ZYMO RESEARCH

The Beauty of Science is to Make Things Simple®

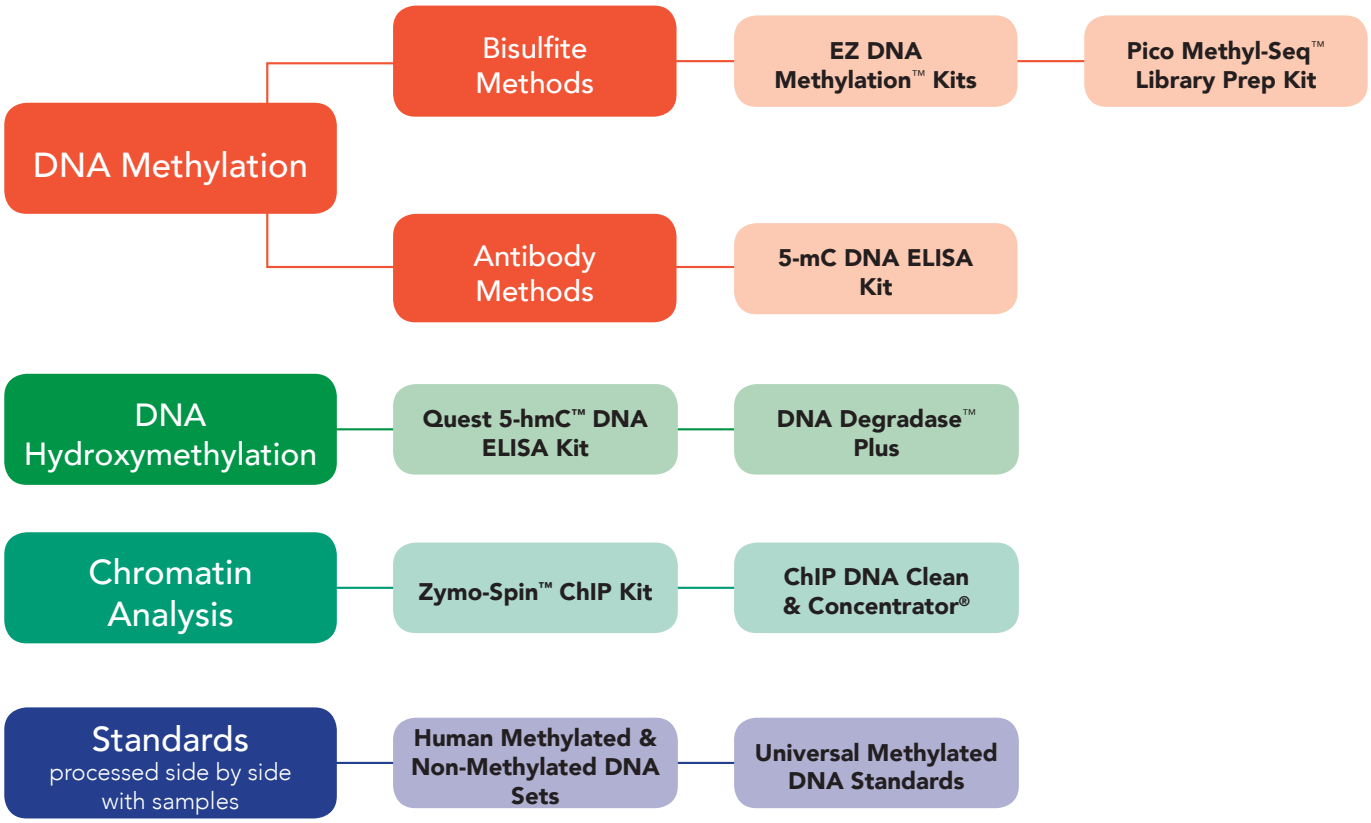
Epigenetics Made Simple

Overview

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

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

Quick Guide of Our Most Popular Epigenetics Products



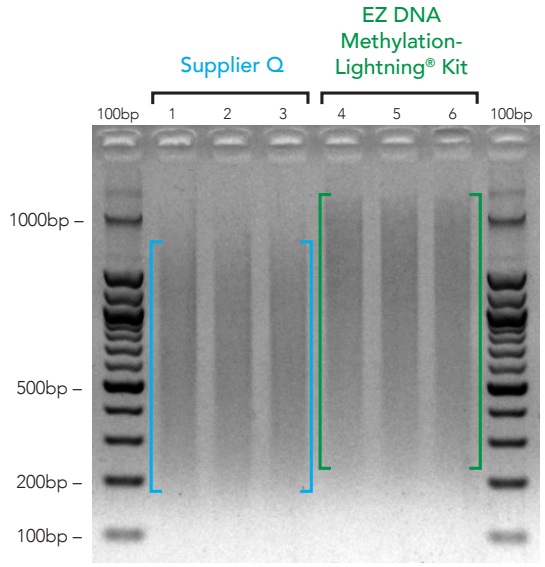
Learn more at www.zymoresearch.com/epigenetics-products

