	93
D6007	ZR Fungal/Bacterial DNA MicroPrep™	50 preps.	93
D6010	ZR Fecal DNA MiniPrep™	50 preps.	94

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D6010-1-100	Fecal DNA Binding Buffer	100 ml	
D6010-1-150	Fecal DNA Binding Buffer	150 ml	
D6010-2-50	Fecal DNA Wash Buffer	50 ml	
D6010-2-100	Fecal DNA Wash Buffer	100 ml	
D6011	ZR-96 Fecal DNA Kit™	2 x 96 preps.	94
D6012	ZR Fecal DNA MicroPrep™	50 preps.	94
D6015	ZR Tissue & Insect DNA MicroPrep™	50 preps.	95
D6016	ZR Tissue & Insect DNA MiniPrep™	50 preps.	95
D6017	ZR-96 Tissue & Insect DNA Kit™	2 x 96 preps.	95
D6020	ZR Plant/Seed DNA MiniPrep™	50 preps.	96
D6020-1-100	Plant/Seed DNA Binding Buffer	100 ml	
D6020-1-150	Plant/Seed DNA Binding Buffer	150 ml	
D6020-2-50	Plant/Seed DNA Wash Buffer	50 ml	
D6020-2-100	Plant/Seed DNA Wash Buffer	100 ml	
D6021	ZR-96 Plant/Seed DNA Kit™	2 x 96 preps.	96
D6022	ZR Plant/Seed DNA MicroPrep™	50 preps.	96
D6030	*OneStep*™ PCR Inhibitor Removal Kit	50 preps.	61
D6035	*OneStep-96*™ PCR Inhibitor Removal Kit	2 x 96 preps.	61
D6035-1-30	Prep Solution	30 ml	
D6101	ZR Soil Microbe DNA MidiPrep™	25 preps.	92
D6105	ZR Fungal/Bacterial DNA MidiPrep™	25 preps.	93
D6110	ZR Fecal DNA MidiPrep™	25 preps.	94
D6115	ZR Tissue & Insect DNA MidiPrep™	25 preps.	95
D6120	ZR Plant/Seed DNA MidiPrep™	25 preps.	96
D6202	*Xpedition*™ Soil/Fecal DNA MiniPrep	50 preps.	97
D6202-1-40	*Xpedition*™ Lysis/Stabilization Solution	40 ml	97
D6202-2-100	Soil/Fecal DNA Binding Buffer	100 ml	
D6202-3-50	Soil/Fecal DNA Wash Buffer	50 ml	
D6206	*Xpedition*™ Fungal/Bacterial DNA MiniPrep	50 preps.	97
D6216	*Xpedition*™ Tissue & Insect DNA MiniPrep	50 preps.	97
D6221	*Xpedition*™ Plant/Seed DNA MiniPrep	50 preps.	97
D7001	ZR-*Duet*™ DNA/RNA MiniPrep	50 preps.	100
D7001-1-50	Lysis Buffer	50 ml	
D7001-2-12	DNA Prep Buffer	12 ml	
D7001-2-25	DNA Prep Buffer	25 ml	
D7010	ssDNA/RNA Clean & Concentrator™	20 preps.	101
D7010-1-10	DNA/RNA Binding Buffer	10 ml	
D7010-1-25	DNA/RNA Binding Buffer	25 ml	
D7010-1-50	DNA/RNA Binding Buffer	50 ml	
D7010-2-10	DNA/RNA Prep Buffer	10 ml	
D7010-2-25	DNA/RNA Prep Buffer	25 ml	
D7010-3-6	DNA/RNA Wash Buffer (concentrate)	6 ml	
D7010-3-12	DNA/RNA Wash Buffer	12 ml	
D7010-3-24	DNA/RNA Wash Buffer	24 ml	
D7011	ssDNA/RNA Clean & Concentrator™	50 preps.	101
D7020	ZR Viral DNA/RNA Kit™	25 preps.	102
D7020-1-25	Viral DNA/RNA Buffer	25 ml	
D7020-1-100	Viral DNA/RNA Buffer	100 ml	
D7021	ZR Viral DNA/RNA Kit™	100 preps.	102
D7022	ZR-96 Viral DNA/RNA Kit™	2 x 96 preps.	102
D7023	ZR-96 Viral DNA/RNA Kit™	4 x 96 preps.	102
