Products and Technologies

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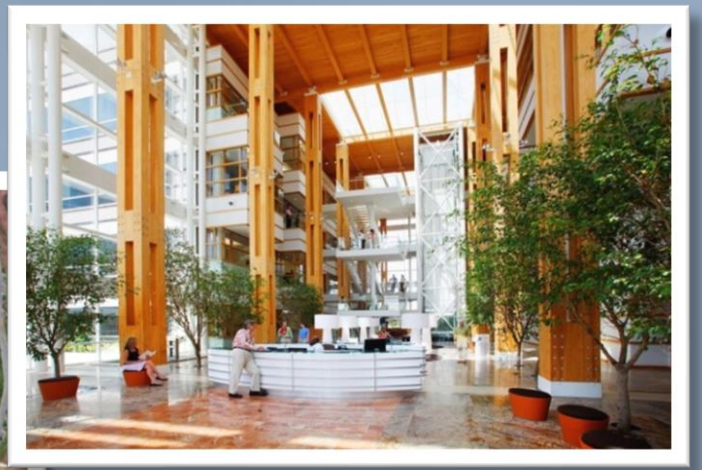
Oct. 2023

About BioDynami

- **Established in 2012**
- **Location**

601 Genome Way, Huntsville Alabama 35806, USA



BioDynami

Product Category

- Next Generation Sequencing (NGS) Library Prep
- Targeted Sequencing
- DNA Fragmentation
- DNA/RNA Purification (Magnetic Beads)
- DNA/RNA Quantification (for Qubit Fluorometer & Microplate Reader)
- DNA Extraction (Magnetic Beads)
- DNA Ladder

Next Generation Sequencing (NGS)

- **Illumina Platform**
  - **NGS Library Prep Kits**
    - NGS DNA Library Prep Flexible Kit
    - NGS DNA Library Prep Kit
    - NGS Low Input DNA Library Prep Kit
    - NGS Cell-free DNA Library Prep Kit
    - ChIP-Seq Library Prep Kit
    - NGS FFPE DNA Library Prep Kit
    - NGS Single stranded DNA Library Prep Kit
    - NGS Ancient DNA Library Prep Kit
    - Bisulfite Sequencing Library Prep Kit
    - Methylation Specific Bisulfite-Seq Library Prep Kit
    - NGS DNA Fragmentation & Library Prep Kit
    - PCR-free NGS DNA Library Prep Kit
    - RNA Seq Library Prep Kit
  - **Multiplexing Index Primers**
    - Multiplexing index primers
    - Multiplexing Unique Dual Index Primers
  - **NGS Library Quantification Standards**
    - NGS Library Quantification Standards with PCR Primers

- **Ion Torrent Platform**
  - **NGS Library Prep Kits**
    - NGS DNA Library Prep Kit
    - NGS DNA Fragmentation & Library Prep Kit
  - **NGS Library Quantification Standards**
    - NGS Library Quantification Standards with PCR Primers

- **MGI Platform**
  - **NGS Library Prep Kits**
    - NGS DNA Library Prep Kit
    - NGS Low Input DNA Library Prep Kit
    - NGS Cell-free DNA Library Prep Kit
    - ChIP-Seq Library Prep Kit
    - NGS FFPE DNA Library Prep Kit
    - NGS DNA Fragmentation & Library Prep Kit
    - RNA Seq Library Prep Kit
  - **MGI NGS Library Circularization**
    - NGS Library Circularization Kit

NGS library prep technology

1 **High Quality**
- High efficiency
- Better coverage
- Limited GC bias

2 **Fast Protocol**
- 1~2 hours protocol
- <10 min of hands-on time

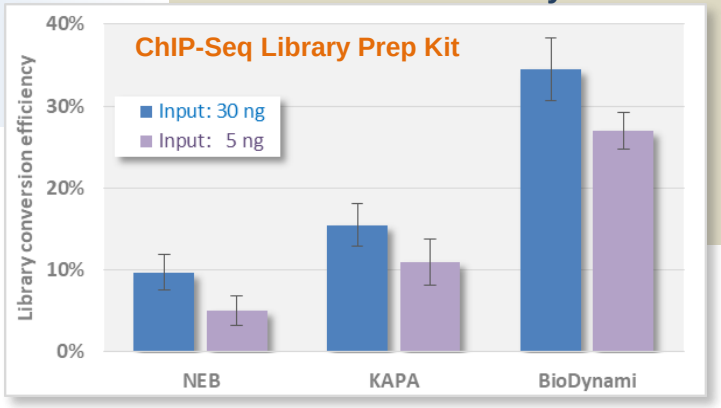
3 **Simple Workflow and Procedure**
- Less steps
- Ready-to-use master mix solution
- Less reaction components

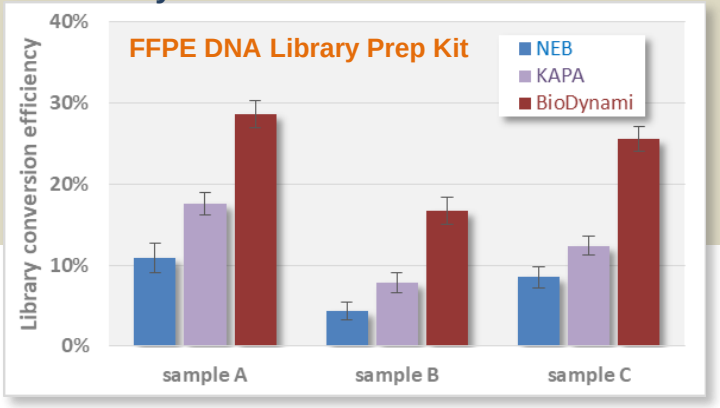
4 **Affordable Price**
- Low cost as compared to other vendors

High Quality

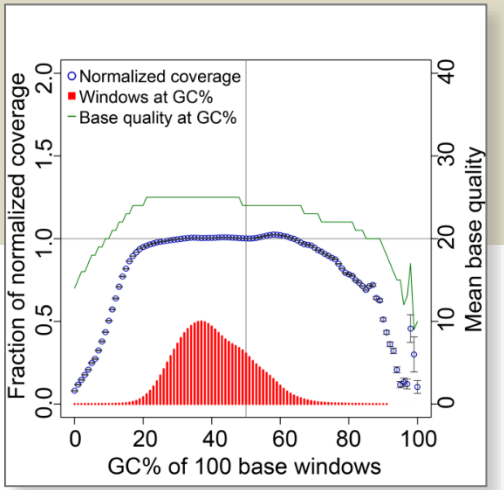
- High efficiency
- Better coverage
- Limited GC bias

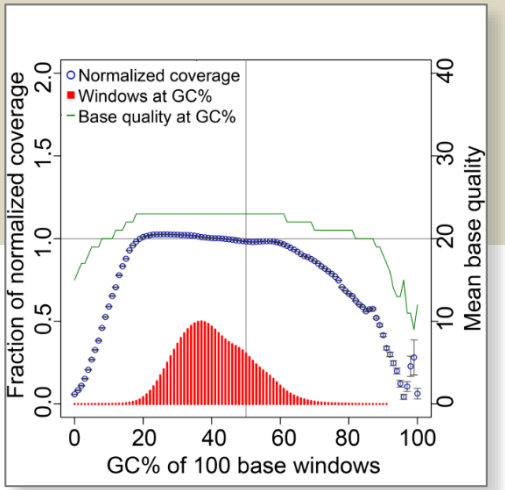
Library Conversion Efficiency

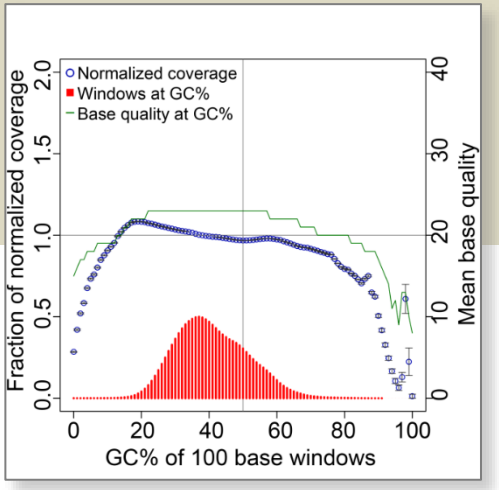




GC bias comparison







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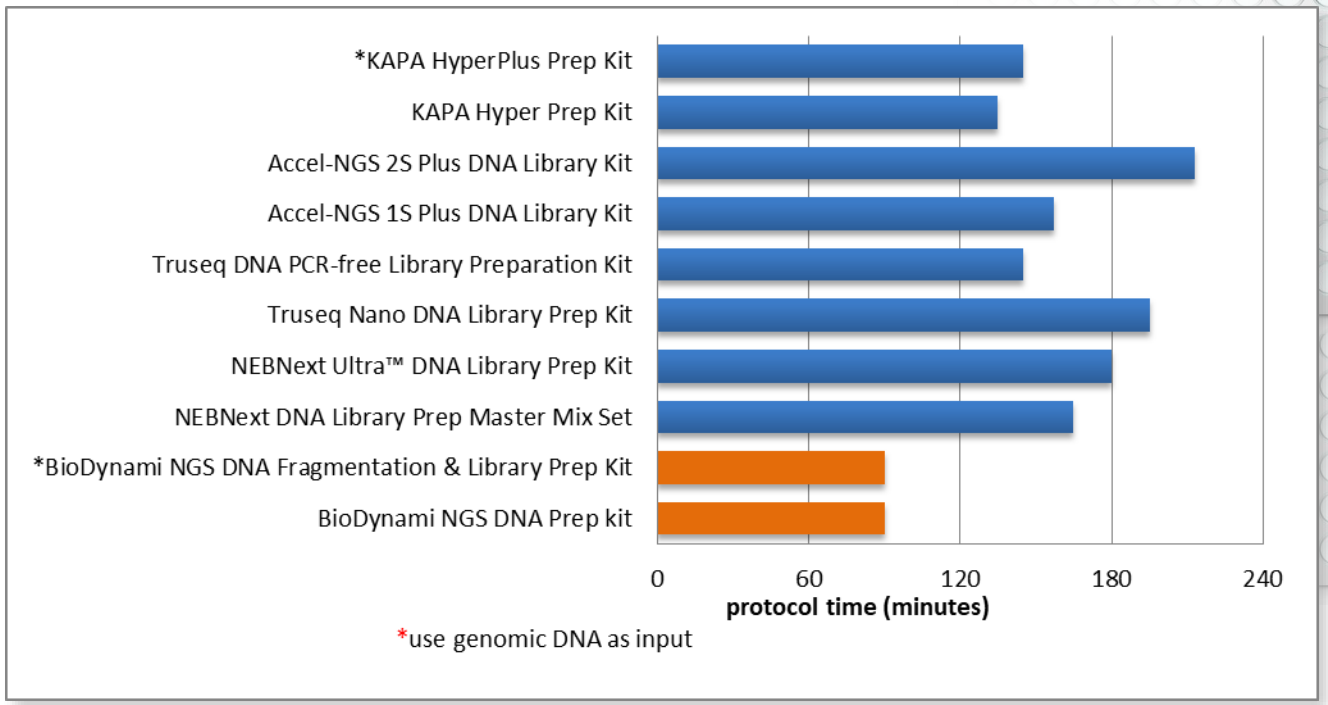
Fast Protocol