EZ DNA Methylation-Lightning® Kits

Highlights

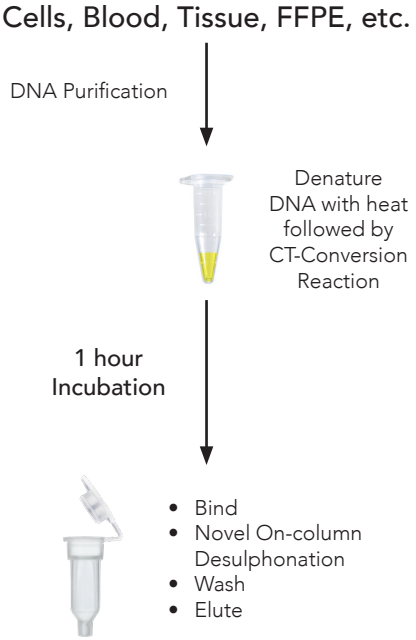
- Fastest method for complete bisulfite conversion of DNA for methylation analysis (1.5 hours).
- Ready-to-use conversion reagent is added directly to DNA.
- Highest conversion efficiency (>99.5%) with the lowest amount of DNA fragmentation.
- High-yield, converted DNA is ideal for PCR, MSP, array, bisulfite and Next-Generation sequencing.

High-quality DNA That is More Intact



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

Bisulfite-converted DNA in Only 1.5 Hours!



Ready for PCR, or other sensitive downstream applications

Product	Cat. No.	Size
EZ DNA Methylation-Lightning® Kit	D5030T	10 rxns.
	D5030	50 rxns.
	D5031	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 Kit	D5046	4 x 96 rxns.
	D5047	8 x 96 rxns.

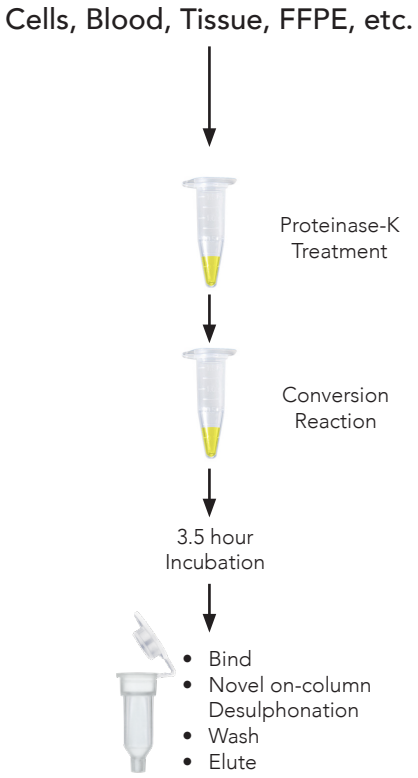
Learn more and view additional formats at www.zymoresearch.com/epigenetics-products

EZ DNA Methylation-Direct™ Kits

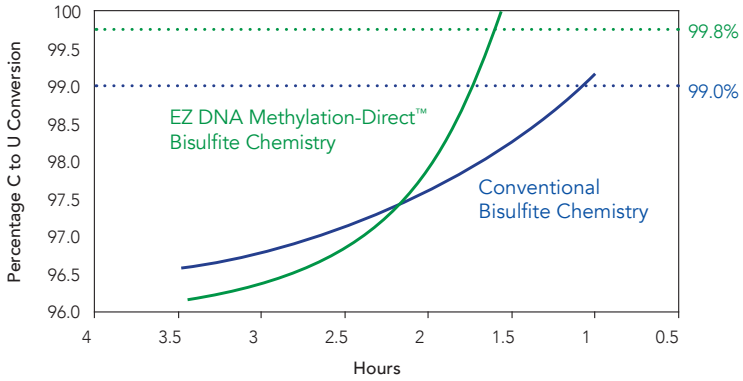
Highlights

- 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.
- Low fragmentation.
- Includes Proteinase K for tissue digestion.
- High-yield, converted DNA ideal for PCR, MSP, array, bisulfite and Next-Generation sequencing.