E1004	Zymolyase with Storage Buffer	1,000 U	145, 153

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E1005	Zymolyase with Storage Buffer	2,000 U	145, 153
E1006	R-Zymolyase with Storage Buffer	1,000 U	145, 153
E1008-2	RNase A	2 mg	153
E1008-8	RNase A	8 mg	153
E1008-24	RNase A	24 mg	153
E1009	DNase I Set (250 U) with 10X Reaction Buffer	1 ml	150
E2001	Zymo*Taq*™ DNA Polymerase	50 rxns.	37, 153
E2002	Zymo*Taq*™ DNA Polymerase	200 rxns.	37, 153
E2003	Zymo*Taq*™ PreMix	50 rxns.	37, 153
E2004	Zymo*Taq*™ PreMix	200 rxns.	37, 153
E2010	CpG Methylase (M. SssI)	200 U	150
E2010-2	10X CpG Reaction Buffer	1 ml	
E2010-3	20X SAM (S-adenosylmethionine)	200 µl	
E2011	CpG Methylase (M. SssI)	400 U	35, 150
E2014	GpC Methylase (M. CviPI)	200 U	35, 151
E2014-2	10X GpC Reaction Buffer	1 ml	
E2015	GpC Methylase (M. CviPI)	1,000 U	35, 151
E2016	DNA Degradase™	500 U	39, 151
E2017	DNA Degradase™	2,000 U	39, 151
E2018-50	dsDNA Shearase™ Plus	50 U	40, 151
E2018-200	dsDNA Shearase™ Plus	200 U	40, 151
E2019-50	dsDNA Shearase™ Plus + DCC™-5	50 U + 50 preps.	40, 151
E2019-200	dsDNA Shearase™ Plus + DCC™-5	200 U + 200 preps.	40, 151
E2020	DNA Degradase Plus™	250 U	39, 151
E2021	DNA Degradase Plus™	1,000 U	39, 151
E2026	5-hmC Glucosyltransferase	100 U	36, 150
E2027	5-hmC Glucosyltransferase	200 U	36, 150
E2030	Atlantis dsDNase	12.5 U	150
E2030-1	Atlantis Digestion Buffer	50 ml	
E2050	Quest*Taq*™ PreMix	50 rxns.	38, 152
E2051	Quest*Taq*™ PreMix	200 rxns.	38, 152
E2052	Quest*Taq*™ qPCR PreMix	50 rxns	38, 152
E2053	Quest*Taq*™ qPCR PreMix	200 rxns	38, 152
F9001-1	5-Fluoroorotic Acid (powder)	1 g	157,143
F9001-5	5-Fluoroorotic Acid (powder)	5 g	157,143
F9003	100X 5-Fluoroorotic Acid (liquid)	10 ml	157,143
H1001	Squisher™-Single	10 pack	171
H1001-50	Squisher™-Single	50 pack	171
H1002-5	Squisher™-8 with 96-Well Block	5 pack & 1 block	171
H1002-20	Squisher™-8 with 96-Well Block	20 pack & 2 blocks	171
H1004-2	Squisher™-96 with 96-Well Block	2 pack & 2 blocks	171
H1004-5	Squisher™-96 with 96-Well Block	5 pack & 5 blocks	171
I1001-5	Isopropyl-β-D-thiogalactopyranoside (IPTG)	5 ml	157
I1001-25	Isopropyl-β-D-thiogalactopyranoside (IPTG)	5 x 5 ml	157
M2001	ZymoMag Protein A	200 µl	
M3011	Dual Media Set™ (100 ml EB & 500 ml OB)	1 Set	148
M3012-100	Expansion Broth (EB)	100 ml	148
M3012-500	Expansion Broth (EB)	500 ml	148

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M3013-100	Overexpression Broth (OB)	100 ml	148
M3013-500	Overexpression Broth (OB)	500 ml	148
M3015-100	ZymoBroth™	100 ml	135
M3015-500	ZymoBroth™	5 x 100 ml	135
M5001-50	ZR 50 bp DNA Marker™	50 µg / 100 µl	103
