



Innovating Epigenetics Solutions

# CHROMATIN IMMUNOPRECIPITATION

- ChIPmentation
- Low input ChIP
- ChIP for transcription factors and histones
- Plant ChIP
- ChIP on FFPE samples
- ChIP on tissue samples
- Chromatin shearing
- ChIP and ChIP-seq grade antibodies
- DNA purification
- Library preparation



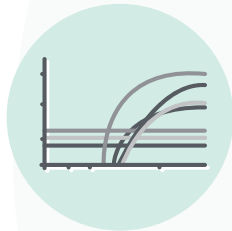
# Diagenode helps you master ChIP and ChIP-seq

With 15 years experience in ChIP assay development Diagenode has built unmatched expertise in chromatin analysis. Our efforts have focused on the development of unique and robust epigenetic solutions, providing you with complete, validated solutions for your ChIP-qPCR and ChIP-seq assays, all-in-one ChIPmentation, as well as epigenetic services.

## What is ChIP?

Chromatin immunoprecipitation (ChIP) is a method used to determine the location of DNA binding sites on the genome for a specific protein of interest, giving invaluable insights into the regulation of gene expression.

ChIP involves the selective enrichment of a chromatin fraction containing a specific antigen. Antibodies that recognize a specific protein or protein modification are used to determine the relative abundance of that antigen at a specific locus or loci.



## ChIP-qPCR

ChIP coupled with qPCR can be used to study protein-DNA interactions at known genomic binding sites. ChIP-qPCR is advantageous for studies that focus on specific genes and regulatory regions across differing experimental conditions.



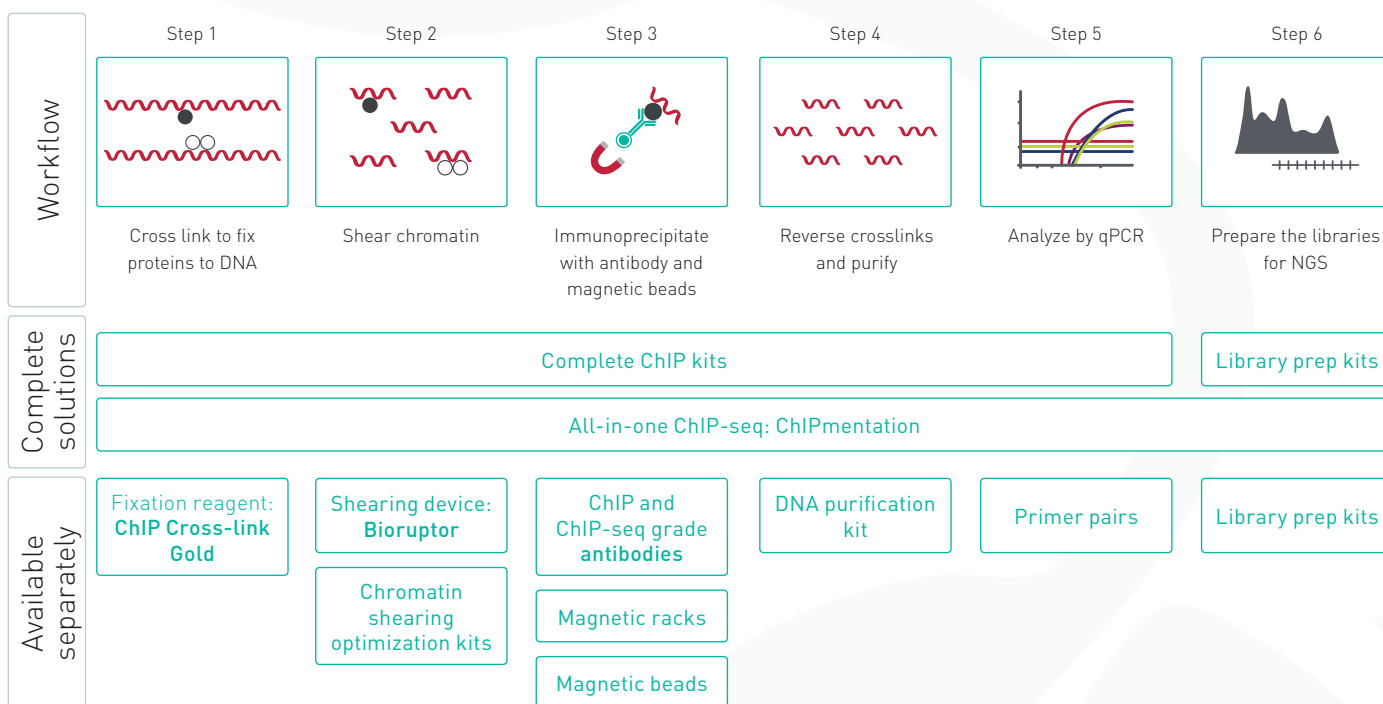
## ChIP-seq

ChIP-seq combines ChIP with massively parallel DNA sequencing to identify and precisely map protein-DNA binding sites at a genome-wide level.