Streamlined, Innovative Workflow



Significantly Improved 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. This data shows that EZ DNA Methylation-Direct™ bisulfite chemistry improves the rate and extent (> 99.8%) of C to U conversion of DNA as compared to conventional bisulfite chemistry.

Learn more and view additional formats at www.zymoresearch.com/epigenetics-products

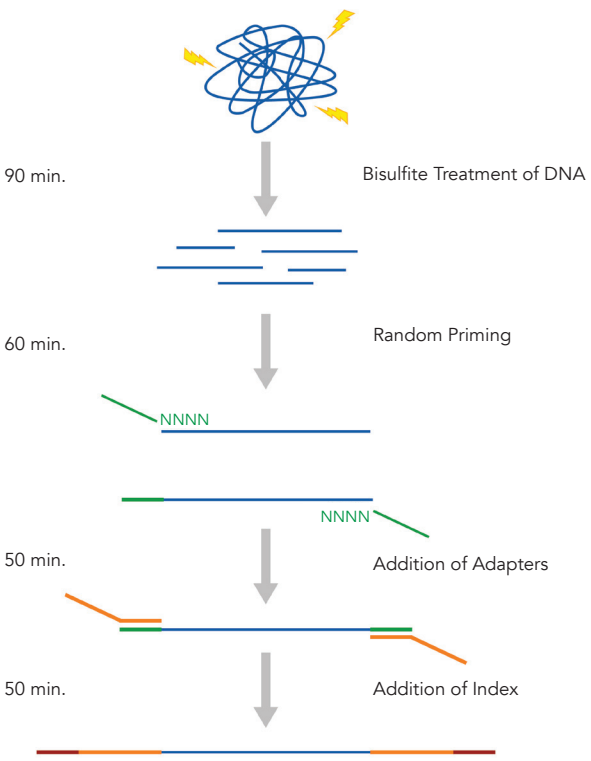
Product	Cat. No.	Size
EZ DNA Methylation-Direct™ Kit	D5020	50 rxns.
	D5021	200 rxns.
EZ-96 DNA Methylation-Direct™ Kit (shallow-well)	D5022	2 x 96 rxns.
EZ-96 DNA Methylation-Direct™ Kit (deep-well)	D5023	2 x 96 rxns.
EZ-96 DNA Methylation-Direct™ Magprep Kit	D5044	4 x 96 rxns.
	D5045	8 x 96 rxns.

Pico Methyl-Seq™ Library Prep Kit

Highlights

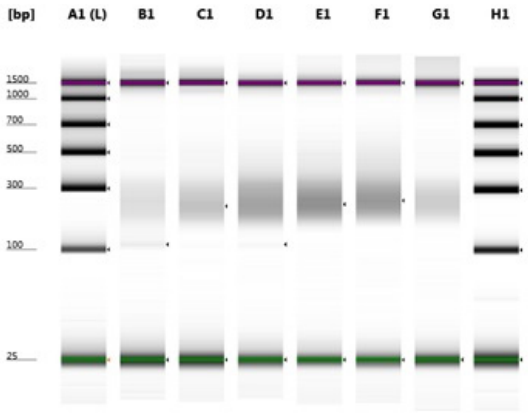
- All-inclusive kit for bisulfite conversion followed by Whole Genome Bisulfite Sequencing (WGBS) library preparation.
- Accommodates ultra-low DNA input (down to 10 pg) and compatible with FFPE samples.
- Simple, ligation- and gel-free workflow can be completed in a few hours.

Streamlined, Innovative Workflow



Pico Methyl-Seq libraries ready for sequencing

High-quality Library Preparation



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

Product	Cat. No.	Size
Pico Methyl-Seq™ Library Prep Kit	D5455	10 preps.
	D5456	25 preps.

