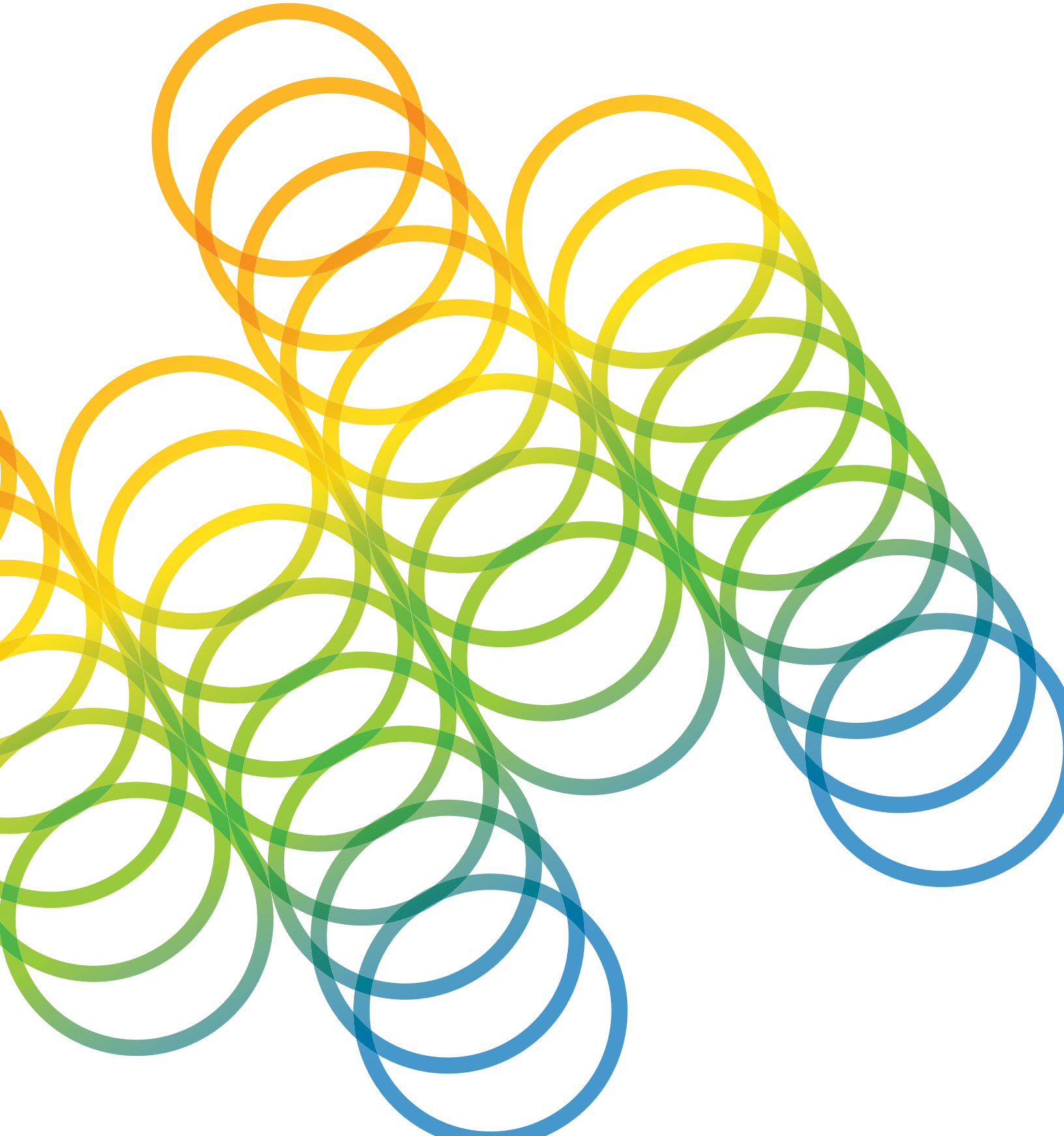
EpiCypher®
Bringing Epigenetics to Life

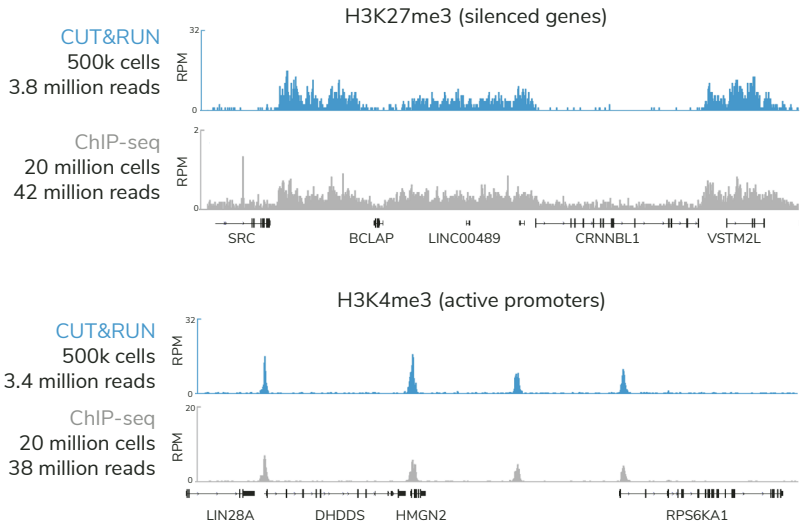
CUTANA™ CUT&RUN Assays for ultrasensitive genomic mapping



CUTANA™ CUT&RUN Assays

Cleavage Under Targets and Release Using Nuclease (CUT&RUN) is a breakthrough method for genomic mapping of protein-DNA interactions and histone post-translational modifications (PTMs). Compared to existing technologies, CUTANA™ CUT&RUN assays generate higher quality data with significant improvements in sensitivity and costs.

CUT&RUN assays offer distinct advantages over ChIP-seq



- Save 10X in sequencing costs
- Use fewer cells (down to 5k)