# ChIP is at your fingertips

With an exclusive focus on epigenetics, Diagenode provides the highest quality epigenetics products on the market. Our complete suite of ChIP and ChIP-seq solutions includes extensively validated ChIP and ChIP-seq grade antibodies, chromatin shearing devices (Bioruptor®), kits for chromatin shearing optimization, specialized kits for ChIP and ChIP-seq as well as for library preparation.

## Optimal solutions for your end-to-end ChIP



### Automation

Automate your complex ChIP experiments with our **IP-Star® Compact** liquid handling platform for increased reproducibility and for reduced operator handling.

### Epigenomic Services

Let our **epigenetic experts** help you achieve! We provide you with **personalized end-to-end epigenomics services** supporting your research from the **experimental design** to the **final analysis of your data**.

#### LEGEND

● Protein of interest

○ Other protein

~ DNA

● Magnetic bead

~ Antibody

~ Magnet

# Chromatin preparation

A successful chromatin preparation relies on the optimization of cross-linking, cell lysis and sonication. Our **Chromatin Shearing Optimization Kits** together with the **Bioruptor** ultrasonicator combine efficient cell lysis and chromatin shearing leading to consistent results.

Each Chromatin Shearing Optimization Kit provides optimized reagents and a thoroughly validated protocol according to your specific experimental needs. SDS concentration is adapted to each workflow taking into account target-specific requirements.

- ✓ Obtain perfect fragment size for high quality ChIP
- ✓ Keep the epitopes accessible to the antibody
- ✓ Get consistent results from different samples and runs
- ✓ Benefit from the optimal kit for your specific experimental needs

	KIT			
	Chromatin Shearing Optimization Kit	Chromatin Shearing Optimization Kit	Chromatin Shearing Optimization Kit	Chromatin Shearing Optimization Kit
	<i>Ultra Low SDS</i>	<i>Low SDS</i>	<i>for Plant</i>	<i>High SDS</i>
Cat. No.	C01020010	C01020013	C01020014	C01020012
Sample type	Cells, tissue	Cells, tissue	Plant tissue	Cells
Target	Histones	TF	Histones	Histones
Amount of starting material	Standard	Standard	Low and standard	Low
Nuclei isolation	Yes	Yes	Yes	No
SDS concentration	< 0.1%	0.2%	0.5%	1%
Corresponding to shearing buffers from	<ul style="list-style-type: none"> <li>• iDeal ChIP-seq Kit for Histones</li> <li>• ChIPmentation Kit for Histones</li> </ul>	<ul style="list-style-type: none"> <li>• iDeal ChIP-seq Kit for Transcription Factors</li> <li>• iDeal ChIP qPCR Kit</li> <li>• iDeal ChIP-FFPE Kit</li> </ul>	<ul style="list-style-type: none"> <li>• Universal Plant ChIP-seq Kit</li> </ul>	<ul style="list-style-type: none"> <li>• True MicroChIP Kit</li> </ul>

## The shearing device of choice for chromatin preparation for ChIP

The **Bioruptor** is the latest innovation in shearing and represents a new breakthrough as all-in-one shearing system that delivers optimal and reproducible chromatin shearing while preserving high protein integrity.

Visit our website to learn more about our different models of Bioruptor and their features.