M5001-200	ZR 50 bp DNA Marker™	200 µg / 400 µl	103
M5002-50	ZR 100 bp DNA Marker™	50 µg / 100 µl	103
M5002-200	ZR 100 bp DNA Marker™	200 µg / 400 µl	103
M5003-50	ZR 1 kb DNA Marker™	50 µg / 100 µl	103
M5003-200	ZR 1 kb DNA Marker™	200 µg / 400 µl	103
M5004-50	ZR 50 bp DNA Marker™ (ready-to-load)	50 µg / 600 µl	103
M5005-50	ZR 100 bp DNA Marker™ (ready-to-load)	50 µg / 600 µl	103
M5006-50	ZR 1 kb DNA Marker™ (ready-to-load)	50 µg / 600 µl	103
P1001-2	96-Well Block	2 blocks	169
P1001-10	96-Well Block	10 blocks	169
P1002-2	96-Well Block with Cover Foil	2 blocks/foils	169
P2001	His-Spin Protein Miniprep™	10 preps.	149
P2002	His-Spin Protein Miniprep™	50 preps.	149
P2003-1	Zymo-Spin™ PI Columns	50 pack	163
P2003-2	His-Affinity Gel	14 ml	157, 149
P2003-3	His-Binding Buffer	50 ml	
P2003-4	His-Wash Buffer	50 ml	
P2003-5	His-Elution Buffer	25 ml	
R1001-1	YR Digestion Buffer	3.2 ml	
R1001-2	YR Lysis Buffer	6.4 ml	
R1002	YeaStar™ RNA Kit	40 preps.	121
R1003	Pinpoint™ Slide RNA Isolation System I	50 preps.	120
R1003-2-3	RNA Extraction Buffer	3 ml	
R1003-2-12	RNA Extraction Buffer	12 ml	
R1003-2-50	RNA Extraction Buffer	50 ml	
R1003-2-100	RNA Extraction Buffer	100 ml	
R1003-3-6	RNA Wash Buffer	6 ml	
R1003-3-12	RNA Wash Buffer	12 ml	
R1003-3-24	RNA Wash Buffer	24 ml	
R1003-3-48	RNA Wash Buffer	48 ml	
R1007	Pinpoint™ Slide RNA Isolation System II	50 preps.	120
R1007-1	RNA Digestion Buffer	1.2 ml	
R1011	Zymoclean™ Gel RNA Recovery Kit	50 preps.	110
R1011-1-50	RAD Buffer	50 ml	
R1013	DNA-Free RNA Kit™	50 preps.	109
R1013-2-25	RNA Binding Buffer	25 ml	
R1013-2-50	RNA Binding Buffer	50 ml	
R1013-2-100	RNA Binding Buffer	100 ml	
R1013-2-1000	RNA Binding Buffer	1000 ml	
R1014	DNA-Free RNA Kit™	200 preps.	109
R1015	RNA Clean & Concentrator™-5	50 preps.	108

Cat. No.	Description	Size	Page
R1016	RNA Clean & Concentrator™-5	200 preps.	108
R1017	RNA Clean & Concentrator™-25	50 preps.	108
R1018	RNA Clean & Concentrator™-25	100 preps.	108
R1019	RNA Clean & Concentrator™-100	25 preps.	108
R1020	ZR Whole-Blood RNA MiniPrep™	50 preps.	118
R1020-1-50	ZR RNA Buffer	50 ml	
R1020-1-100	ZR RNA Buffer	100 ml	
R1020-1-200	ZR RNA Buffer	200 ml	
R1020-2-12	RNA Pre-wash Buffer	12 ml	
R1020-2-25	RNA Pre-wash Buffer	25 ml	
R1020-2-50	RNA Pre-wash Buffer	50 ml	
R1020-2-100	RNA Pre-wash Buffer	100 ml	
R1021	ZR Whole-Blood RNA MiniPrep™	100 preps.	118
R1022	ZR-96 Whole-Blood RNA™	2 x 96 preps.	118
R1022-1-50	Blood RNA Buffer	50 ml	
R1022-1-100	Blood RNA Buffer	100 ml	
R1022-2-50	RBC Lysis Buffer	50 ml	
R1022-2-100	RBC Lysis Buffer	100 ml	