- Works with most targets, cell types, and processing conditions
- User-friendly workflow with reliable results

FIGURE 1

Representative genome browser tracks show H3K27me3 and H3K4me3 enrichment in K562 cells, generated using CUTANA™ CUT&RUN assays (blue; by EpiCypher) and ChIP-seq (gray; from ENCODE).

Overview of the CUTANA CUT&RUN approach

How is CUT&RUN different from ChIP?

- Streamlined: cells to data in < 4 days
- Less optimization: no cell lysis or chromatin fragmentation
- Target is selectively enriched without IP
- Improved signal-to-noise and reduced background

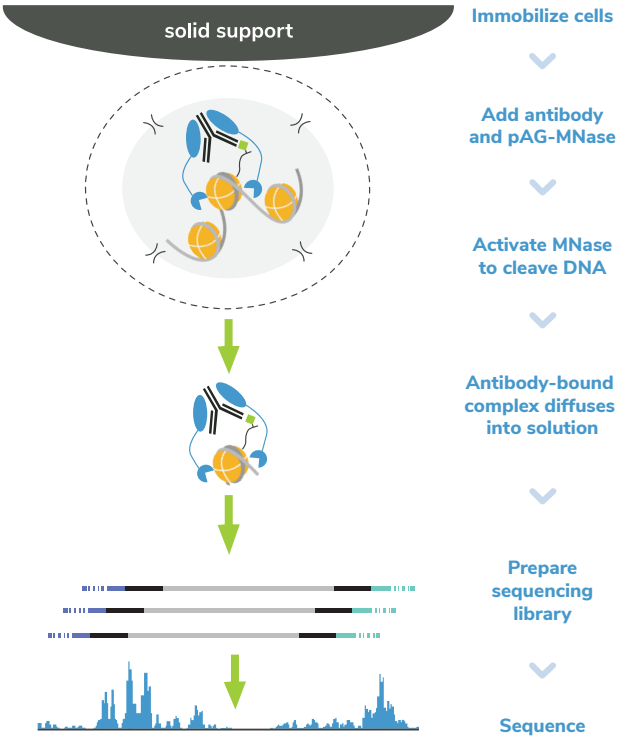
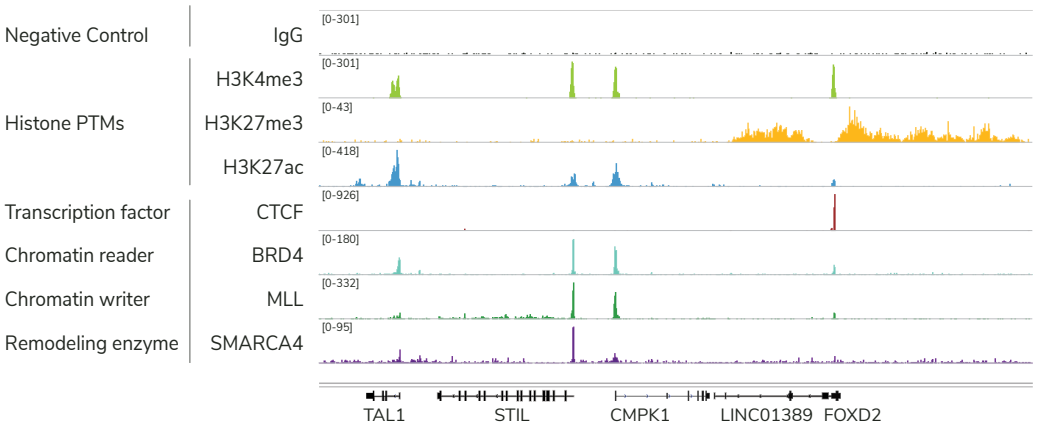