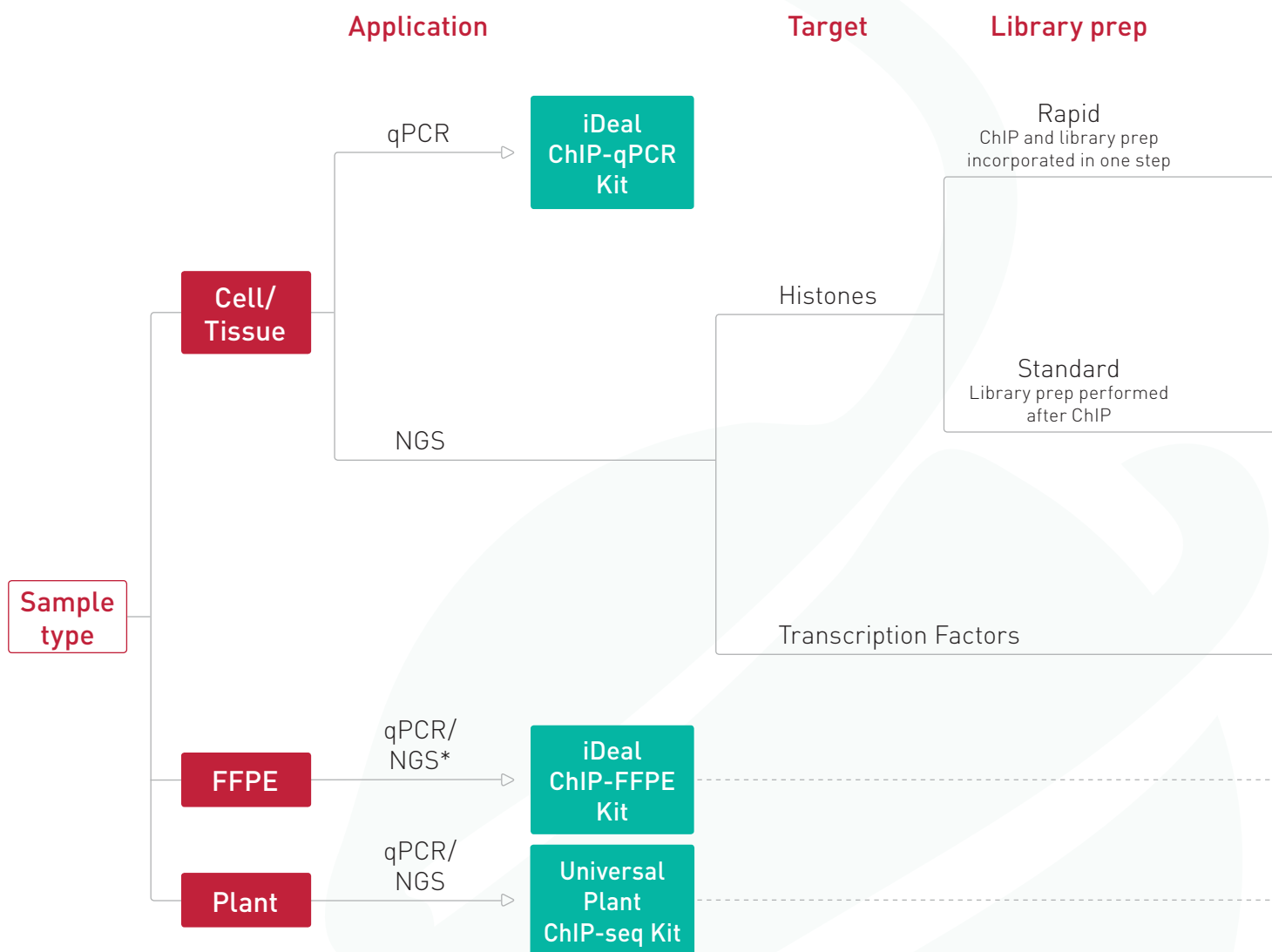


# Chromatin immunoprecipitation kits

Diagenode's optimized, high performance ChIP kits are the result of over 15 years of research and development. We provide a flexible platform that addresses specific research needs with a vast array of optimized ChIP kits.