Learn more and view additional formats at www.zymoresearch.com/epigenetics-products

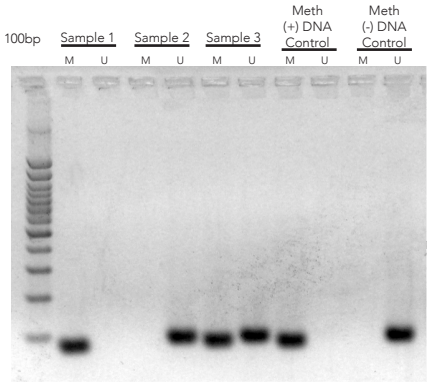
Epigenetic Standards

Human Methylated & Non-Methylated DNA Set

Highlights

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

Ideal Controls for BSP and MSP Analysis



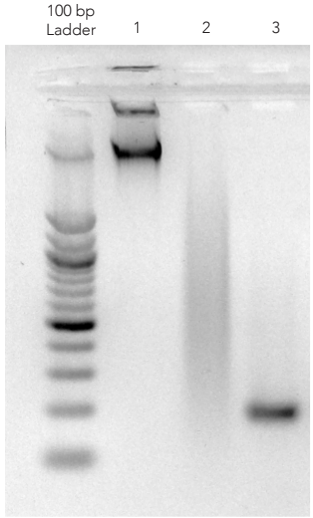
Example MSP experiment using MSP designed primers for RASSF1. Sample 1 is positive for a Methylated Template. Sample 2 is positive for a Non-Methylated Template and Sample 3 contains Methylated and Non-Methylated Templates. MSP experiment also shows proper controls: Meth (+) DNA Control D5014-2 Human Methylated DNA, Meth (-) DNA Control D5014-1 Human Non-methylated DNA. 2% Agarose Gel, 130V for 35 mins. M = Methylated Template, U = Non-Methylated Template

Universal Methylated DNA Standards

Highlights

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

Assess Bisulfite Conversion Efficiency and Primer Design



Gel electrophoresis depicting genomic DNA, bisulfite converted genomic DNA and genomic DNA amplified with bisulfite-specific primers. Lane 1 – Input DNA: Universal Methylated Human DNA Standard (D5011). Lane 2- Bisulfite converted Universal Methylated Human DNA (D5011) using EZ-DNA Methylation Direct (D5020). Lane 3 – Universal Methylated Human DNA (D5011) bisulfite converted and amplified with supplied hMLH1 control primers.

Product	Cat. No.	Size
Human WGA Methylated & Non-methylated DNA Set	D5013	1 set
Human Methylated & Non-methylated DNA Set	D5014	1 set
Universal Methylated Human DNA Standard	D5011	1 set
Universal Methylated Mouse DNA Standard	D5012	1 set

Learn more and view additional formats at www.zymoresearch.com/epigenetics-products

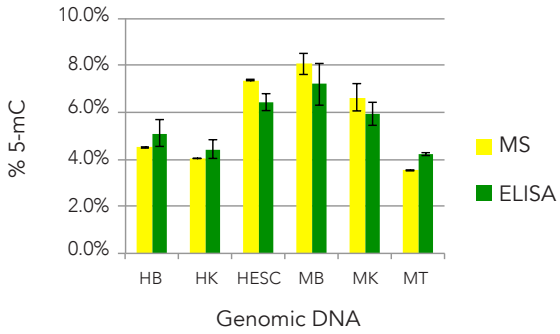
ELISA Kits

5-mC DNA ELISA Kit

Highlights

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

Specific Quantitation of 5-mC DNA



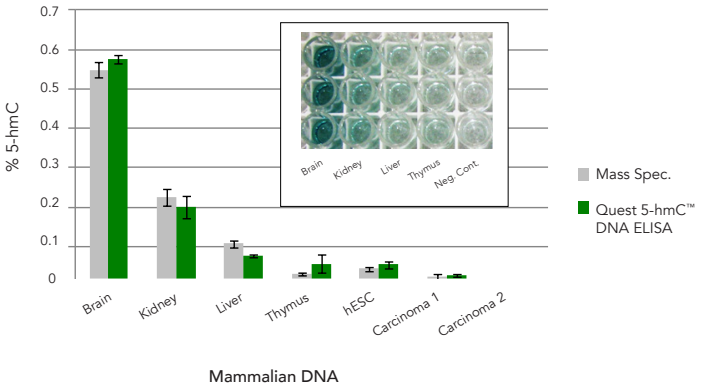
The 5-mC DNA ELISA Kit can quantify 5-mC in numerous DNA samples with close correlation to LC-MS analysis. Percent 5-mC was calculated for the following genomic DNA samples: human brain (HB), human kidney (HK), human embryonic stem cell (HESC), mouse brain (MB), mouse kidney (MK), and mouse testes (MT).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

Quest 5-hmC™ DNA ELISA Kit

Highlights

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

Specific Quantitation of 5-hmC DNA



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
5-mC DNA ELISA Kit	D5325	1 x 96 rxns.
	D5326	2 x 96 rxns.
Quest 5-hmC™ DNA ELISA Kit	D5425	1 x 96 rxns.
	D5426	2 x 96 rxns.