FIGURE 2

Immobilized cells/nuclei are permeabilized and labelled with an antibody. A fusion of Proteins A and G with micrococcal nuclease (pAG-MNase) is added and activated, cleaving antibody-bound DNA. Clipped DNA is purified for sequencing.

Why use CUT&RUN?

Compatible with diverse and challenging targets

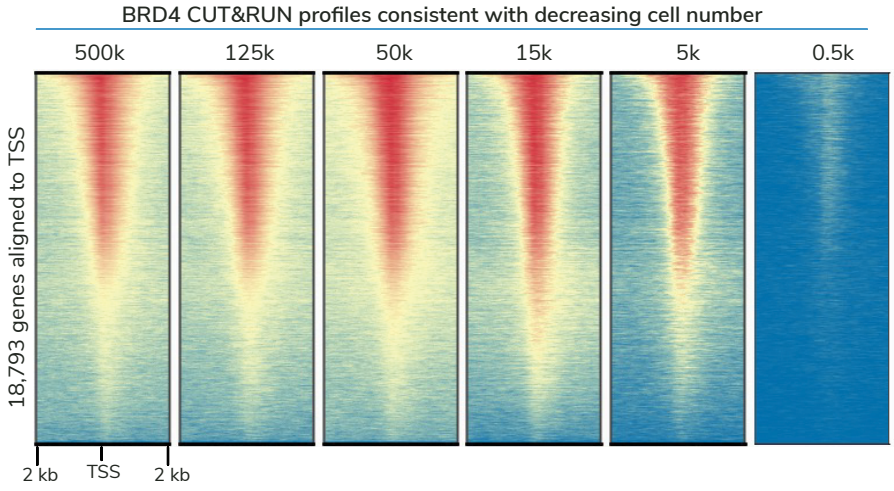


Access targets that are historically difficult to study, including chromatin remodeling enzymes.

FIGURE 3

Representative genome browser tracks show CUTANA™ CUT&RUN results using K562 cells. Observed peaks show expected distribution profiles using 3-8 million sequencing reads per reaction for a variety of epigenetic targets.