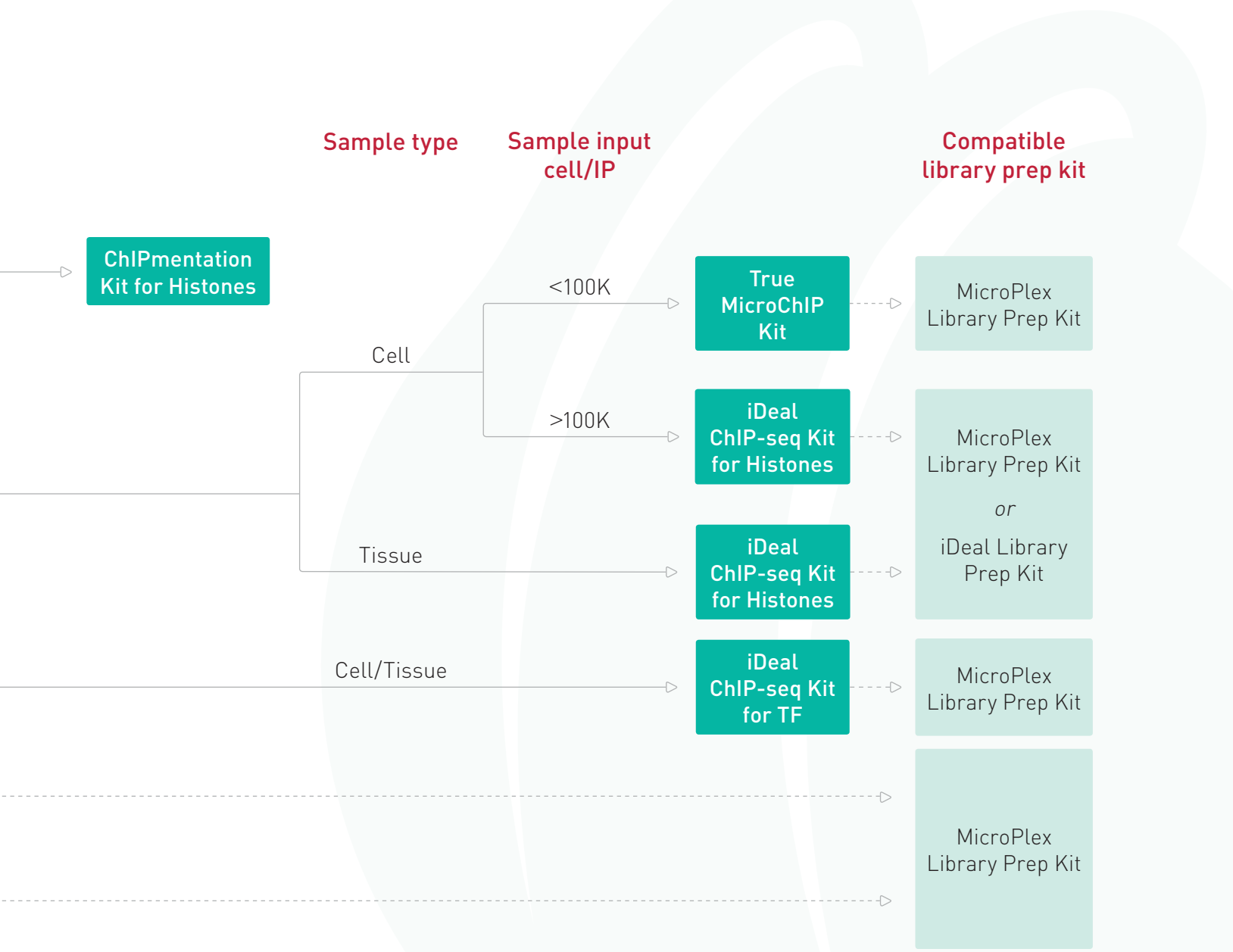
Choose the right kit for your experiment:

## Which ChIP kit is right?



\*The quality of sequencing data depends on the quality of the FFPE sample

- ✓ Complete kits
- ✓ Optimized robust protocols
- ✓ Magnetic beads for more reproducible results
- ✓ Perfect match of sequencing results with reference dataset
- ✓ Many species tested (human, mouse, rat, horse, chicken, cow, pig, plants and more)





## A quick glance: ChIP kit features

	ChIPmentation for Histones	iDeal ChIP-qPCR	iDeal ChIP-seq for Histones
<b>Downstream application</b>	NGS	qPCR	NGS
<b>Starting material: cells per 1 chromatin prep</b>	700 K - 7 M	H: 700 K - 7 M TF: 25 M	700 K - 7 M
<b>Number of cells per 1 IP</b>	5 K - 1 M	H: 100 K - 1 M TF: 4 M	100 K - 1 M
<b>Starting material: tissue per 1 chromatin prep</b>	-	H: 20 mg - 30 mg TF: 200 mg	20 mg - 30 mg
<b>Amount of tissue per 1 IP</b>	-	H: 1.5 - 5 mg TF: 30 mg	1.5 - 5 mg
<b>Target</b>	Histones	Histones, TF	Histones
<b>Included buffers</b>	Cell lysis, Chromatin shearing, Immunoprecipitation	Cell lysis, Chromatin shearing, Immunoprecipitation	Cell lysis, Chromatin shearing, Immunoprecipitation
<b>DNA purification</b>	na	✓	✓
<b>Control antibodies</b>	IgG, H3K4me3	na	IgG, H3K4me3
<b>Control primers</b>	Human: (+)GAPDH, (-)Myoglobin exon 2	na	Human: (+)GAPDH TSS, (-)Myoglobin exon 2
<b>Library prep reagents</b>	✓	na	Separately in MicroPlex Lib Prep or iDeal Lib Prep
<b>Indexes</b>	24	na	Separately in MicroPlex Lib Prep or iDeal Lib Prep
<b>Manual Kits</b>	<a href="#">C01011010</a> (24 rxns)	<a href="#">C01010180</a> (24 rxns)	<a href="#">C01010050</a> (10 rxns) <a href="#">C01010051</a> (24 rxns) <a href="#">C01010059</a> (100 rxns)
<b>Automated Kits - for IP-Star</b>	<a href="#">C01011000</a> (24 rxns)	<a href="#">C01010181</a> (24 rxns)	<a href="#">C01010057</a> (24 rxns) <a href="#">C01010171</a> (100 rxns)
<b>Compatible Chromatin Shearing Optimization Kit</b>	<a href="#">C01020010</a>	<a href="#">C01020013</a>	<a href="#">C01020010</a>
<b>Services</b>	✓	✓	✓