R1034	ZR Viral RNA Kit™	50 preps.	117
R1034-1-50	ZR Viral RNA Buffer	50 ml	
R1034-1-100	ZR Viral RNA Buffer	100 ml	
R1035	ZR Viral RNA Kit™	200 preps	117
R1038	ZR Urine RNA Isolation Kit™	20 preps.	119
R1038-1-20	RNA Extraction Buffer Plus	20 ml	
R1038-1-50	RNA Extraction Buffer Plus	50 ml	
R1039	ZR Urine RNA Isolation Kit™	50 preps.	119
R1040	ZR-96 Viral RNA Kit™	2 x 96 preps.	117
R1041	ZR-96 Viral RNA Kit™	4 x 96 preps.	117
R1050	*Quick-RNA*™ MicroPrep	50 preps.	116
R1051	*Quick-RNA*™ MicroPrep	200 Preps	116
R1052	ZR-96 *Quick-RNA*™	2 x 96 preps.	116
R1053	ZR-96 *Quick-RNA*™	4 x 96 preps.	116
R1054	*Quick-RNA*™ MiniPrep	50 preps.	116
R1055	*Quick-RNA*™ MiniPrep	200 preps.	116
R1056	*Quick-RNA*™ MidiPrep	25 preps.	116
R1060-1-50	RNA Lysis Buffer	50 ml	
R1060-1-100	RNA Lysis Buffer	100 ml	
R1060-2-10	RNA Prep Buffer	10 ml	
R1060-2-25	RNA Prep Buffer	25 ml	
R1070	ZR small-RNA™ PAGE Recovery Kit	20 preps.	111
R1070-1-10	RNA Recovery Buffer	10 ml	
R1070-2-20	RNA MAX Buffer	20 ml	
R1080	ZR-96 RNA Clean & Concentrator™	2 x 96 preps.	108
R1090	ZR small-RNA™ Ladder	10 µg	127
R1100	RNA Shield™ Purification Kit + 50 ml RNA Shield™	50 preps.	126
R1100-50	RNA Shield™	50 ml	126
R1100-250	RNA Shield™	250 ml	126
R1101	RNA Shield™ Purification Kit	50 preps.	126
R2010	ZR Fungal/Bacterial RNA MicroPrep™	50 preps.	124
R2014	ZR Fungal/Bacterial RNA MiniPrep™	50 preps.	124
R2024	ZR Plant RNA MiniPrep™	50 preps.	125

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R2030	ZR Tissue & Insect RNA MicroPrep™	50 preps.	125
R2040	ZR Soil/Fecal RNA MicroPrep™	50 preps.	124
R2040-1-50	S/F RNA Lysis Buffer	50 ml	
R2050	Direct-zol™ RNA MiniPrep	50 preps.	114
R2050-1-50	TRI Reagent®	50 ml	
R2050-1-100	TRI Reagent®	100 ml	
R2050-2-40	Direct-zol™ RNA PreWash	40 ml	
R2050-2-160	Direct-zol™ RNA PreWash	160 ml	
R2051	Direct-zol™ RNA MiniPrep + TRI Reagent®	50 preps.	114
R2052	Direct-zol™ RNA MiniPrep	200 preps.	114
R2053	Direct-zol™ RNA MiniPrep + TRI Reagent®	200 preps.	114
R2054	Direct-zol™-96 RNA ™	2 x 96 preps.	114
R2055	Direct-zol™-96 RNA + TRI Reagent®	2 x 96 preps.	114
R2056	Direct-zol™-96 RNA	4 x 96 preps.	114
R2057	Direct-zol™-96 RNA + TRI Reagent®	4 x 96 preps.	114
R2060	Direct-zol™ RNA MicroPrep	50 preps.	114
R2061	Direct-zol™ RNA MicroPrep + TRI Reagent®	50 preps.	114
R2062	Direct-zol™ RNA MicroPrep	200 preps.	114
R2063	Direct-zol™ RNA MicroPrep + TRI Reagent®	200 preps.	114
R2100	Direct-zol™-96 MagBead RNA	2 x 96 preps.	115
R2100-1-5	Direct-zol Binding Buffer	5 ml	
R2100-1-10	Direct-zol Binding Buffer	10 ml	