- 1~2 hours protocol
- <10 min of hands-on time



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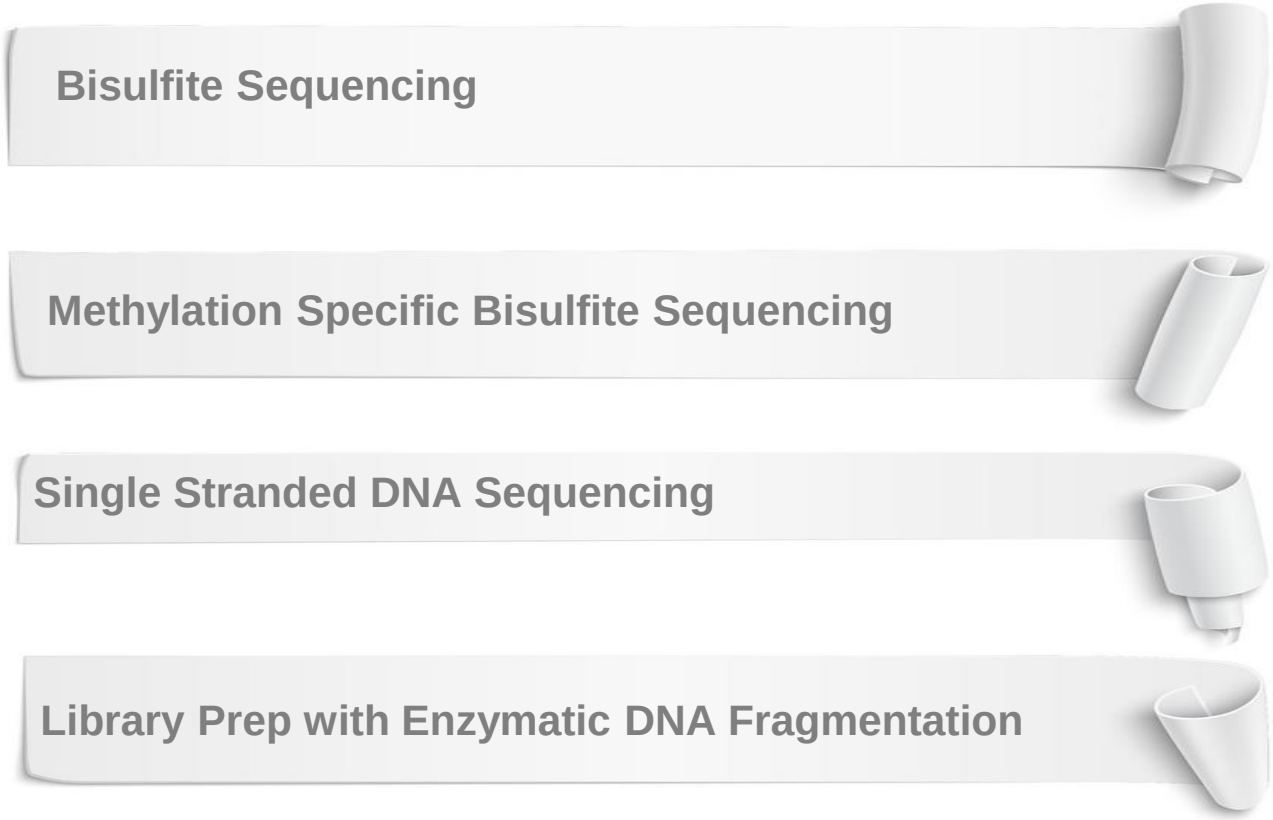
Special NGS applications

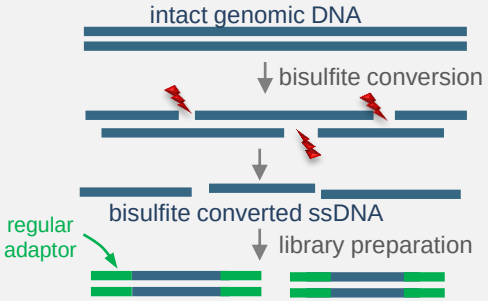


BioDynami

Epigenetics: The differences of Bisulfite-Seq

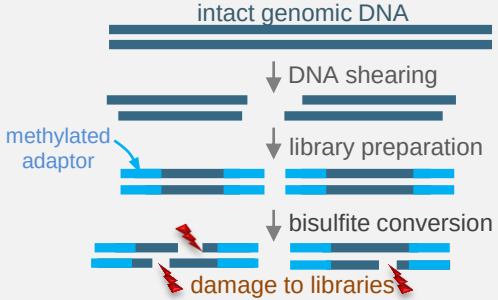
BioDynami kit: Bisulfite conversion first

- No library loss by bisulfite conversion
- No expensive methylated adaptors
- No DNA shearing



Other kits: Library preparation first

- Huge library loss by bisulfite conversion
- Expensive methylated adaptor needed
- Tedious & costly DNA shearing required



BioDynami kit

- 2 reaction steps followed by PCR
- 2 purification steps
- 1.5 hrs protocol
- 10 min hands-on time

Swift Bioscience kit

- 3 reaction steps followed by PCR
- 3 purification steps
- 4 hours protocol
- 50 min hands-on time

The rest of the world

BioDynami

Epigenetics: Focusing on methylated CpG sites

Methylation Specific Bisulfite Sequencing (MSBS): The only technology in the market to sequence methylated CpG sites

MSBS Library Prep Kit

- Enrichment of Methylated CpG sites
- Single-base resolution
- Low cost as compared to whole genome bisulfite sequencing
- 1.5-hour protocol

Comparison of NGS technologies for Epigenetics

	MSBS (BioDynami)	WGBS	RRBS	MeDIP-Seq
Technology	methylation specific bisulfite sequencing	whole genome bisulfite sequencing	reduced representation bisulfite sequencing	methylated DNA immunoprecipitation sequencing
Feature	enrichment of methylated CpG sites	whole genome is sequenced including non-methylated regions	DNA fragments from restirction enzyme digestion is used	antibody based methylated cytosine capture
Bisulfite sequencing	yes	yes	yes	no
Single base resolution	yes	yes	yes	no (150-200 bases)
Low cost	yes	no	yes	yes
Whole methylated CpG coverage	yes	yes	no (only 10%)	yes

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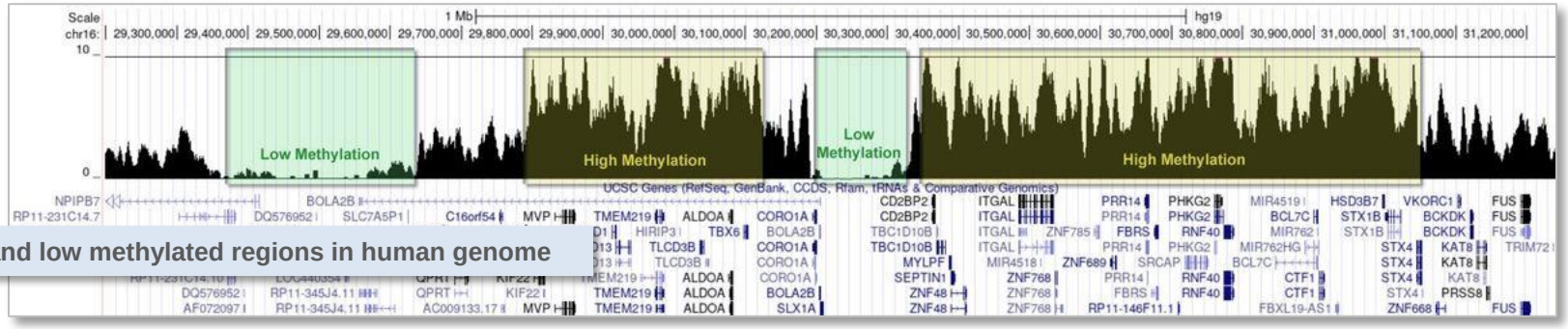
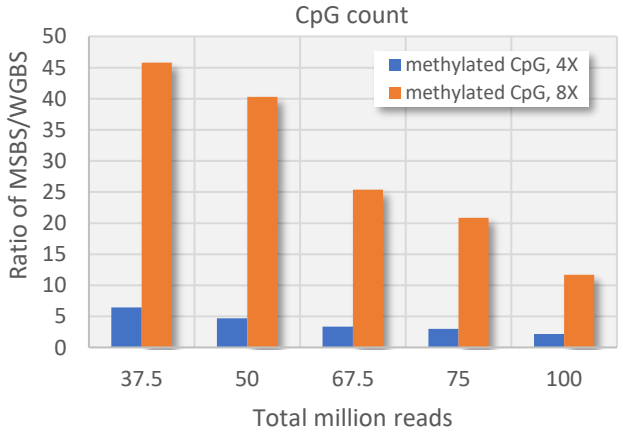
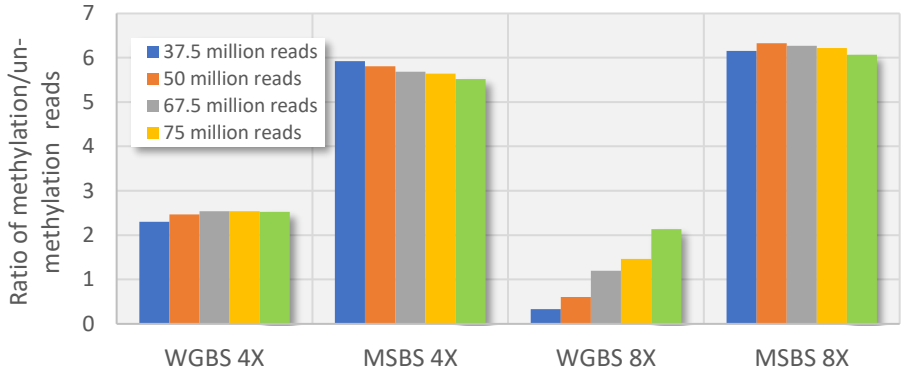
Epigenetics: Focusing on methylated CpG sites

MSBS Library Prep Kit



High and low methylated regions in human genome





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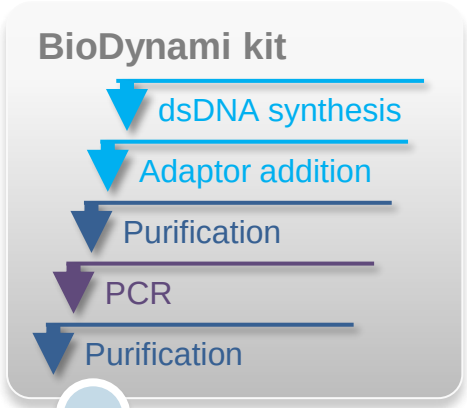
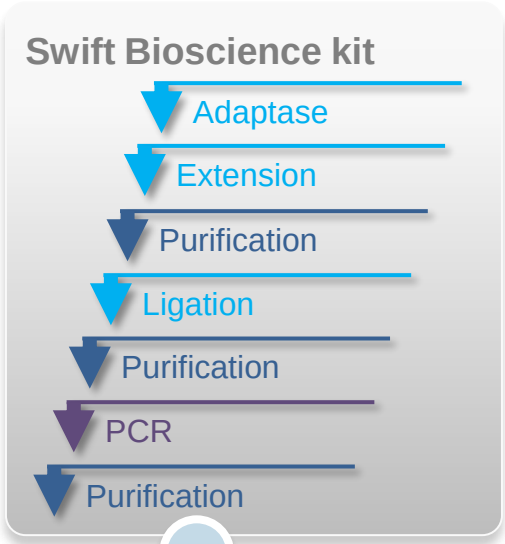
Single stranded DNA sequencing

NGS Single Stranded DNA Library Prep Kit



- 2 simplified purification steps
- 1.5 hrs protocol
- 10 min hands-on time



- 3 purification steps
- 4 hours protocol
- 50 min hands-on time

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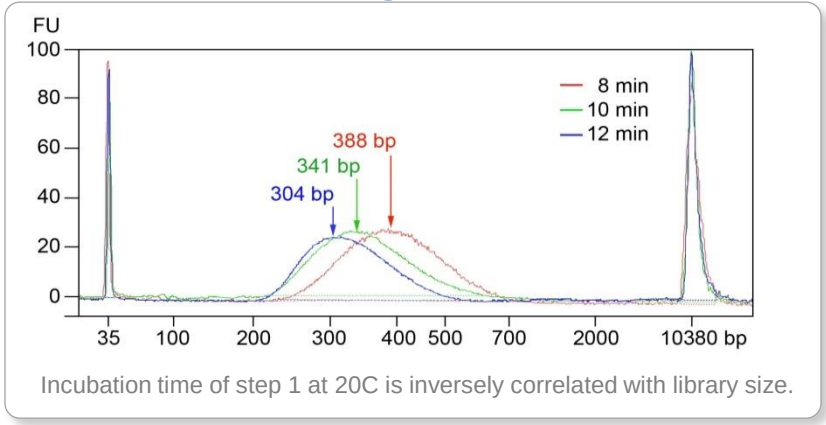
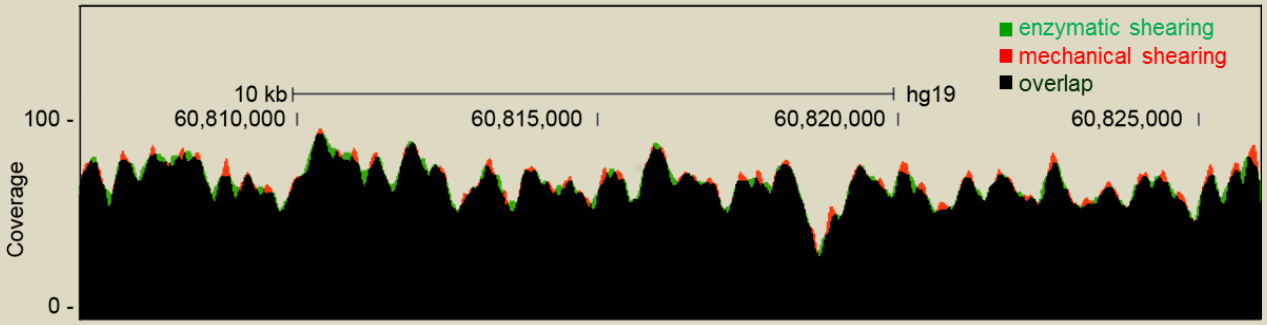
Library prep with enzymatic DNA fragmentation

NGS DNA Fragmentation & Library Prep Kit

- No mechanical DNA shearing required
- Intact genomic DNA as direct input
- 1.5-hour protocol



Incubation time of step 1 at 20C is inversely correlated with library size.