Use low cell numbers without sacrificing data quality

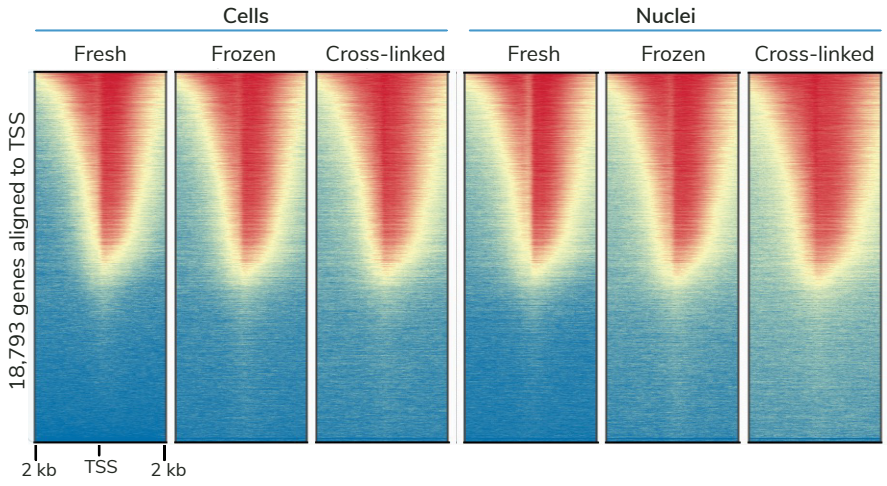


Generate data with high signal-to-noise using as few as 5,000 cells.

FIGURE 4

BRD4 profiles from K562 cells aligned to the transcription start site (TSS). Gene rows in each heatmap are aligned relative to 500k cell input. Signal is indicated by a color gradient from red (high) to blue (low).

Fresh, frozen, or fixed – CUT&RUN can handle it all



Use preferred sample processing conditions with confidence.

FIGURE 5

Indistinguishable H3K4me3 profiles from K562 cells/nuclei aligned to the TSS. Gene rows in each heatmap are aligned relative to fresh cells. Signal is indicated by a color gradient from red (high) to blue (low).

Quantitative chromatin profiling with SNAP-CUTANA™ Spike-in Controls

SNAP-CUTANA™ Spike-in Controls are defined panels of highly pure, DNA-barcoded nucleosomes carrying widely-studied histone PTMs. These panels provide unparalleled troubleshooting support for truly quantitative and reliable CUT&RUN assays.

Applications

- *In situ* validation of antibody specificity
- Direct readout of assay success
- Troubleshoot experiments
- Monitor assay performance across experiments
- Quantitative sample normalization

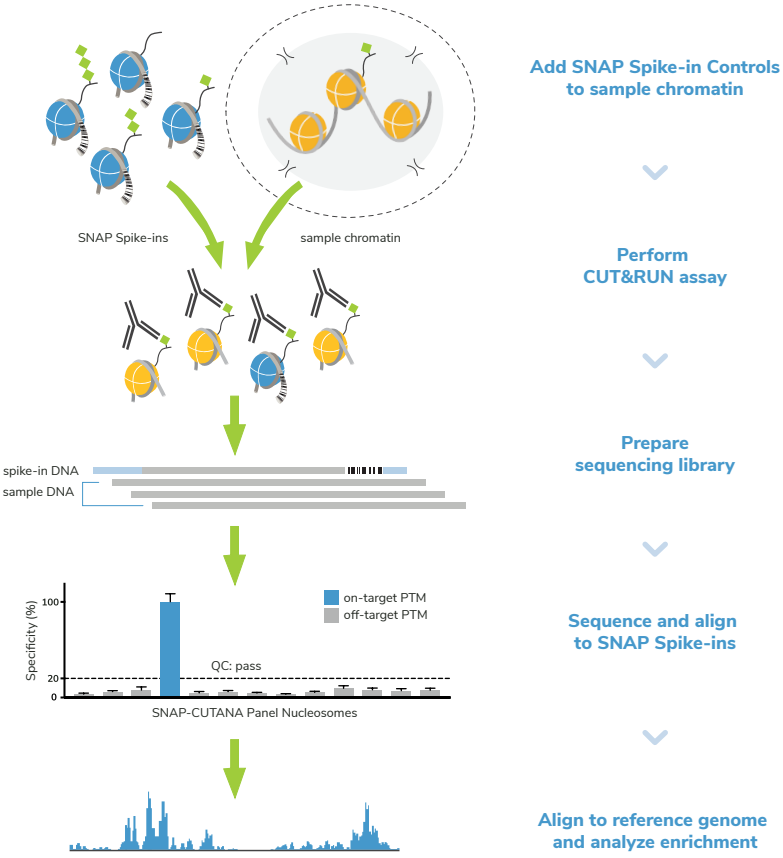


FIGURE 6

SNAP-CUTANA™ Spike-ins are added to CUT&RUN reactions prior to antibody addition and are processed alongside sample chromatin. DNA barcodes enable analysis of on- and off-target spike-in recovery from sequencing data.