R2100-1-20	Direct-zol Binding Buffer	20 ml	
R2100-2-200	Direct-zol MagBead PreWash	200 ml	
R2101	Direct-zol™-96 MagBead RNA + TRI Reagent®	2 x 96 preps.	115
R2102	Direct-zol™-96 MagBead RNA	4 x 96 preps	115
R2103	Direct-zol™-96 MagBead RNA + TRI Reagent®	4 x 96 preps	115
R2104	Direct-zol™-96 MagBead RNA	8 x 96 preps	115
R2105	Direct-zol™-96 MagBead RNA + TRI Reagent®	8 x96 preps	115
S1001	Rattler™ Plating Beads, 230 g	1 bottle	172
S1001-5	Rattler™ Plating Beads, 230 g	5 bottles	172
S1001-B	Rattler™ Plating Beads - bulk format (non-sterile)	25 kg bag	172
S5001	Vortex-Genie® 2 (120V)	1 unit	172
S5001-1	Microtube Foam Inserts	2 units	172
S5001-2	Microplate Foam Inserts	2 units	172
S5001-3	29-37 mm Tube Foam Inserts	2 units	172
S5001-4	Pop-off Cup	1 unit	172
S5001-5	Horizontal 50 ml Tube Holder	1 unit	173
S5001-6	Horizontal 15 ml Tube Holder	1 unit	173
S5001-7	Horizontal Microtube Holder	1 unit	173
S5002	Vortex-Genie® 2 (230V, Euro plug)	1 unit	172
S5003	Digital Vortex-Genie® 2 (120V)	1 unit	172
S5004	Digital Vortex-Genie® 2 (230V, Euro plug)	1 unit	172
S5005	MicroPlate Genie® (120V)	1 unit	173
S5006	MicroPlate Genie® (230V, Euro plug)	1 unit	173
S5007	Roto-Shake Genie® (120V)	1 unit	173
S5008	Roto-Shake Genie® (230V, Euro plug)	1 unit	173
S5009	MagStir Genie® (120V)	1 unit	173
S5010	MagStir Genie® (230V, Euro plug)	1 unit	173
S6001-2-120	Disruptor Genie® (120V)	1 unit	170
S6001-2-230	Disruptor Genie® (230V, Euro plug)	1 unit	170

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S6002-50	ZR BashingBead™ Lysis Tubes (0.5 mm)	50 tubes	167
S6002-96-1	ZR-96 BashingBead™ Lysis Rack (0.5 mm)	1 rack	169
S6002-96-2	ZR-96 BashingBead™ Lysis Rack (2 mm)	1 rack	169
S6003-50	ZR BashingBead™ Lysis Tubes (2 mm)	50 tubes	167
S6005	FastPrep®-24	1 unit	170
S6005-1	HiPrep™ Attachment (48 x 2 ml tubes)	1 unit	170
S6005-2	CoolPrep™ Attachment (24 x 2 ml tubes)	1 unit	170
S6005-3	TeenPrep™ Attachment (12 x 15 ml tubes)	1 unit	170
S6005-4	BigPrep™ Attachment (2 x 50 ml tubes)	1 unit	170
S6005-5	FastPrep® European AC Cord	1 unit	170
S6005-6	QuickPrep™ Adapter	1 unit	170
S6006	2010 Geno/Grinder®	1 unit	171
S6006-1	2 ml Tube Holder/Cryo Block Assembly	2 blocks	171
S6006-2	15 ml Tube Holder/Cryo Block Assembly	2 blocks	171
S6006-3	50 ml Tube Holder/Cryo Blcok Assembly	2 blocks	171
S6006-10	Large Capacity Clamp Assembly	1 unit	171
S6007-1	BBX24 Bullet Blender™	1 unit	170
S6007-2	BBX24B Bullet Blender™ Blue with Cooling Fan	1 unit	170
S6007-3	BB 50DX Bullet Blender™ 50DX with Cooling Fan	1 unit	170
S6008	FastPrep-96	1 unit	170