No detectable bias as compared to mechanical shearing

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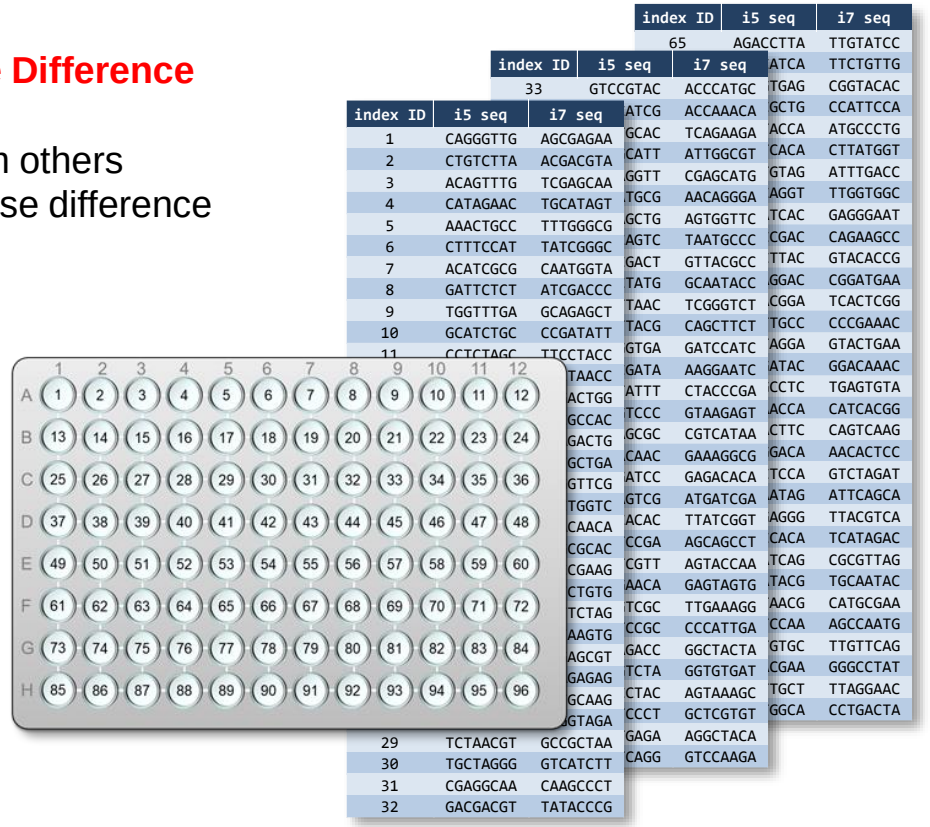
Multiplexing: Unique Dual Index Primers

- Improves sample-identification with **4-Base Difference Index System**
  - Each index has 4 bases different from others
  - Excellent specificity than other's 3-base difference

- 96 pre-mixed unique pairs of index primers

- Minimizes sequencing errors such as:
  - Index hopping
  - Index cross-contamination
  - Mis-assignment of reads
  - Amplification errors
  - De-multiplexing errors



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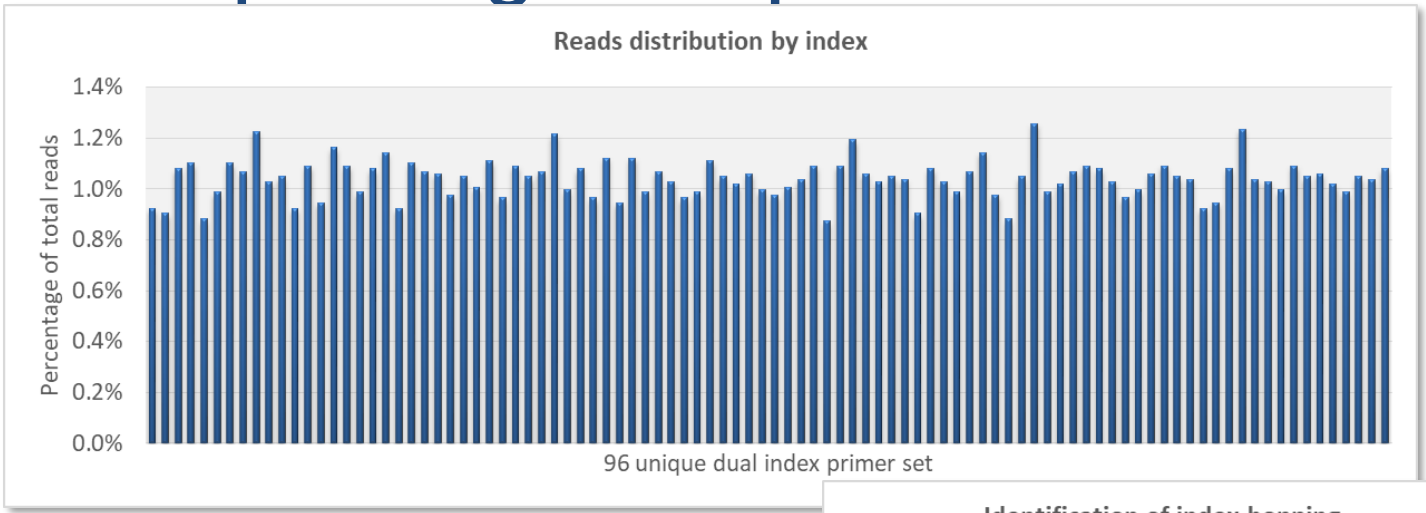
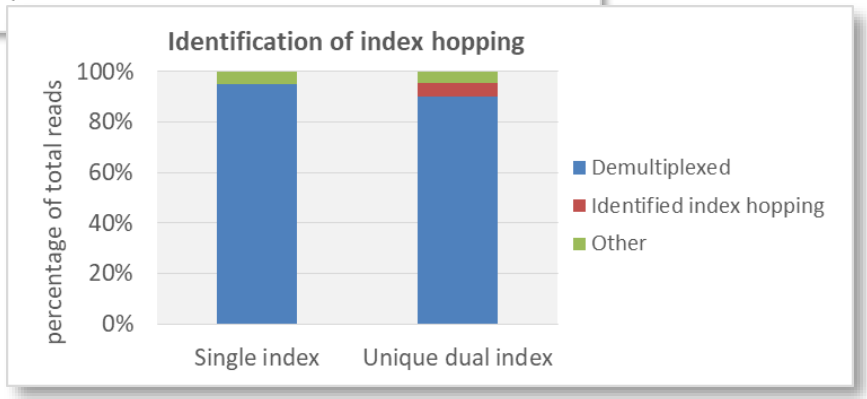
Multiplexing: Unique Dual Index Primers

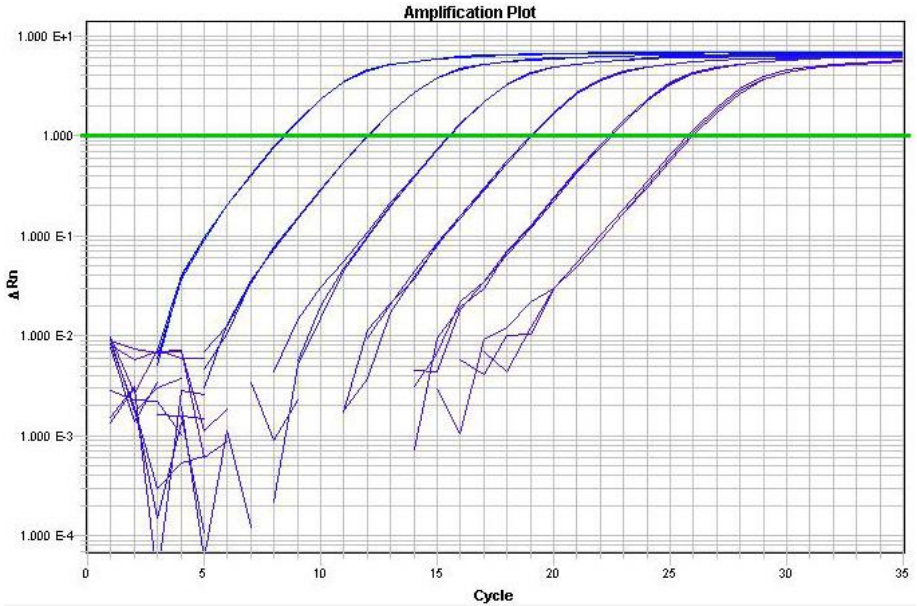


Even distribution of 96 samples using unique dual index primers.

Identification of index hopping by unique dual index.



BioDynami



Library standards amplification

NGS Library Quantification Standards

- Quantify NGS library concentration
- Compatible with any commercial QPCR reagent (SYBR Green based)

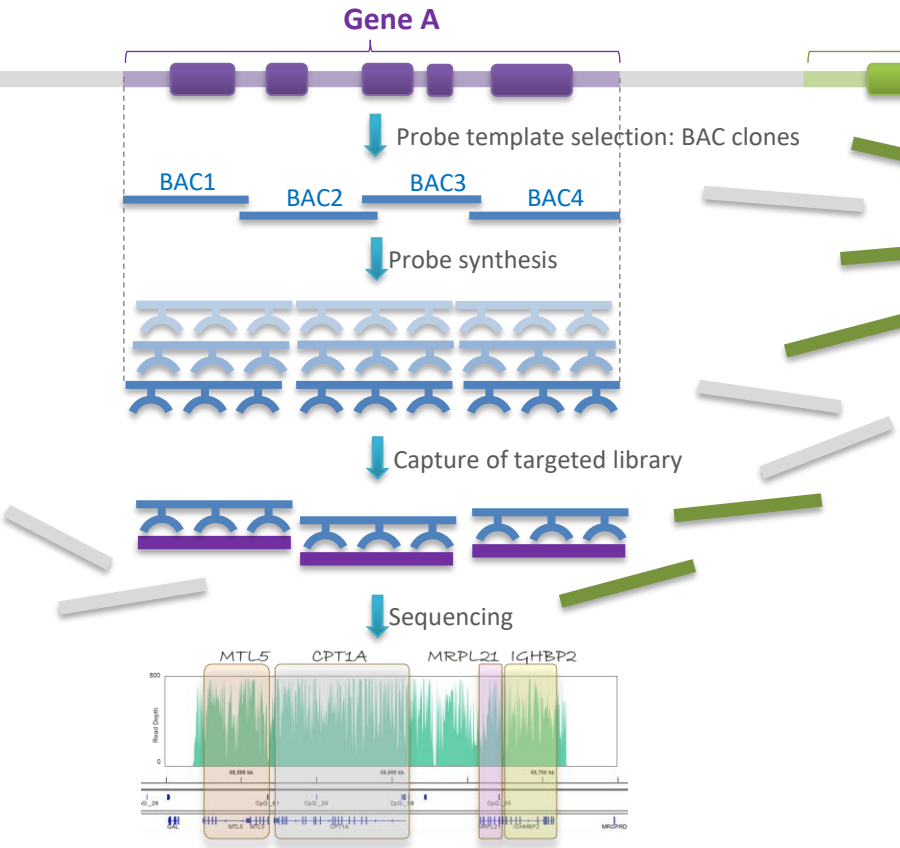
NGS library quantification

BioDynami

Product Category

- Next Generation Sequencing (NGS) Library Prep
- **Targeted Sequencing**
  - MHC Library Prep & Capture Kit
  - MHC Class I Library Prep & Capture Kit
  - MHC Class II Library Prep & Capture Kit
  - MHC Class III Library Prep & Capture Kit
  - MHC Core Library Prep & Capture Kit
  - LRC/KIR Library Prep & Capture Kit
  - Breast Cancer Panel Library Prep & Capture Kit
- DNA Fragmentation
- DNA/RNA Purification (Magnetic Beads)
- DNA/RNA Quantification (For Qubit Fluorometer)
- DNA Extraction (Magnetic Beads)
- DNA Ladder

Targeted Sequencing: CATCH-Seq Technology



Advantages of CATCH-Seq

- **Large target regions**:
  - 100 kb to 10 mb of contiguous sequence
  - Cover exons, introns, 5' regulatory regions, 3' regulatory regions, and flanking regions.
- **Greater specificity with longer probes (200-300bp)**
- **Better coverage of the targeted region including repeats**
- **Significantly lower cost than oligo-based probes**
- **Multiplexed capture of samples reduces costs**