Learn more and view additional formats at www.zymoresearch.com/epigenetics-products

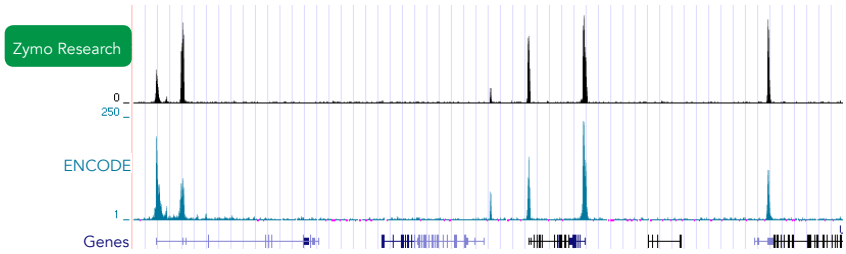
Chromatin Analysis

Zymo-Spin™ ChIP Kit

Highlights

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

High-quality ChIP DNA Recovery

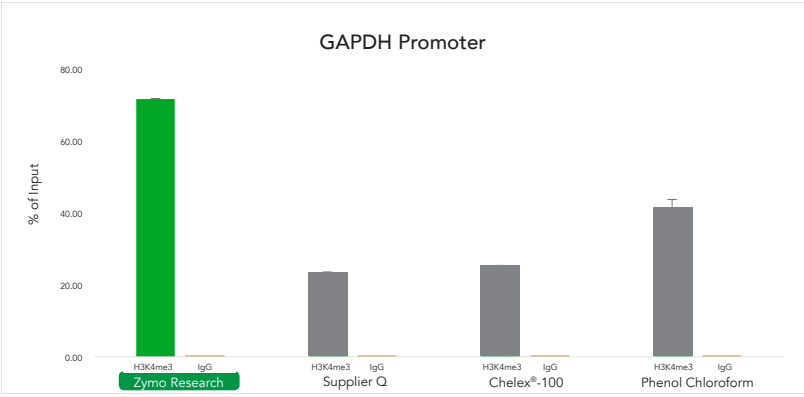


ENCODE Quality ChIP Workflow: Browser tracks depicting H3K4me3 ChIP-Seq assay using the Zymo-Spin™ ChIP Kit. Peaks overlap the same sites identified at the Broad Institute of MIT and Harvard as part of the ENCODE project.

ChIP DNA Clean & Concentrator® Kits

Highlights

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



Efficient DNA Clean-up from ChIP Protocols

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

Learn more and view additional formats at www.zymoresearch.com/epigenetics-products

Product	Cat. No.	Size
Zymo-Spin™ ChIP Kit	D5209	10 preps.
	D5210	25 preps.
ChIP DNA Clean & Concentrator® (uncapped columns)	D5201	50 preps.
ChIP DNA Clean & Concentrator® (capped columns)	D5205	50 preps.

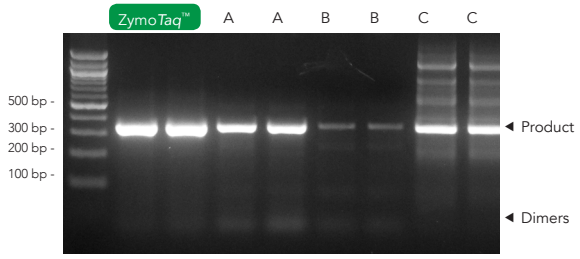
Enzymes

*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.

Reduce Non-specific PCR Product Formation



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.

dsDNA Shearase™ Plus

Highlights

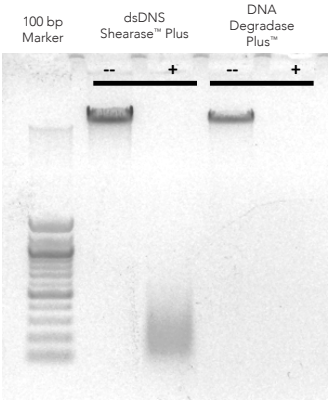
- The simplest method for generating random-ended dsDNA fragments.
- Fragment size is conveniently controlled by adjusting the enzyme concentration.
- dsDNA Shearase™ Plus-generated fragments are ideal for library construction, Next-Generation sequencing, and methylated DNA immunoprecipitation (MeDIP).