S6010	ZR BashingBead™ Lysis/Filtration Tubes with 0.5 mm Beads (50 ml)	25 pack	
S6011	ZR BashingBead™ Lysis/Filtration Tubes with 2.0 mm Beads (50 ml)	25 pack	
S6020	*Xpedition*™ Sample Processor	1 unit	170
S6020-1	Lithium-Ion Battery	1 unit	
S6020-2	Lithium-Ion Battery Charging Station	1 unit	
S6020-3	Power Adaptor and Converter	1 unit	
T2001	Frozen-EZ Yeast Transformation II Kit™	120 rxns.	140
T2002	Frozen-EZ Solution 1	60 ml	
T2003	Frozen-EZ Solution 2	6 ml	
T2004	Frozen-EZ Solution 3	60 ml	
T3001	Z-Competent™ *E. coli* Transformation Kit	up to 20 ml	134
T3001-2-10	Z-Competent™ 2X Stock Wash Buffer	10 ml	
T3001-2-30	Z-Competent™ 2X Stock Wash Buffer	30 ml	
T3001-3-10	Z-Competent™ 2X Stock Competent Buffer	10 ml	
T3001-3-30	Z-Competent™ 2X Stock Competent Buffer	30 ml	
T3001-4-20	Z-Competent™ Dilution Buffer	20 ml	
T3001-4-60	Z-Competent™ Dilution Buffer	60 ml	
T3002	Z-Competent™ *E. coli* Transformation Buffer Set	up to 60 ml	134
T3003	Z-Competent™ *E. coli*–JM109	10 x 100 µl	132
T3005	Z-Competent™ *E. coli*–JM109	96 x 50 µl	132
T3007	Z-Competent™ *E. coli*–Zymo 5a	10 x 100 µl	132
T3009	Z-Competent™ *E. coli*–Zymo 5a	96 x 50 µl	132
T3011	Z-Competent™ *E. coli*–HB101	10 x 100 µl	132
T3013	Z-Competent™ *E. coli*–HB101	96 x 50 µl	132
T3015	Z-Competent™ *E. coli*–C600	10 x 100 µl	132
T3017	Z-Competent™ *E. coli*–TG1	10 x 100 µl	132
T3019	Z-Competent™ *E. coli*–Zymo 10B	10 x 100 µl	132
T3020	Z-Competent™ *E. coli*–Zymo 10B	96 x 50 µl	132
T3021	Z-Competent™ *E. coli*–XJa Autolysis™	10 x 100 µl	133

Cat. No.	Description	Size	Page
T3031	Z-Competent™ *E. coli*–XJa(DE3) Autolysis™	10 x 100 µl	133
T3041	Z-Competent™ *E. coli*–XJb Autolysis™	10 x 100 µl	133
T3051	Z-Competent™ *E. coli*–XJb(DE3) Autolysis™	10 x 100 µl	133
T5021	XJa Autolysis™, Glycerol Stock	1 tube	133
T5031	XJa(DE3) Autolysis™, Glycerol Stock	1 tube	133
T5041	XJb Autolysis™, Glycerol Stock	1 tube	133
T5051	XJb(DE3) Autolysis™, Glycerol Stock	1 tube	133
W1001-1	DNase/RNase-free Water	1 ml	
W1001-4	DNase/RNase-free Water	4 ml	
W1001-6	DNase/RNase-free Water	6 ml	
W1001-10	DNase/RNase-free Water	10 ml	
W1001-30	DNase/RNase-free Water	30 ml	
X1001-5	5-bromo-4-chloro-3-indolyl β-D-galactopyranoside (X-GAL)	5 ml	157
X1001-25	5-bromo-4-chloro-3-indolyl β-D-galactopyranoside (X-GAL)	5 x 5 ml	157
Y1001	a-Factor Mating Pheromone	240 µl	144
Y1002	Yeast Protein Kit	200 preps.	142
Y1002-1-100	Y-Lysis Buffer	100 ml	
Y1002-1-6	Y-Lysis Buffer	6 ml	
Y1003-50	YPD Plus™	50 ml	141
Y1003-100	YPD Plus™	2 x 50 ml	141

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