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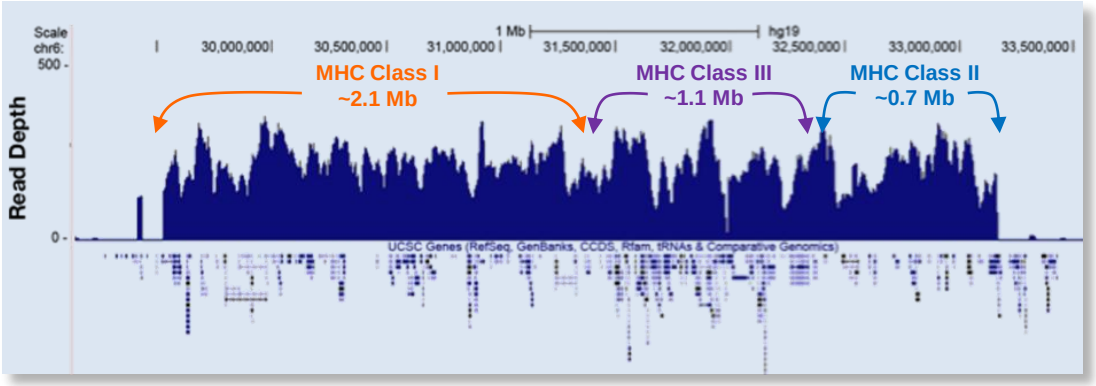
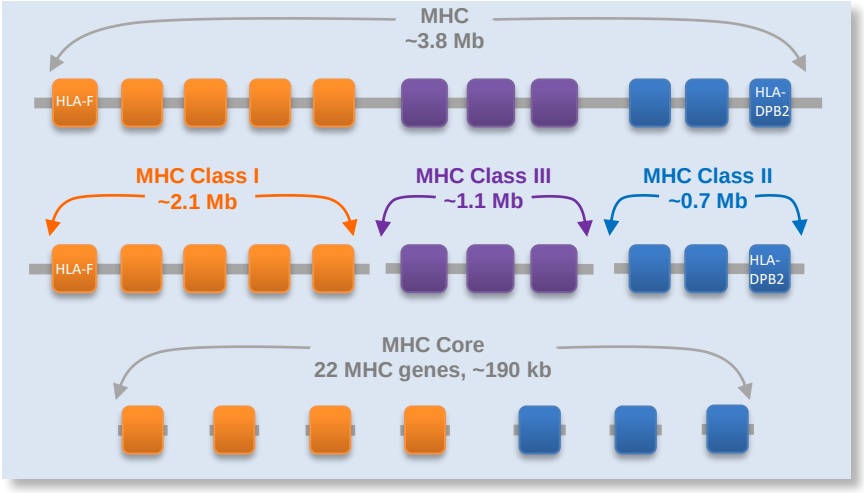
Targeted Sequencing Kits

MHC Targeted Sequencing Kits

- **Integration of library prep with capture, or capture alone**
  - Simplifies the procedure
  - Enhances the capture efficiency
- **Multiple choices of targeted MHC regions**
  - Kits available for the following regions
    - Full 3.8 MB of MHC region
    - 2.1 MB Class I region
    - 0.7 MB Class II region
    - 1.1 MB Class III region
    - 190 kb MHC core regions (22 MHC genes)
  - Covers exons, introns, 5’ regulatory regions, 3’ regulatory regions, and beyond.
- **Easy detection of SNPs, indels, and structural variants**
  - The only reagent provides intact sequence information





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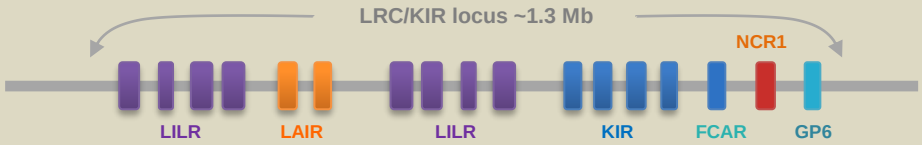
Targeted Sequencing Kits

LRC/KIR Targeted Sequencing Kits

- **Full capture of LRC/KIR region**
  - Covers 1.3 MB regions
  - Covers exons, introns, 5’ regulatory regions, 3’ regulatory regions, and beyond.
- **Easy detection of SNPs, indels, and structural variants**
  - The only reagent provides intact sequence information



Breast Cancer Panel Targeted Sequencing Kits

- **Full genomic regions of 88 genes**
  - Covers ~9 MB regions
  - Covers exons, introns, 5’ regulatory regions, 3’ regulatory regions, and beyond.
- **Easy detection of SNPs, indels, and structural variants**
  - The only reagent provides intact sequence information

ABCB1	ABCG2	AKT1	APC	AR	ATM	BAD	BAP1
BCL2	BIRC5	BRCA1	BRCA2	CCND1	CCND2	CDH1	CDK2
CDKN1A	CDKN1C	CDKN2A	CSF1	CTNNB1	CTSD	EGF	EGFR
EP300	ERBB2	ERBB3	ESR1	ESR2	FBXO32	FGFR1	FGFR2
FOXA1	GATA3	GLI1	GRB7	GSTP1	HIC1	ID1	IGF1
IGF1R	IGFBP1	IGFBP3	IL6	ITCH	JUN	KRT5	MAP3K1
MAPK1	MAPK3	MAPK8	MDM2	MGMT	MKI67	MLH1	MMP2
MMP9	MUC1	MUC16	MYC	NEK2	NME1	NME2	NOTCH1
NR3C1	PGR	PIK3CA	PIK3R1	PLAU	PTEN	PTGS2	PYCARD
RASSF1	RB1	RET	SERPINE1	SFN	SFRP1	SNAI2	SRC
TFF3	TGFB1	THBS1	TP53	TWIST1	VEGFA	WEE1	XBP1

BioDynami

Product Category

- Next Generation Sequencing (NGS) Library Prep
- Targeted Sequencing
- **DNA Fragmentation**
  - **DNA Fragmentation Enzyme Mix**
  - **DNA Fragmentation & Blunting Enzyme Mix**
  - **DNA Fragmentation & A-tailing Enzyme Mix**
- DNA/RNA Purification (Magnetic Beads)
- DNA/RNA Quantification (For Qubit Fluorometer)
- DNA Extraction (Magnetic Beads)
- DNA Ladder

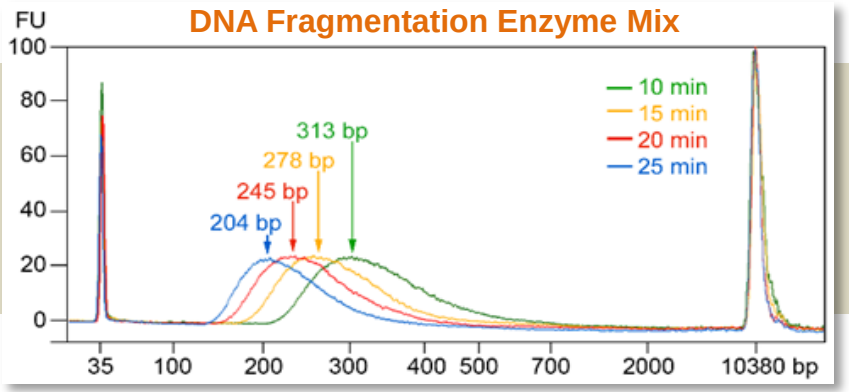
Enzyme Mix for DNA Fragmentation

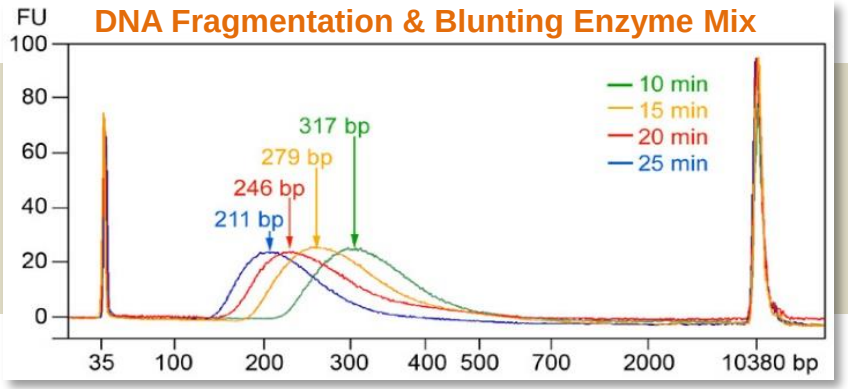
Features

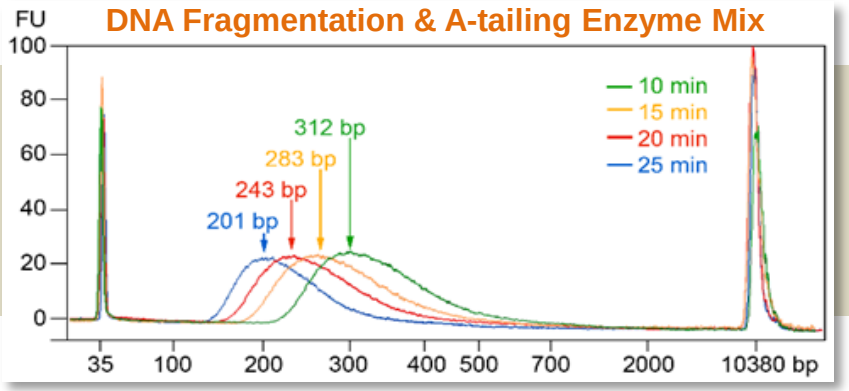
- Fast enzymatic DNA fragmentation: 30-45 min
- Simple Procedure: 3 min of hands-on time
- Works with both EDTA-free DNA and DNA resuspended in TE buffer
- Ideal for NGS application, PCR cloning, TA-ligation, and blunt end ligation
- Three types available, listed below

	DNA Fragmentation Enzyme Mix	DNA Fragmentation & Blunting Enzyme Mix	DNA Fragmentation & A-tailing Enzyme Mix
Protocol time	30-45 min	30-45 min	30-45 min
Hands-on time	3 min	3 min	3 min
Compatibility with EDTA-free DNA	Yes	Yes	Yes
Compatibility with DNA in TE buffer	Yes	Yes	Yes
One-step reaction	Yes	Yes	Yes
Ends of DNA fragments	random	blunt	3' A-tailed
Application	NGS library prep	NGS library prep PCR cloning blunt end ligation	NGS library prep PCR cloning TA ligation

Enzyme Mix for DNA Fragmentation







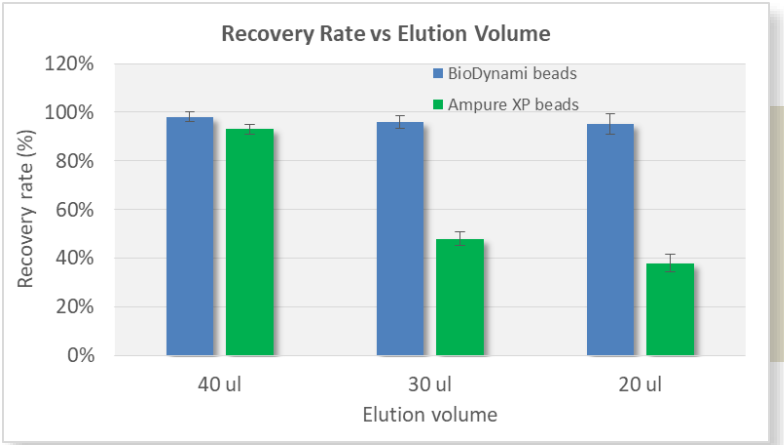
BioDynami

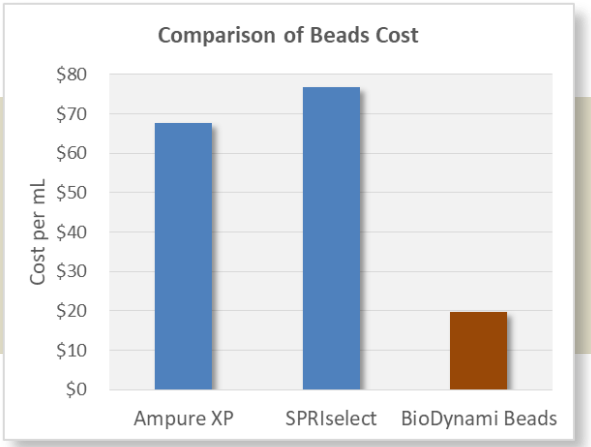
Product Category

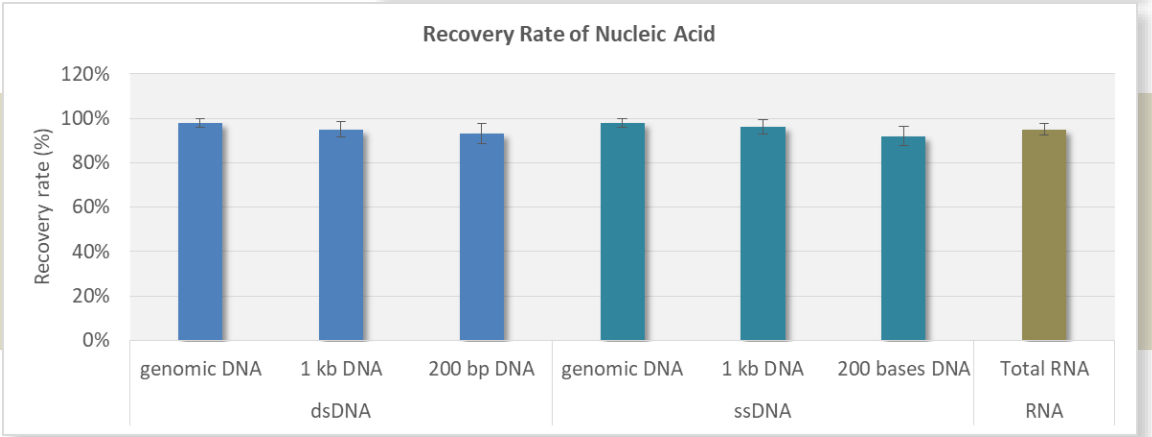
- Next Generation Sequencing (NGS) Library Prep
- Targeted Sequencing
- DNA Fragmentation
- **DNA/RNA Purification (Magnetic Beads)**
  - Magnetic Beads (DNA & RNA Purification)
  - Magnetic Beads (PCR Purification)
  - Magnetic Beads (tRNA Purification)
  - Magnetic Beads (microRNA & Oligo Purification)
  - Magnetic Beads (Short Oligo Purification)
  - DNA Concentrator (Magnetic Beads)
  - cfDNA Purification (Magnetic Beads)
  - miRNA Purification Kit (tRNA Depletion)
  - Genomic DNA Purification Magnetic Beads (RNA Depletion)
  - Plasmid Purification Magnetic Beads (RNA Depletion)
  - RNA Contamination Removal Magnetic Beads (gDNA Purification)
- DNA/RNA Quantification (For Qubit Fluorometer)
- DNA Extraction (Magnetic Beads)
- DNA Ladder