FEATURES

ORDERING



## KIT

iDeal ChIP-seq for TF	True MicroChIP	iDeal ChIP-FFPE Kit	Universal Plant ChIP-seq
NGS	qPCR, NGS	qPCR, NGS	qPCR, NGS
25 M	20 K - 100 K	-	-
4 M	10 K - 100 K	-	-
200 mg	-	up to 6 slides	0.1 - 2 g
30 mg	-	up to 6 slides	0.007 - 0,13 g
TF	Histones	Histones, TF	Histones
Cell lysis, Chromatin shearing, Immunoprecipitation	Cell lysis, Chromatin shearing, Immunoprecipitation	Cell lysis, Chromatin shearing, Immunoprecipitation	Cell lysis, Chromatin shearing, Immunoprecipitation
✓	Separately - MicroChIP DiaPure columns C03040001	✓	✓
IgG, CTCF	IgG, H3K4me3	-	IgG, H3K4me3
Human: (+)H19, (-)Myoglobin exon 2	Human: (+)GAPDH TSS, (-)Myoglobin exon 2	-	Arabidopsis: (+)FLC-ATG, (-)FLC-Intron1
Separately in MicroPlex Lib Prep	Separately in MicroPlex Lib Prep	Separately in MicroPlex Lib Prep	Separately in MicroPlex Lib Prep
Separately in MicroPlex Lib Prep	Separately in MicroPlex Lib Prep	Separately in MicroPlex Lib Prep	Separately in MicroPlex Lib Prep
C01010054 (10 rxns) C01010055 (24 rxns) C01010170 (100 rxns)	C01010130 (16 rxns)	C01010190 (24 rxns)	C01010152 (24 rxns)
C01010058 (24 rxns) C01010172 (100 rxns)	C01010140 (16 rxns)	-	C01010153 (24 rxns)
C01020013	C01020012	C01020013	C01020014
✓	✓	✓	✓

# Library preparation kits

Diagenode's library preparation kits have been extensively validated with ChIP-seq samples. The MicroPlex Library Preparation Kit, which uses a simple 3-step protocol, is an optimal choice for library preparation, especially for very low inputs of DNA down to 50 pg. Moreover, the kits are available with either single or dual index options. For standard DNA inputs, the iDeal Library Preparation Kit can be also used.

FEATURES	KIT		
	MicroPlex Library Preparation	iDeal Library Preparation	
Sample	Fragmented dsDNA		Fragmented dsDNA
Input	50 pg - 50 ng		5 ng - 1 µg
Protocol	3 steps in one tube		3 steps
Hands on time	2 hours		3 hours
Intermediate purification	no		yes
Sequencing technology	Illumina®		Illumina®
Indexes	Single	Dual	Single
Multiplexing	Up to 48 samples	Up to 384 samples	Up to 24 samples
Indexes	Included in the kit	Available separately	Included in the kit (1-12) + available separately (13-24)
Manual protocol	✓	✓	✓
Automated protocol	✓	✓	✓

## MicroPlex Library Preparation kit v3 - with dual indexes

### KITS\*:

C05010001 - MicroPlex Lib. Prep Kit v3 /48 rxns

C05010002 - MicroPlex Lib. Prep Kit v3 /96 rxns

### DUAL INDEXES:

C05010003 - 24 Dual indexes for MicroPlex Kit v3 /48 rxns

C05010004 - 96 Dual indexes for MicroPlex Kit v3 – Set I /96 rxns

C05010005 - 96 Dual indexes for MicroPlex Kit v3 – Set II /96 rxns

C05010006 - 96 Dual indexes for MicroPlex Kit v3 – Set III /96 rxns

C05010007 - 96 Dual indexes for MicroPlex Kit v3 – Set IV /96 rxns

\*The dual indexes are not included in the kits.