Robust antibodies directly validated in CUT&RUN applications

ChIP antibody validation does not predict success in CUT&RUN. Our CUTANA™ CUT&RUN antibodies are tested for reliable performance in CUT&RUN assays. Available for histone PTMs and chromatin-associated protein (CAP) targets.

- High signal-to-noise, low background
- CAPs (e.g. transcription factors): display expected peak structures and motif enrichment (see figure)
- Histone PTMs: exquisite target specificity and high enrichment efficiency

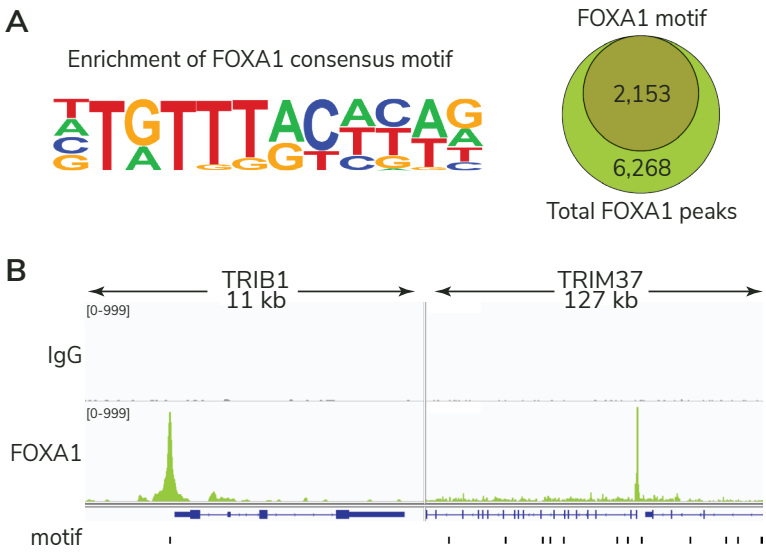
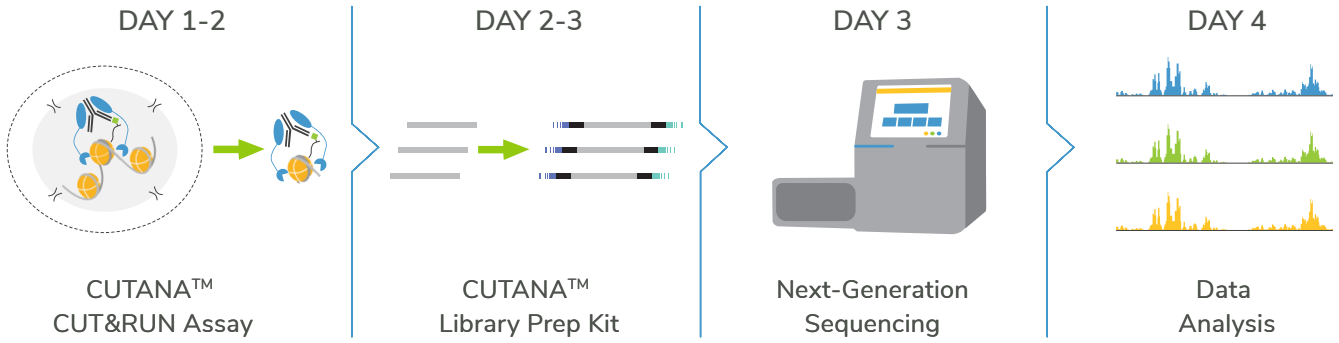


FIGURE 7

EpiCypher antibody to FOXA1 (Cat. No 13-2001) enriches for the FOXA1 consensus motif in CUT&RUN assays using K562 cells (A,B).

Streamlined workflow: **Cells to data in < 4 days**

EpiCypher has developed a robust and user-friendly CUT&RUN workflow. The improved throughput and lower costs allow researchers to fully leverage epigenomic mapping for their research projects.