Magnetic Beads (DNA & RNA Purification)

- Effective recovery of DNA and RNA samples
  - DNA fragments >100 base pairs
  - RNA fragments >200 bases
- Removal of unwanted components and impurities
- Compatible with manual and automated processing
- Cost effective alternative to AMPure® XP & SPRIselect
- Cuts the cost by **75%**







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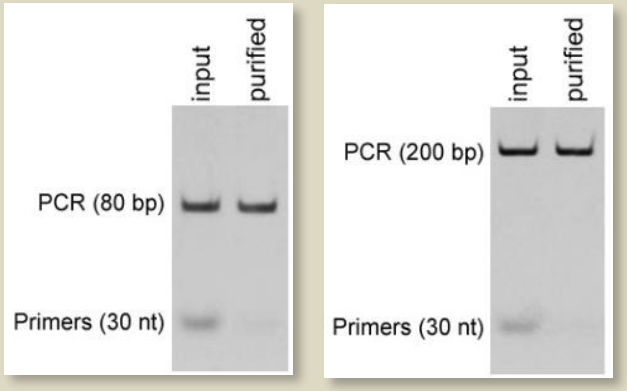
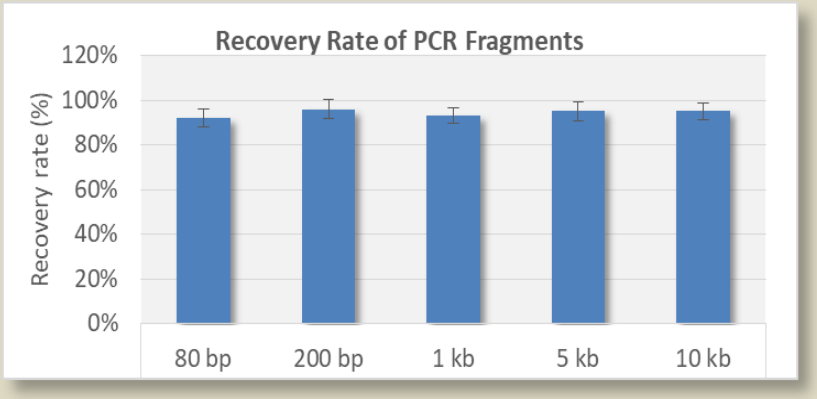
Magnetic Beads (PCR Purification)

- The **only** beads for PCR purification >80 bp
- Removal of primers <30 nt
- Removal of unwanted components and impurities
- Applications:
  - PCR purification
  - PCR cloning
  - Sequencing
  - Other applications requiring purified PCR fragments

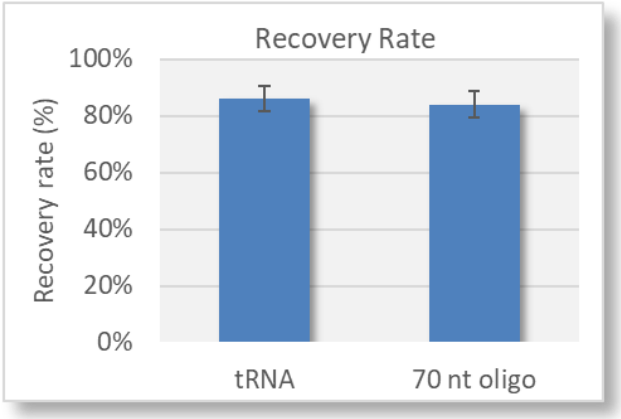


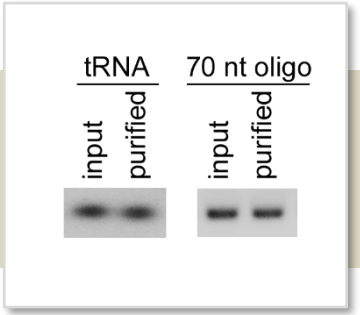


BioDynami

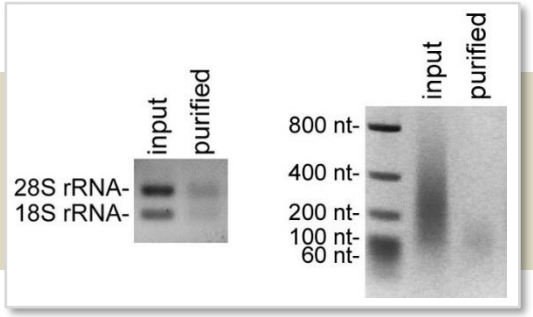
Magnetic Beads (tRNA Purification)

- The **only** beads for tRNA purification
  - tRNA
  - Oligo 70 nt or longer
  - dsDNA fragments 70 bp or longer
  - ssDNA fragments 70 nt or longer
  - RNA fragments 70 nt or longer
- Removal of larger RNA/DNA contamination:
  - 18S rRNA
  - 28S rRNA
  - RNA/DNA> 180 nt
- Removal of impurities and unwanted reaction components





tRNA & 70 nt oligo recovery

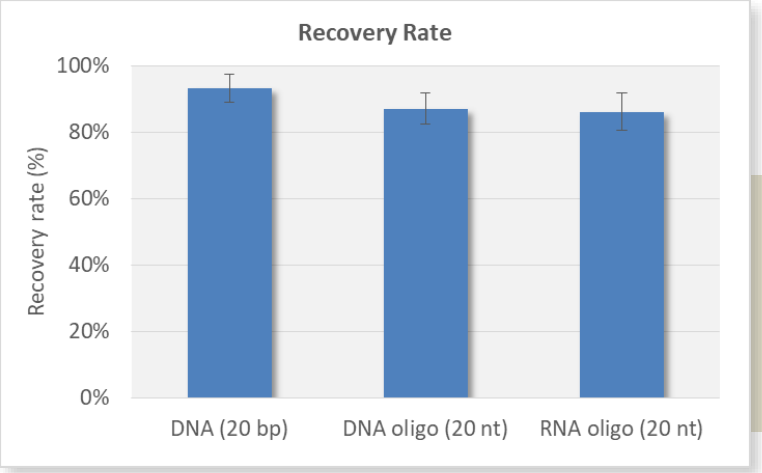


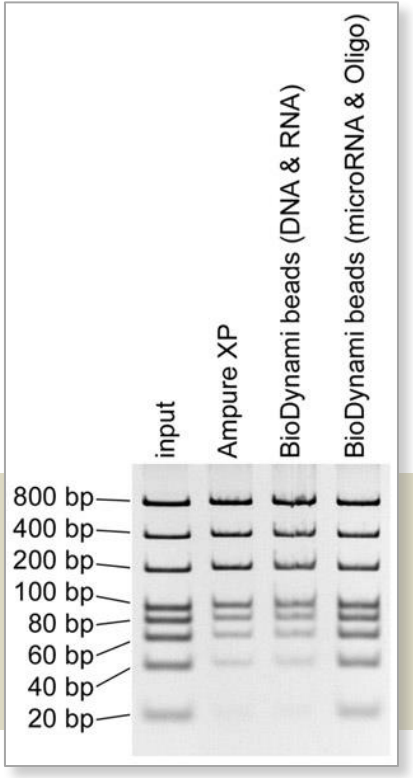
Depletion of larger RNAs

BioDynami

Magnetic Beads (microRNA & Oligo Purification)

- The **only** beads for short DNA & RNA purification
  - microRNA
  - dsDNA fragments 20 bp or longer
  - ssDNA fragments 20 nt or longer
  - RNA fragments 20 nt or longer
  - DNA/RNA hybrid fragments 20 nt or longer
  - Oligo and chimeric oligo 20 nt or longer
- Removal of impurities and unwanted reaction components

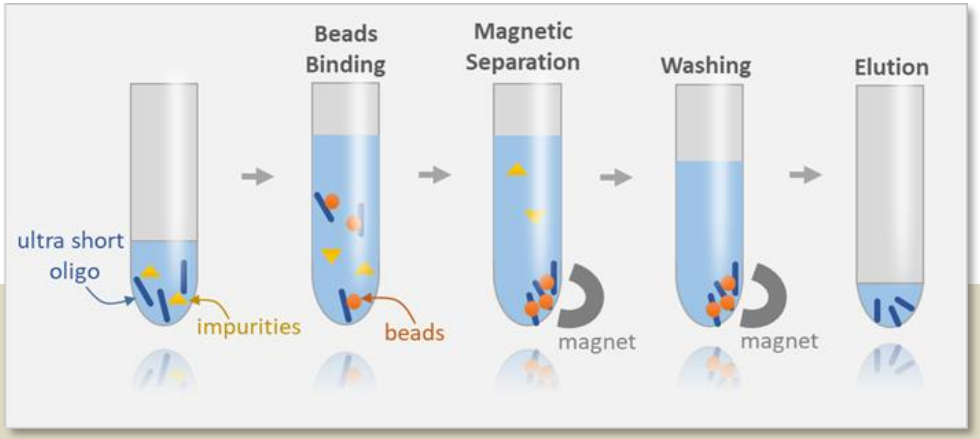


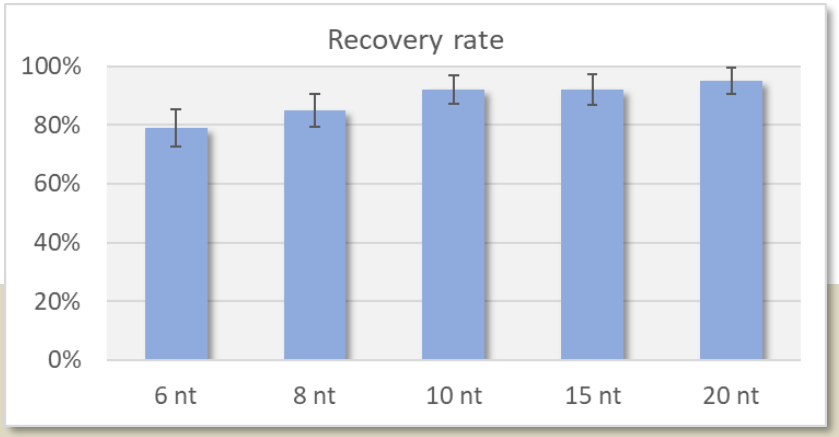


BioDynami

Magnetic Beads (Short Oligo Purification)

- The **only** beads for purification of oligos as short as 6 nt.
  - 6 nt oligos: 80% recovery rate
  - >8 nt oligos: >90% recovery rate
- Removal of impurities and unwanted reaction components