## MicroPlex Library Preparation Kit v2 - with single indexes

C05010012 - MicroPlex Lib. Prep Kit v2 (12 indexes) /12 rxns

C05010013 - MicroPlex Lib. Prep Kit v2 (12 indexes) /48 rxns

C05010014 - MicroPlex Lib. Prep Kit v2 (48 indexes) /48 rxns

## iDeal Library Preparation Kit – with single indexes

C05010020 - iDeal Lib. Prep Kit x24 (incl. Index Primer Set 1)

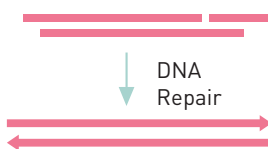
C05010021 - Index Primer Set 2 (iDeal Lib. Prep Kit x24)

# How the MicroPlex Library Preparation Kit Works

## STEP 1 Template preparation

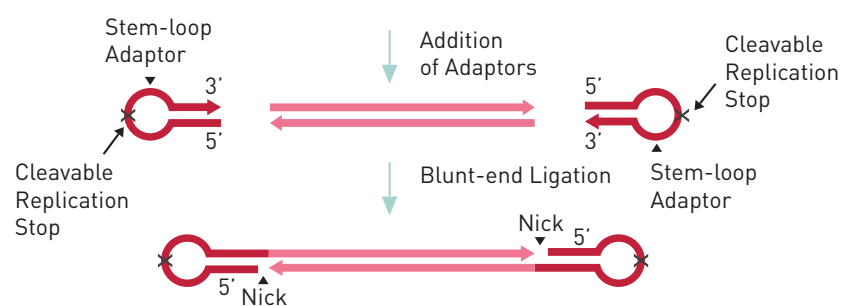
5 minutes\*

Template:  
Fragmented  
dsDNA/cDNA



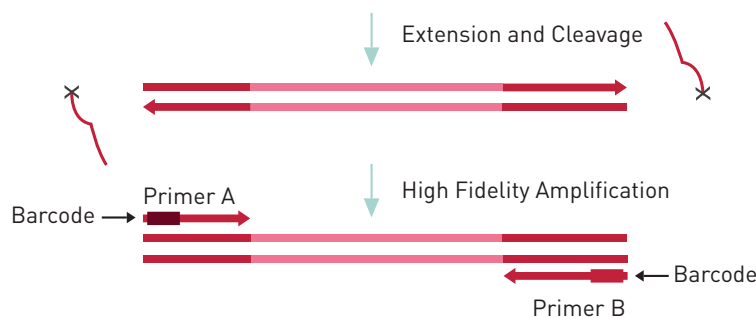
## STEP 2 Library synthesis

5 minutes\*



## STEP 3 Library amplification

5 minutes\*



\* hands-on-time

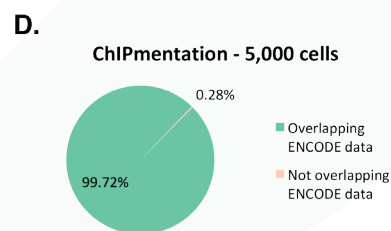
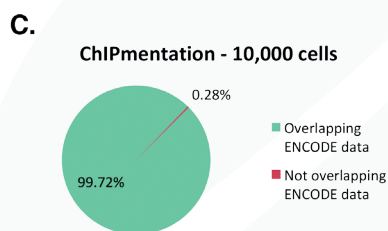
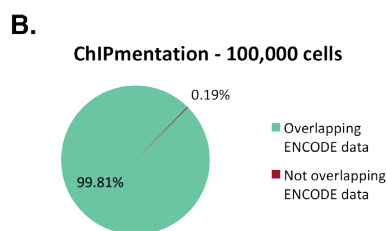
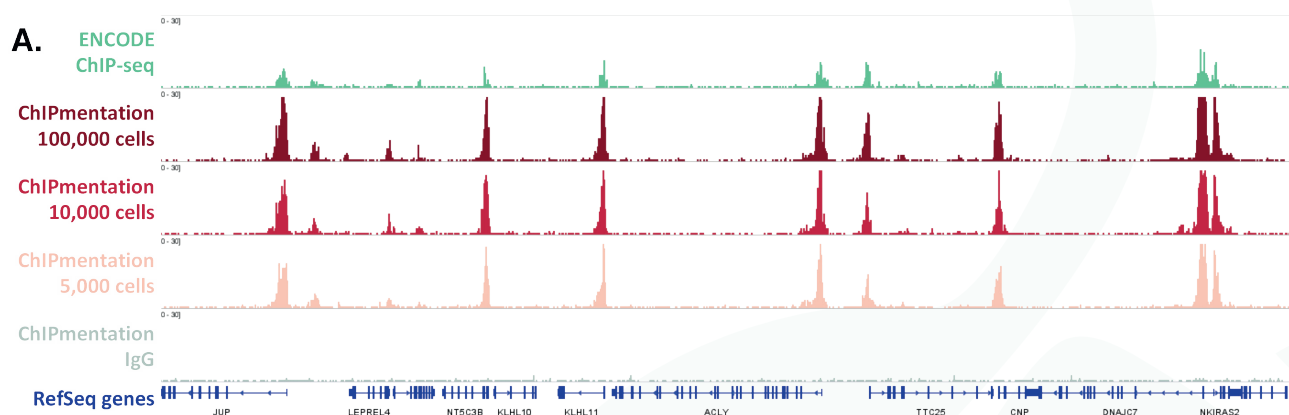
### **Microplex workflow - protocol with dual indexes.**

An input of 50 pg to 50 ng of fragmented dsDNA is converted into sequencing-ready libraries for Illumina® NGS platforms using a fast and simple 3-step protocol.