CUTANA Kits: **An end-to-end solution for easy CUT&RUN experiments**

Together, the CUTANA™ CUT&RUN Kit and CUT&RUN Library Prep Kit get your experiment started faster.

Why use our kits?

- All the essentials you need to go from cells to sequence-ready libraries
- Includes validated spike-ins and control antibodies
- Library prep **specifically optimized** for CUT&RUN
- Detailed FAQs and troubleshooting tips

Complete your CUT&RUN assay with **validated reagents and protocols**

For a do-it-yourself option, EpiCypher offers the CUTANA™ CUT&RUN Protocol (epicypher.com/protocols) and supporting reagents.

Resources to get you started:

- Do-it-yourself protocol and video
- pAG-MNase – key CUT&RUN enzyme
- ConA beads, magnetic stands
- Antibodies directly validated in CUT&RUN
- Spike-in controls – data normalization

EpiCypher®

CUTANA™

Products and Services

KITS

Follow these links to EpiCypher's optimized CUTANA™ CUT&RUN and Library Prep Kits, which include reagents and detailed protocols to go from cells to sequence-ready DNA libraries.

CUT&RUN Kit

CUT&RUN Library Prep Kit

ORDERING INFO:

CUT&RUN Kit
48 reactions
Cat. No. 14-1048

CUT&RUN Library Prep Kit
48 reactions
Cat. No. 14-1001- Primer Set 1
Cat. No. 14-1002 - Primer Set 2

PROTOCOLS

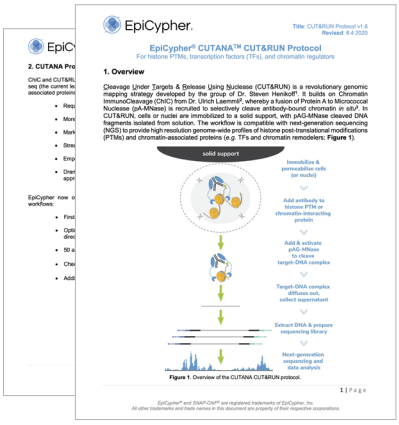
PROTOCOLS & RESOURCES

EpiCypher offers a fully-validated CUT&RUN protocol, along with a corresponding video walk-through explaining the technology.

CUT&RUN Protocol: epicypher.com/protocols
CUT&RUN Protocol Video: youtu.be/hze84YxZJU8

Literature: Skene and Henikoff *eLIFE* 2017 (PMID : 28079019)
Literature: Meers et al. *eLIFE* 2019 (PMID : 31232687)
- Paper describes optimized protocol using pAG-MNase

Inquire at info@epicypher.com to learn more about CUT&RUN services.


EpiCypher®
EpiCypher® CUTANA™ CUT&RUN Protocol
1. Overview

PRODUCTS

REAGENTS & TOOLS

pAG-MNase
50 / 250 reactions
Cat. No. 15-1016
Cat. No. 15-1116

DNA Purification Kit
48 reactions
Cat. No. 14-0050

ConA Conjugated Paramagnetic Beads
50 / 250 reactions
Cat. No. 21-1401
Cat. No. 21-1411

0.2 mL Magnetic Separation Rack
Cat. No. 10-0008

1.5 mL Magnetic Separation Rack
Cat. No. 10-0012

8-strip 0.2 mL PCR Tubes
120 strips
Cat. No. 10-0009

SPIKE-IN CONTROLS

SNAP-CUTANA™ K-MetStat Panel
Cat. No. 19-1002

E. coli **Spike-in DNA**
Cat. No. 18-1401

CUT&RUN ANTIBODIES*

H3K4me3
Cat. No. 13-0041

CTCF
Cat. No. 13-2014

HA Tag
Cat. No. 13-2010

BRD4
Cat. No. 13-2003

BRG1/SMARCA4
Cat. No. 13-2002

p53
Cat. No. 13-2015

EZH2
Cat. No. 13-2026

* for a complete list, visit epicypher.com/cut-and-run-antibodies

EpiCypher®
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