DNA Degradase™ & DNA Degradase Plus™

Highlights

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

Enzymes for Effective DNA Fragmentation and Degredation



Using standard reaction conditions, 250ng of Hela genomic DNA was incubated with either dsDNA Shearase™ Plus or DNA Degradase Plus™ and resolved on a 1.4% agarose gel. DNA incubated with dsDNA Shearase™ Plus appeared as a smear between 100-500 bp. No detectable DNA was observed after incubation with DNA Degradase Plus™. 250ng of non-digested Hela gDNA was included as a control with each reaction.

Product	Cat. No.	Size
Zymo*Taq*™ DNA Polymerase	E2001	50 rxns.
	E2002	200 rxns.
Zymo*Taq*™ PreMix	E2003	50 rxns.
	E2004	200 rxns.
Zymo*Taq*™ qPCR PreMix	E2054	50 rxns.
	E2055	200 rxns.
Quest*Taq*™ PreMix	E2050	50 rxns.
	E2051	200 rxns.
Quest*Taq*™ qPCR PreMix	E2052	50 rxns.
	E2053	200 rxns.
dsDNA Shearase™ Plus	E2018-50	50 U
	E2018-200	200 U

Learn more and view additional formats at www.zymoresearch.com/epigenetics-products

Epigenetic Services


Apple
(Malus domestica)


Alligator
(Alligator mississippiensis)


Salmon
(Salmo salar)


Baboon
(Papio anubis)


Opossum
(Didelphimorphia)


Pig
(Sus scrofa domesticus)


Barrel Clover
(Medicago truncatula)


Mouse
(Mus musculus)

Explore Epigenomics

with Next-Gen sequencing services

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


Zebra Finch
(Taeniopygia guttata)


Human
(Homo sapien)


Fruit Fly
(Drosophila melanogaster)


Wine Grape
(Vitis vinifera)


Cow
(Bos taurus)

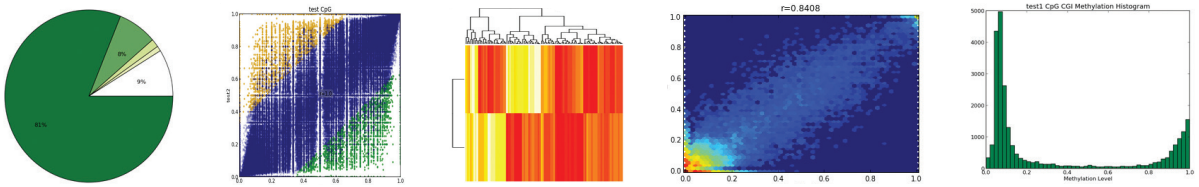

Platypus
(Ornithorhynchus anatinus)


Bean
(Phaseolus vulgaris)


Chicken
(Gallus gallus domesticus)

Genome-wide DNA Methylation Analysis

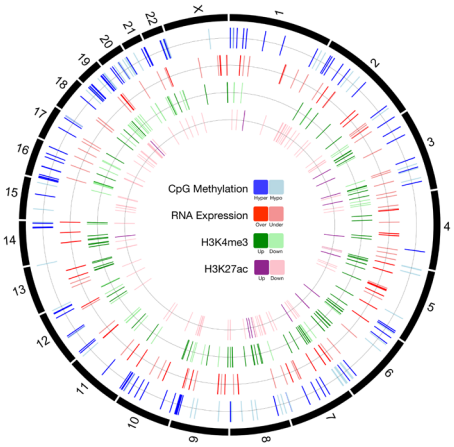
Methyl-Seq services utilize the latest sequencing technologies and outperform popular array-based platforms



Integrated Sequence Data Analysis

Get the Whole Picture!

Simultaneously visualize epigenetic and gene expression data



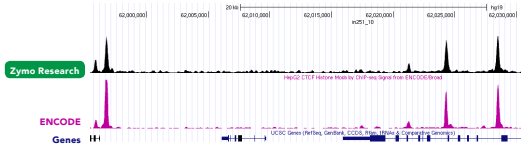
Methyl-Check™

DNA Methylation Validation Platform

Service Option	Targeted Sequencing from Zymo	Pyrosequencing
≥100 - 1,000X coverage per locus?	Yes	No
Analyze 1,000's of loci per sequencing run?	Yes	No
Multiplex Compatibility	Yes	No

ChIP-Seq

Fully customizable services for **chromatin immunoprecipitation** followed by next-generation sequencing



Additional Services: ChIP-Seq RNA-Seq Microbiomics ...and more!