# ChIPmentation

Diagenode's unique ChIPmentation technology, based on tagmentation, enables the integration of library preparation during ChIP itself using a transposase loaded with sequencing adaptors. Unlike standard library preparation techniques that require many steps, ChIPmentation incorporates an easier and shorter protocol. Moreover, this reduced number of steps allows successful IPs on lower amounts of chromatin, which makes it ideal to analyze numerous histone marks on each chromatin sample.

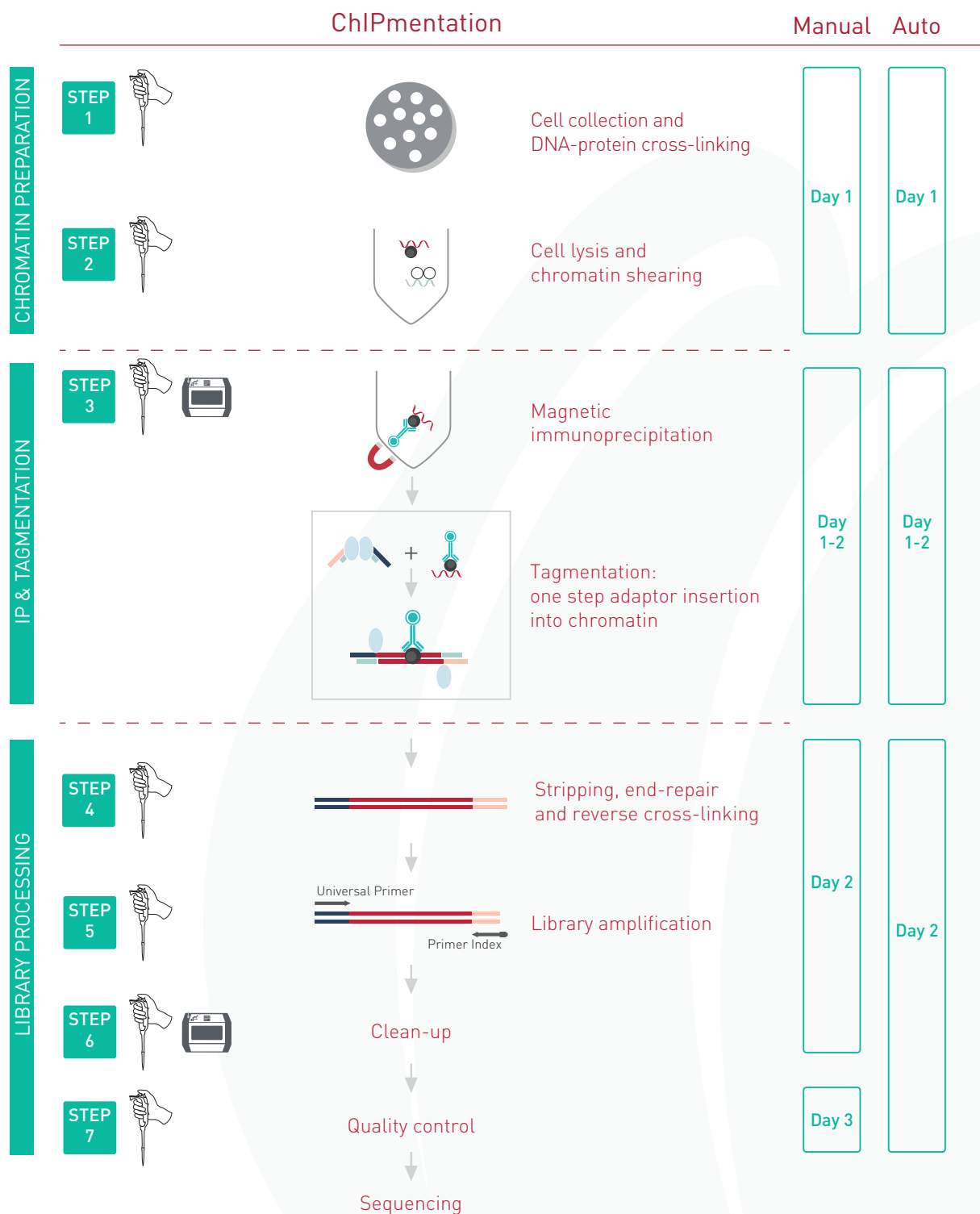
- ✓ Easier and faster than classical ChIP-seq
- ✓ Validated for various histone marks
- ✓ Ideal for analysis of large cohorts of samples
- ✓ Ideal for analysis of large number of marks on a unique sample
- ✓ High quality sequencing data