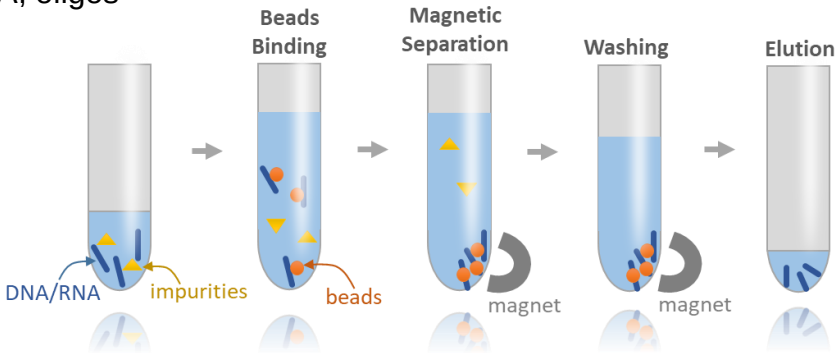


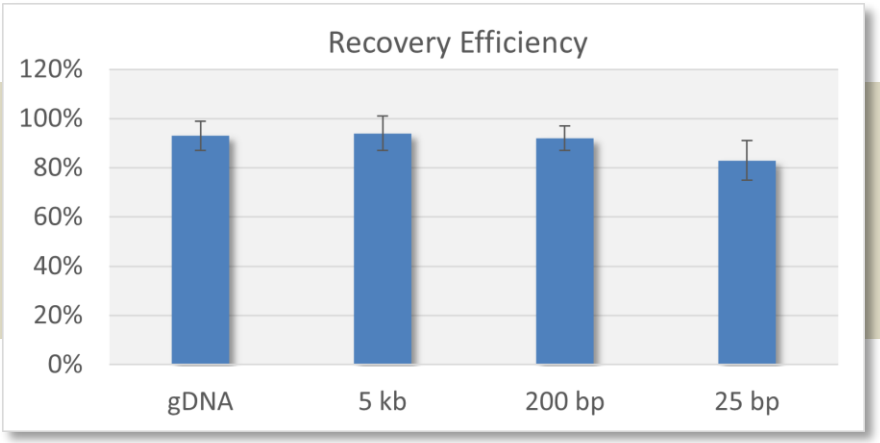


BioDynami

DNA Concentrator (Magnetic Beads)

- Concentrate DNA and RNA samples, even small DNA, RNA, oligos
- Binding capacity: 10 ug DNA per prep
- Remove unwanted components and other impurities
- No vacuum
- No centrifuge
- No column
- Low Cost: **$1.4/sample**



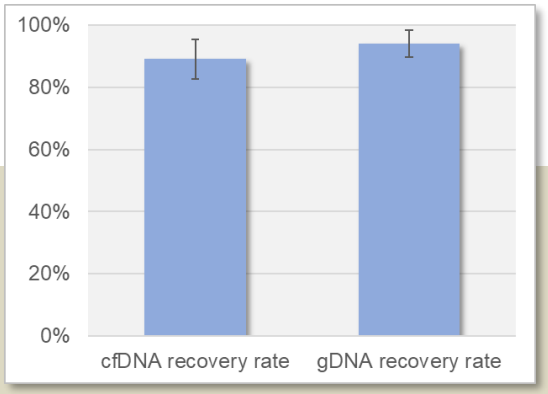


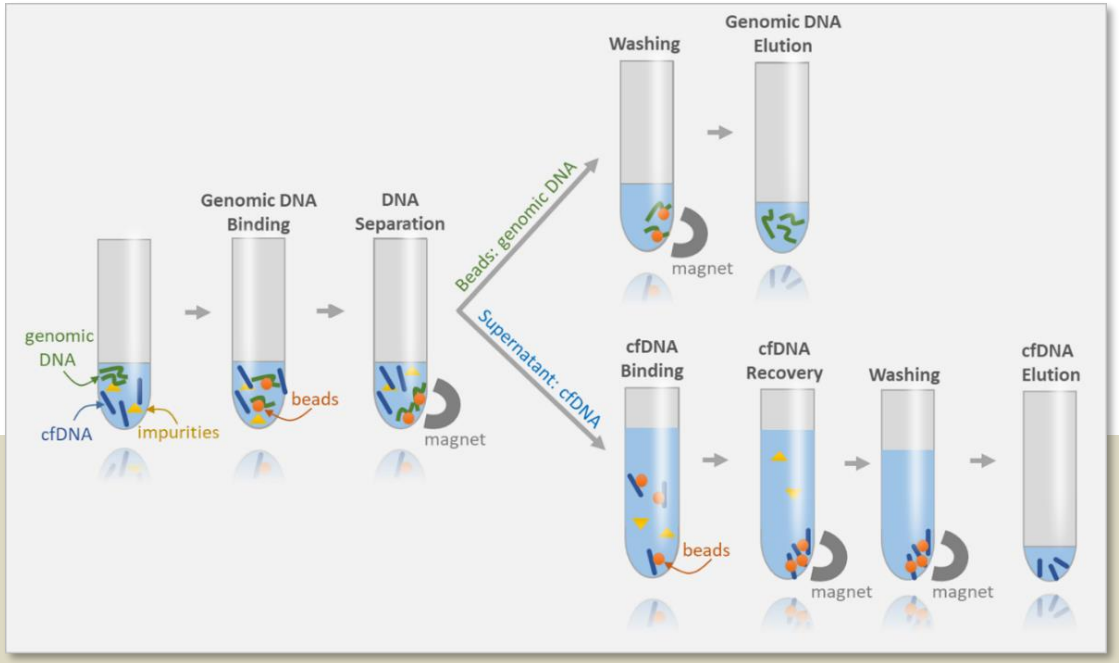
BioDynami

cfDNA Purification (Magnetic Beads)

Features

- The **only** beads Separate cfDNA from genomic DNA, and recover both types of DNA
- Recover cfDNA effectively
  - As short as 50 bp can be recovered
- Recover high molecular weight genomic DNA effectively
- Remove unwanted components and other impurities

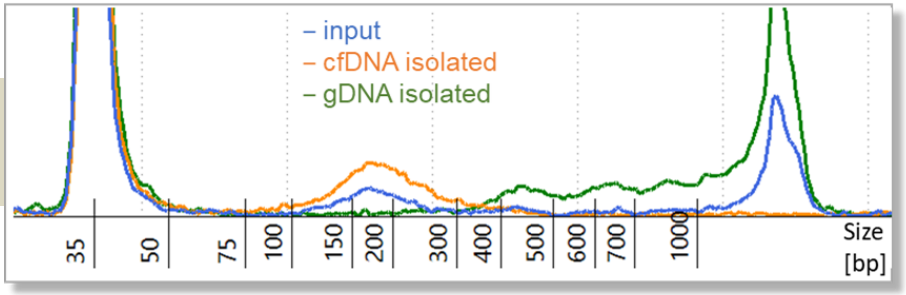




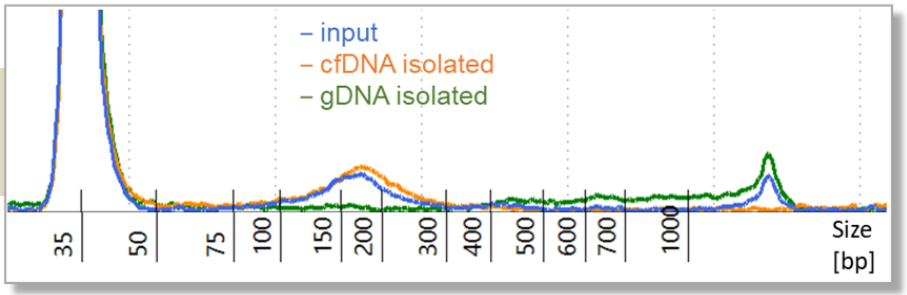
BioDynami

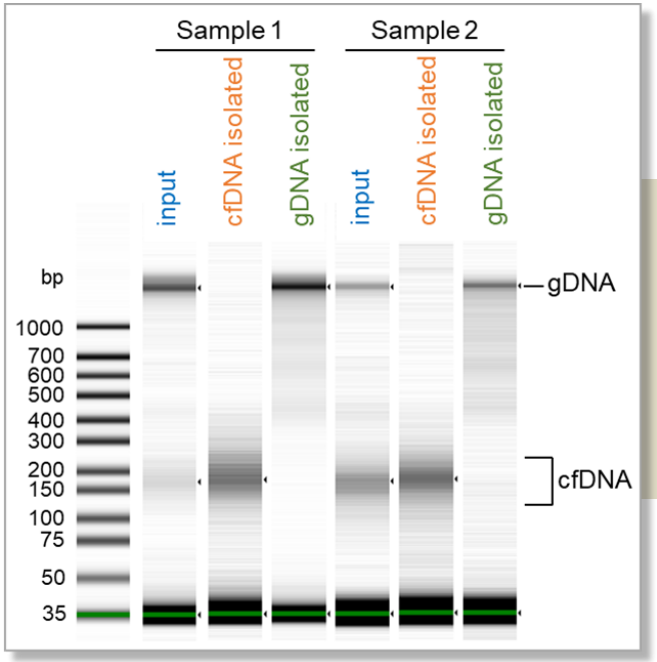
cfDNA Purification (Magnetic Beads)

Sample 1: 33% cfDNA



Sample 2: 66% cfDNA



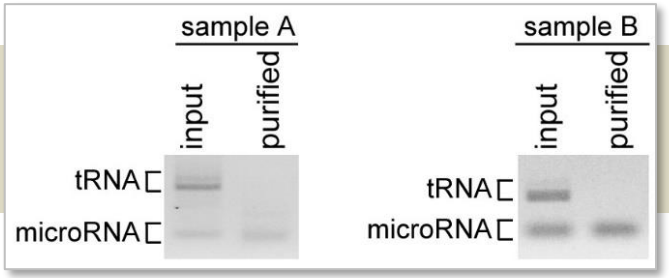


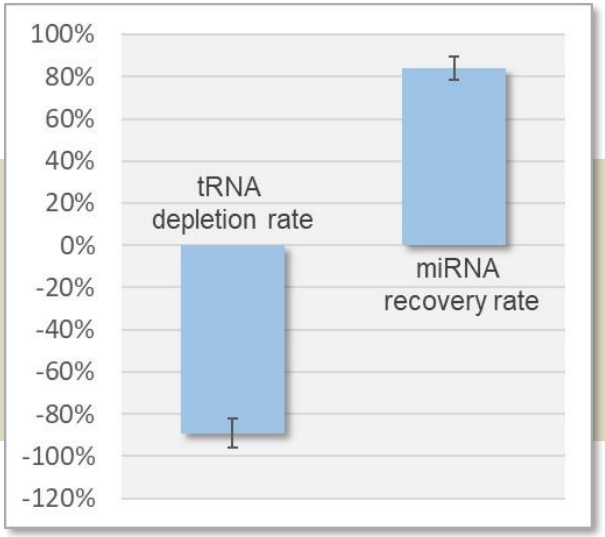
BioDynami

miRNA Purification Kit (tRNA Depletion)

Features

- The **only** beads for purification of miRNA by removing tRNA, 5S RNA, and larger RNA contaminations
- Remove unwanted components and other impurities





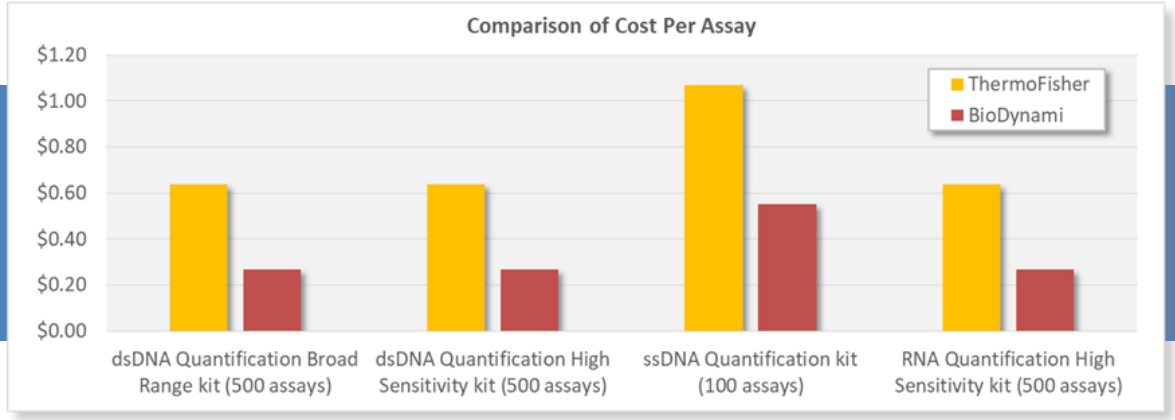
BioDynami

Product Category

- Next Generation Sequencing (NGS) Library Prep
- Targeted Sequencing
- DNA Fragmentation
- DNA/RNA Purification (Magnetic Beads)
- **DNA/RNA Quantification (for Qubit Fluorometer & microplate reader)**
  - DNA/RNA Quantification (for Qubit Fluorometer)
    - dsDNA Quantification Broad Range Kit
    - dsDNA Quantification High Sensitivity Kit
    - ssDNA Quantification Kit
    - RNA Quantification High Sensitivity Kit
    - Short Oligo Quantification Kit (Qubit fluorometer)
    - Assay Tubes (for Qubit Fluorometer)
  - DNA/RNA Quantification (for microplate reader)
    - dsDNA Quantification Broad Range Kit
    - dsDNA Quantification High Sensitivity Kit
- DNA Extraction (Magnetic Beads)
- DNA Ladder