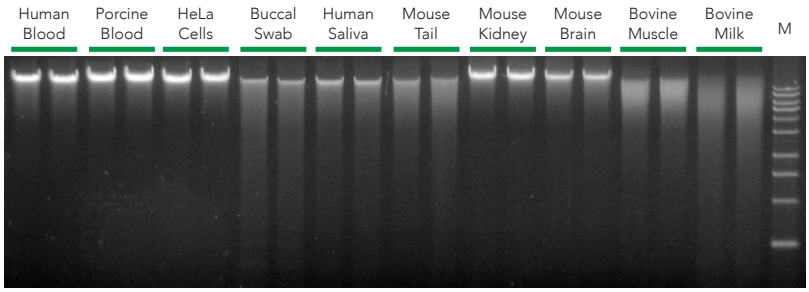
Learn more at www.zymoresearch.com/services

Related Products

Quick-DNA™ Kits

Highlights

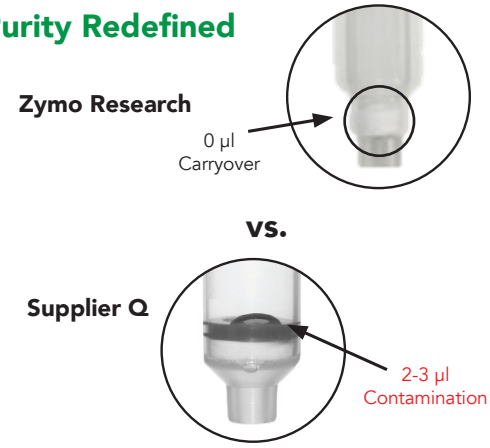
- Extract high-quality DNA for Epigenetic Analysis from any biological fluids, cultured/monolayer cells, or solid tissues.
- Zymo-Spin™ technology ensures DNA is ready for all sensitive downstream applications such as bisulfite conversion, qPCR, sequencing, and arrays.
- Recommended with the EZ DNA Methylation™ family of products.



High-quality DNA from Any Sample

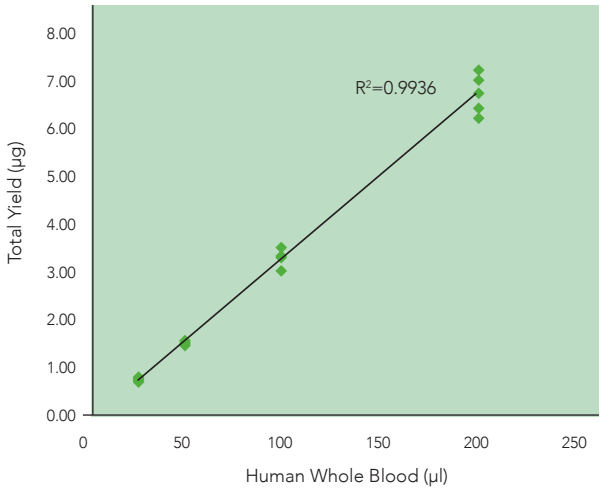
High-quality DNA obtained from a wide range of biological samples using the *Quick*-DNA™ Miniprep Plus Kit. DNA purified using the *Quick*-DNA™ Miniprep Plus Kit is ultra-pure, highly concentrated, and ready for all downstream applications. Input DNA was standardized to 300 ng and analyzed in a 1% (w/v)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

Purity Redefined



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

Reliable & Consistent



DNA Yields Increase Linearly with Increasing Volumes of Human Whole Blood Using the *Quick*-DNA™ Miniprep Plus Kit. Six replicates of 25, 50, 100, and 200 µl of human whole blood were processed.

Product	Cat. No.	Size
Quick-DNA™ Microprep Plus Kit	D4074	50 preps.
Quick-DNA™ Miniprep Plus Kit	D4068T	10 preps.
	D4068	50 preps.
	D4069	200 preps.
Quick-DNA™ Miniprep Kit *(no Proteinase K)*	D3024	50 preps.
	D3025	200 preps.

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Cat. No. B1005 Version 02

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