## ChIPmentation sequencing results obtained from decreasing starting amounts of cells.

Chromatin preparation has been performed on 7 M K562 cells using the ChIPmentation Kit for Histones (Cat. no. C01011010). Diluted chromatin from 100,000, 10,000 and 5,000 cells was used for the immunoprecipitation with the Diagenode antibody targeting H3K4me3 (Cat. no. C15410003). A. Distribution of the ChIPmentation readsets in a representative region of the genome. B., C. and D. Comparison of the top 40% peaks from 100,000 (B.), 10,000 (C.) and 5,000 (D.) cells with ENCODE dataset.

# ChIPmentation workflow



## LEGEND

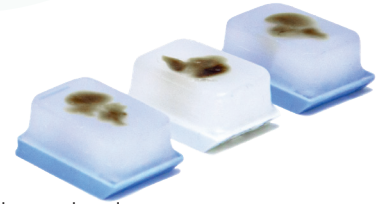


# Kits and reagents highlights

## CHIP ON FFPE SAMPLES

### iDeal ChIP-FFPE Kit

- ✓ Fast and user-friendly deparaffinization workflow
- ✓ Deparaffinization: less toxic than a conventional xylene-based method
- ✓ Easy recovery of re-hydrated tissue due to DiaFilter columns
- ✓ Fast chromatin preparation without enzymatic digestion
- ✓ A mild de-crosslinking preserves dsDNA
- ✓ Eluted DNA suitable for qPCR analysis or other down-stream applications



## CHIP ON PLANT

### Universal Plant ChIP-seq kit

- ✓ Specifically optimized for extracting plant chromatin
- ✓ Optimized crosslinking (crosslinking bags)
- ✓ Compatible with low input
- ✓ Higher enrichment
- ✓ Higher DNA recovery after ChIP
- ✓ Tested on many plant species (tomato, populus, Arabidopsis, rice and others)
- ✓ Validated with MicroPlex Library Preparation Kit for library prep



## DNA PURIFICATION

The **IPure kit v2** (C03010014 (24 rxns), C03010015 (100 rxns)), based on magnetic beads, is specifically optimized for efficient DNA purification after ChIP.

- ✓ Significantly greater yields than with column-based purification
- ✓ Recovery of small amounts of DNA
- ✓ Straightforward protocol using magnetic beads
- ✓ Toxic reagents not used (e.g. phenol/chloroform)
- ✓ Provides pure DNA for any downstream application (e. g. NGS)



# Other solutions to use with our products or your own protocols

## FIXATION REAGENT FOR INDIRECT PROTEINS

For proteins not bound directly to DNA, use **ChIP Cross-link Gold** (Cat. No. C01019027) for efficient protein-protein fixation in higher order or dynamic interactions.

## VALIDATED ANTIBODIES

- ✓ **ChIP and ChIP-seq validation** - As the expert in epigenetics we validate our antibodies in epigenetic applications: ChIP and ChIP-seq
- ✓ **Rigorous QC** - Many steps of validation with stringent criteria - only the antibodies which pass QC are added to the catalog
- ✓ **Batch-specific data** - Each batch of antibody is validated and the data are presented on the website



Check out the list of our highly validated antibodies at [www.diagenode.com](http://www.diagenode.com)

## CHIP NEGATIVE CONTROLS

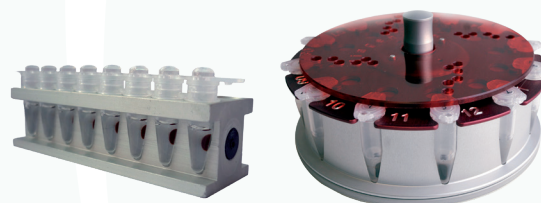
Depending on the antibody of interest, choose between **rabbit, mouse** or **rat IgG**.

## BEADS

Extensively validated magnetic and agarose beads validated for isolation of immune complexes in ChIP experiments.

## MAGNETIC RACK

Use Diagenode's DiaMag 0.2 ml and/or DiaMag 1.5 ml, for fast and efficient isolation of magnetic beads.



## PRIMER PAIRS

Check out our list of ChIP/ChIP-seq grade primer pairs on our website.

Shop online in our EpiStore at  
[www.diagenode.com](http://www.diagenode.com)