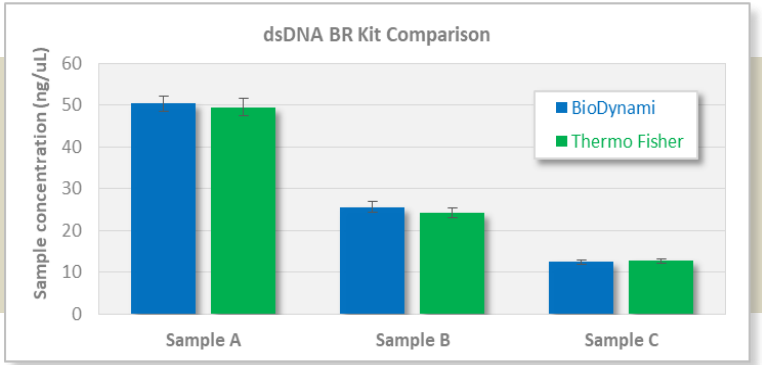
DNA/RNA Quantification (for Qubit Fluorometer)

- Features
  - Optimized for use with the Qubit® Fluorometer
  - Cuts the cost by **63%**
- Kit
  - dsDNA Broad Range kit
  - dsDNA High Sensitivity kit
  - ssDNA kit
  - RNA High Sensitivity kit

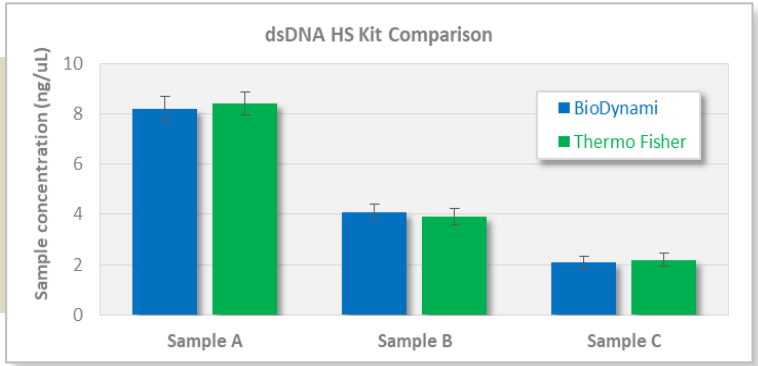


BioDynami

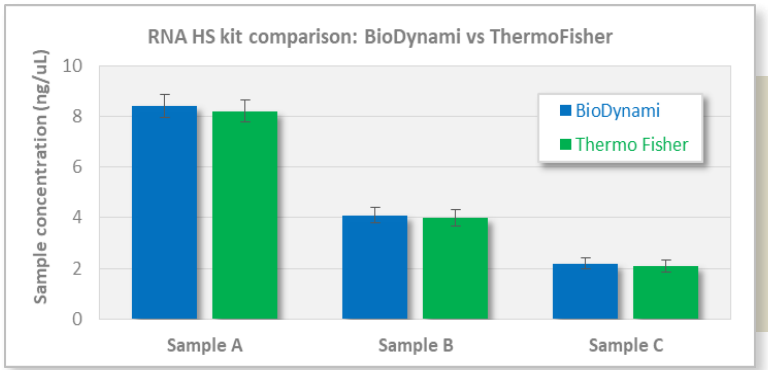
DNA/RNA Quantification (for Qubit Fluorometer)



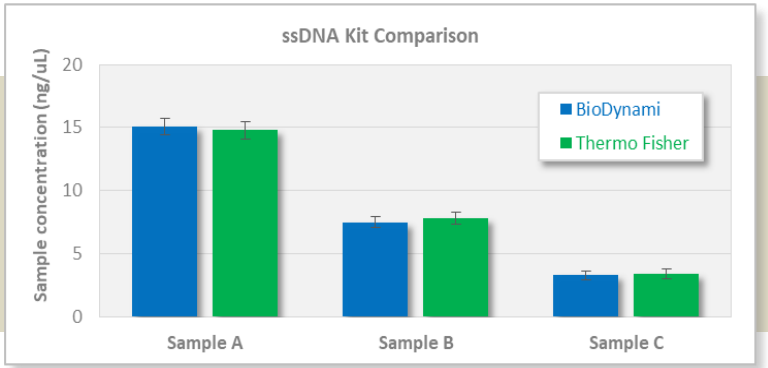
dsDNA Broad Range



dsDNA High Sensitivity



RNA



ssDNA

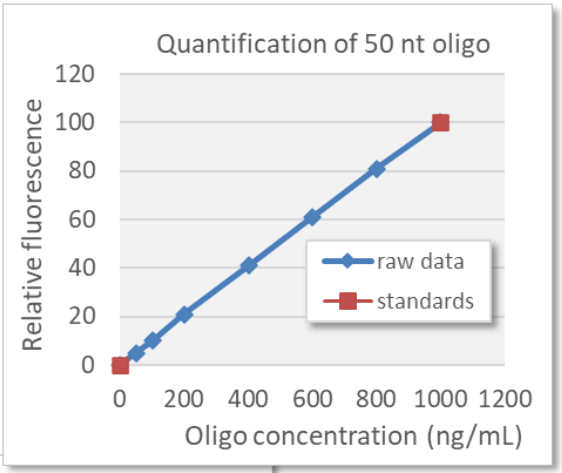
BioDynami

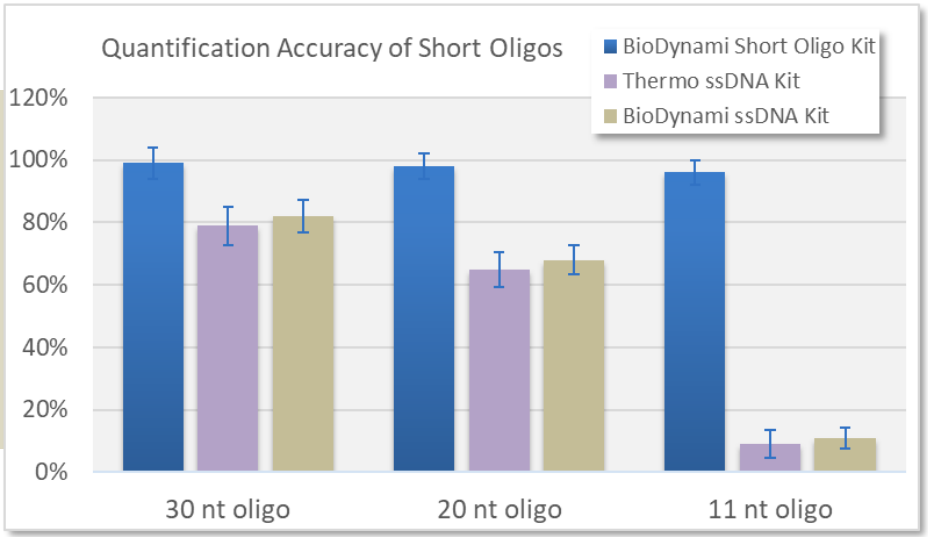
Short Oligo Quantification Kit (for Qubit Fluorometer)

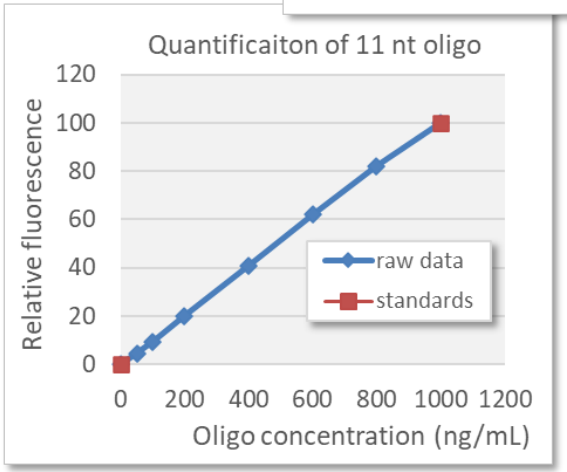
The Kit is developed for the quantification of short oligos (11 to 50 nt) using a Qubit Fluorometer to solve the problem the inaccuracy of short oligos quantification with the ssDNA Quantification kits.

Features

- The **only** kit for quantifies oligos from 11 nt to 50 nt
- Uses the ssDNA assay setting



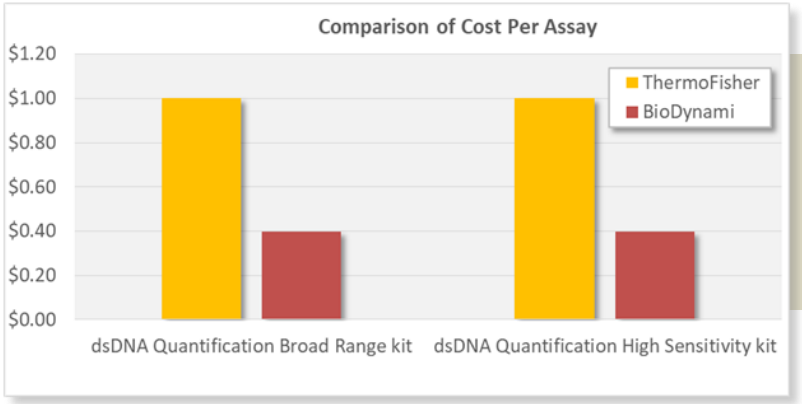


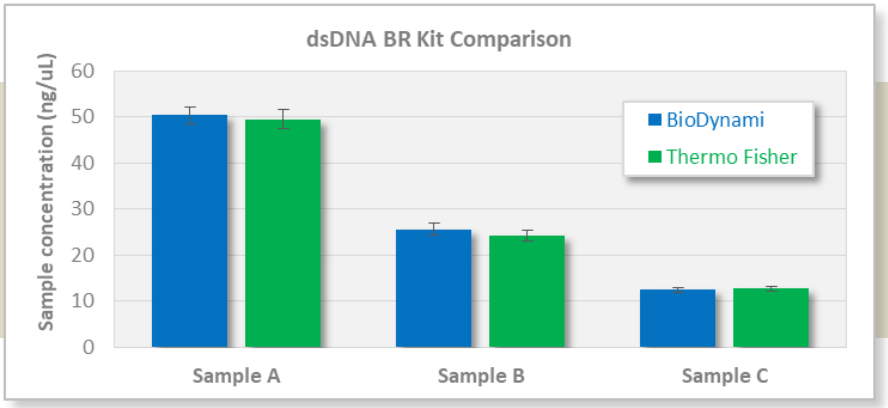


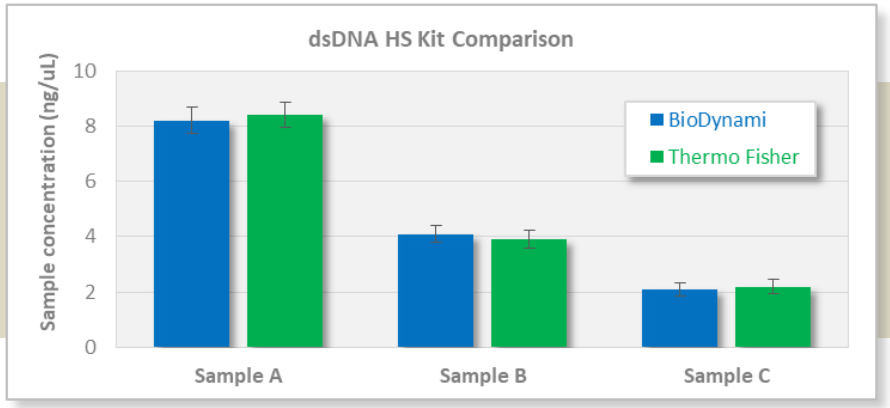
BioDynami

DNA Quantification (for Microplate Reader)

- Features
  - Optimized for use with microplate reader
  - Cuts the cost by **63%**
- Kit
  - dsDNA Broad Range kit
  - dsDNA High Sensitivity kit







BioDynami

Product Category

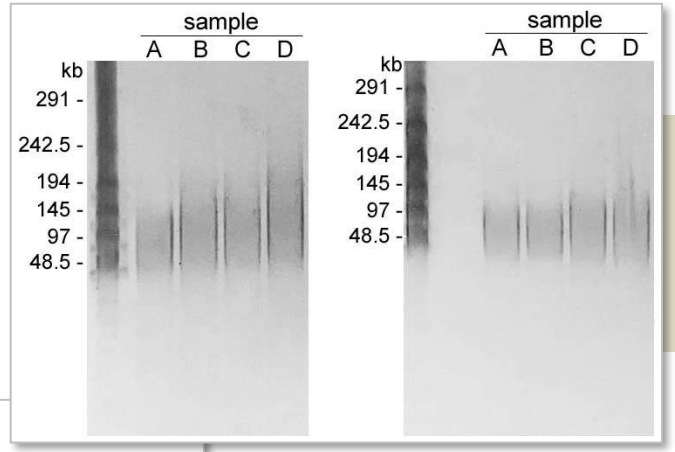
- Next Generation Sequencing (NGS) Library Prep
- Targeted Sequencing
- DNA Fragmentation
- DNA/RNA Purification (Magnetic Beads)
- DNA/RNA Quantification (For Qubit Fluorometer)
- **DNA Extraction (Magnetic Beads)**
  - **Genomic DNA Extraction Kit for Cells (HMW, Magnetic Beads)**
  - **Genomic DNA Extraction Kit for Blood (HMW, Magnetic Beads)**
  - **Genomic DNA Extraction Kit for Tissues (HMW, Magnetic Beads)**
  - **Bacterial DNA Extraction Kit (Magnetic Beads)**
  - **Plasmid Miniprep High Throughput Kit**
  - **Plasmid Miniprep Kit**
  - **Disposable Pestle and Tube Set**
- DNA Ladder

Genomic DNA Extraction Kit (HMW, Magnetic Beads)

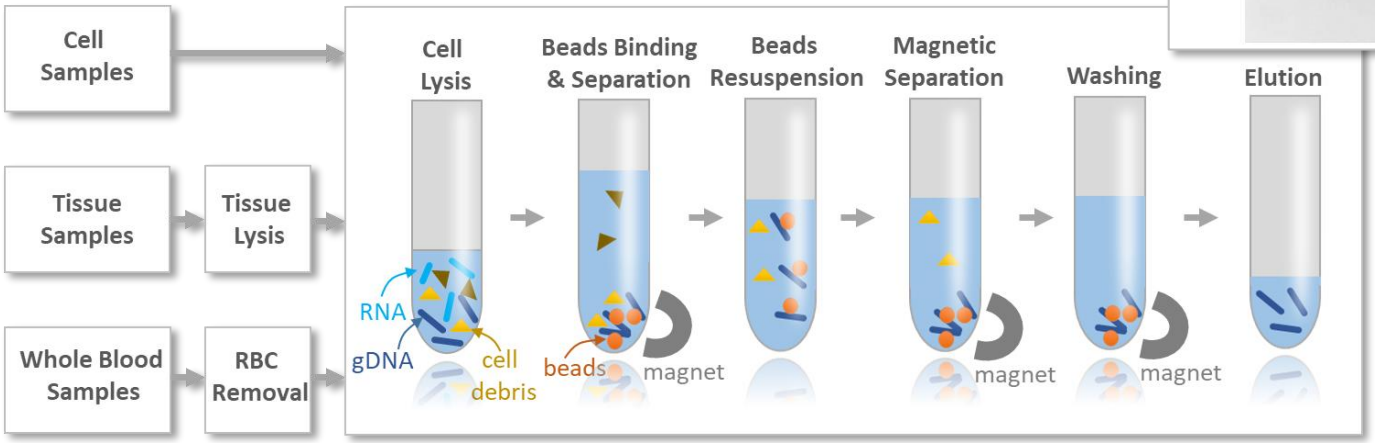
Extracting high molecular weight (HMW) genomic DNA from cells, blood, and tissues.

Features

- HMW: 50 kb to 150 kb
- High Purity
- Simple magnetic beads method
  - No centrifuge needed
  - No column needed
  - No vacuum needed

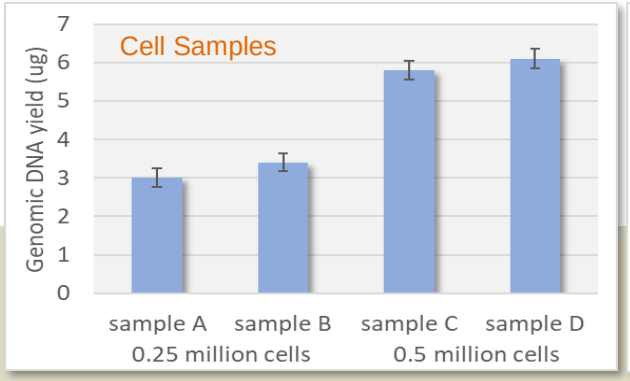


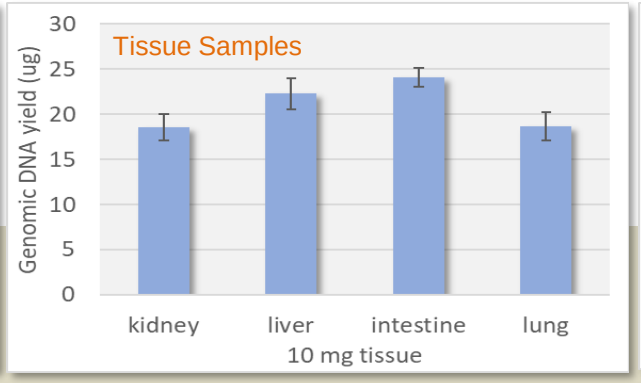
Sample A: liver tissue
Sample B: intestine tissue
Sample C: whole blood
Sample D: cultured 293T cells

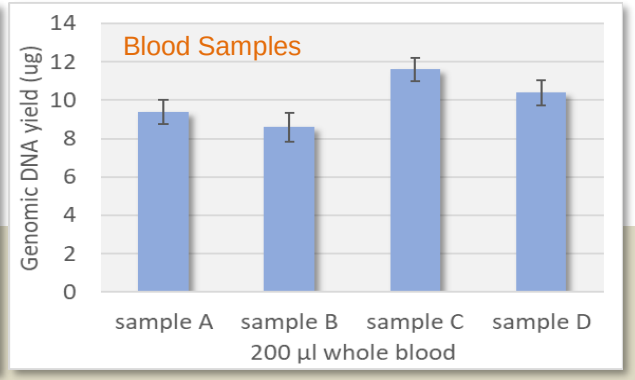


BioDynami

Genomic DNA Extraction Kit (HMW, Magnetic Beads)







	Cell Samples	Blood Samples	Tissue Samples
Technology	Magnetic beads	Magnetic beads	Magnetic beads
Sample amount	Up to 0.5 million cells	Up to 200 µl whole blood	Up to 10 mg tissue
Genomic DNA size	50-150 kb (tube tapping) 40-100 kb (tube vortexing)	50-150 kb (tube tapping) 40-100 kb (tube vortexing)	50-150 kb (tube tapping) 40-100 kb (tube vortexing)
Genomic DNA yield	3-6 ug (0.25 -0.5 million cells)	4-12 ug (200 µl blood)	Up to 30 ug (dependent on the tissue)
Elution volume	100 µl	100 µl	100 µl
O.D. 260/280	1.8-2.0	1.8-2.0	1.8-2.0
O.D. 260/230	Above 2.0	Above 2.0	Above 2.0

BioDynami

Genomic DNA Extraction Kit (HMW, Magnetic Beads)

Comparison of genomic DNA Extraction Kits from Vendors

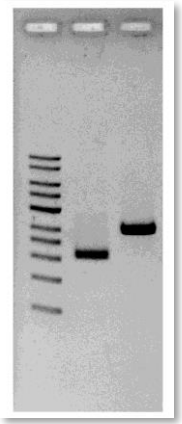
Vendor and Kit	Approximate Protocol Time*			Note**
	Cells	Blood	Tissues	
BioDynami gDNA Extraction	30 minutes	50 minutes	90 minutes	Fast; Simple; High-yield; High-purity. Unique magnetic beads technology.
Circulomics Nanobind	> 60 minutes	60 minutes	>2 hours	High viscosity made some samples difficult to process.
Revolugen FireMonkey	~45 minutes	>60 minutes	N/A	DNA denaturation due to 80°C heating. Low yield due to only 2nd eluate is used.
Qiagen MagAttract	N/A	60 minutes	Overnight +40 min	Not very high molecular weight.
Qiagen Genomic Tips	3.5 hours	3.5 hours	4 hours	Long workflow; Not very high molecular weight.
Phenol/Chloroform Extraction	> 6 hours	> 6 hours	> 6 hours	Long workflow; Hazardous reagents; DNA resuspension is difficult.

*Workflow times are estimated based on protocol and internal testing

**Based on internal testing

Plasmid Miniprep (Magnetic Beads)

- 100% centrifuge-free
  - No need to pellet bacteria
  - Use bacteria culture directly
- Simple
  - No centrifuge
  - No vacuum
  - No column
- Flexible
  - High throughput
  - Low throughput



Plasmid Miniprep High Throughput Kit
Plasmid Miniprep Kit

BioDynami kit (Magnetic Beads)

- Lysis
- Neutralization
- Beads Separation
- Beads Purification
- Washing
- Elution

- 100% centrifuge-free
- Bacteria medium used directly
- No column
- No vacuum
- Both high-throughput & low throughput
- Fast and simple protocol

Other kits (Magnetic Beads)

- Centrifuge of Culture
- Lysis
- Neutralization
- Centrifuge
- Beads Purification
- Washing
- Elution

- Centrifuge required
- No column
- No vacuum

BioDynami

Product Category

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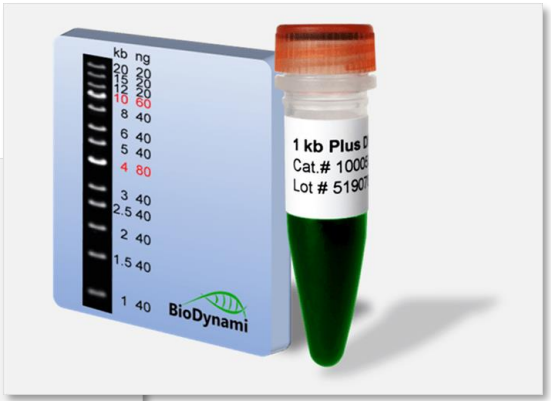
- DNA/RNA Quantification (For Qubit Fluorometer)
- DNA Extraction (Magnetic Beads)
- **DNA Ladder**
  - 20 bp DNA Ladder
  - 100 bp DNA Ladder
  - 1 kb DNA Ladder
  - 1 kb Plus DNA Ladder

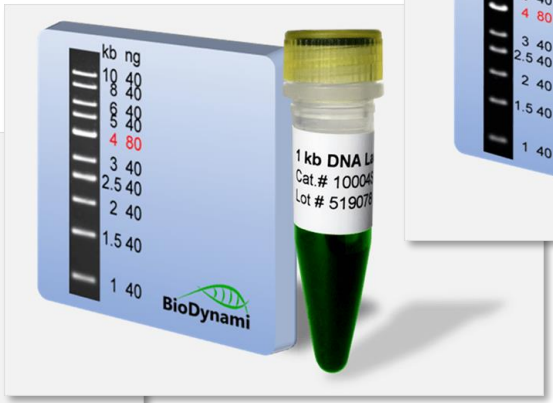
DNA Ladder

- From 20 bp to 20 kb
- Ready to load

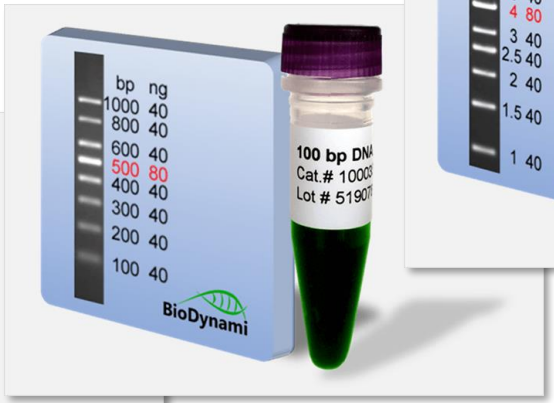
1 kb Plus DNA Ladder



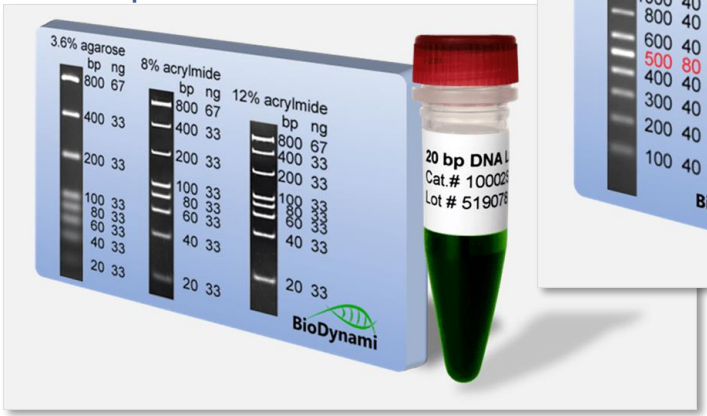
1 kb DNA Ladder



100 bp DNA Ladder



20 bp DNA Ladder



BioDynami

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Technologies & Reagents

Fast
Simple
Affordable
High-Quality