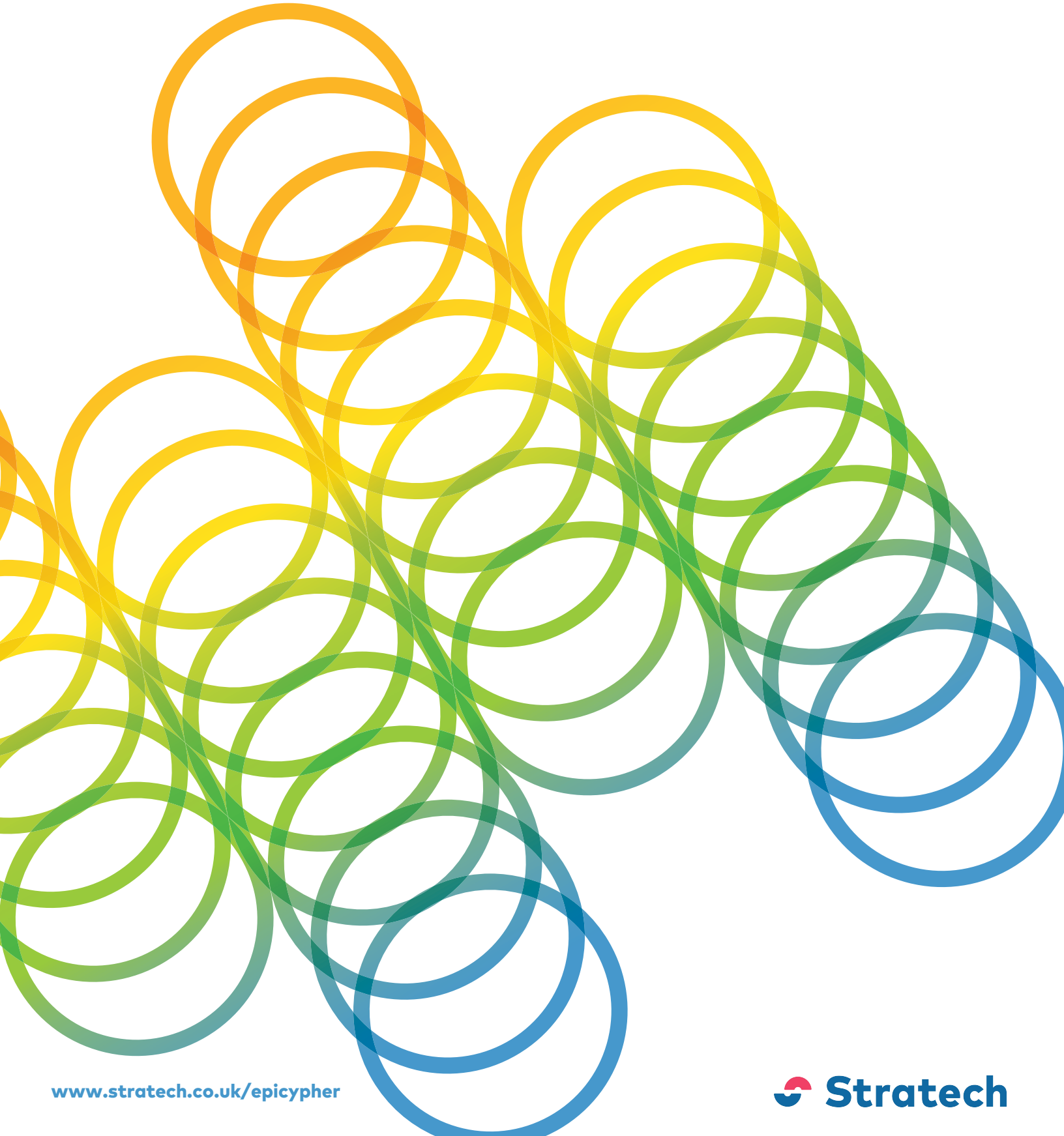




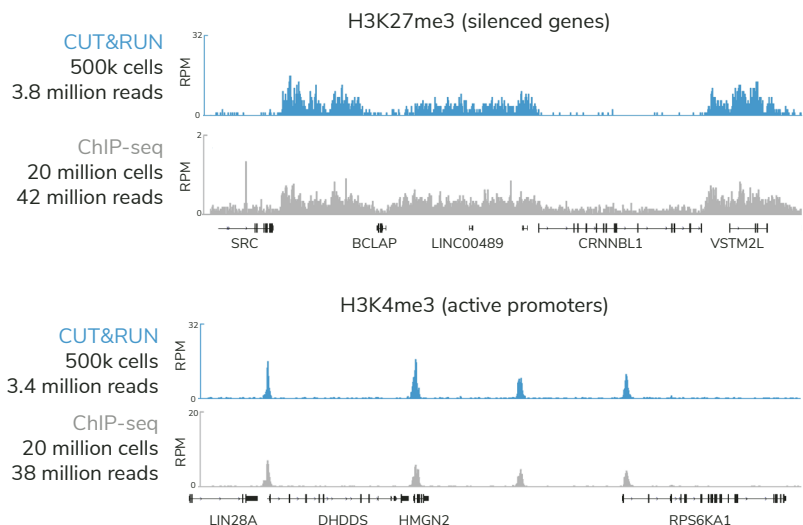
CUTANA™  
CUT&RUN Assays  
for ultrasensitive  
genomic mapping



# 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).

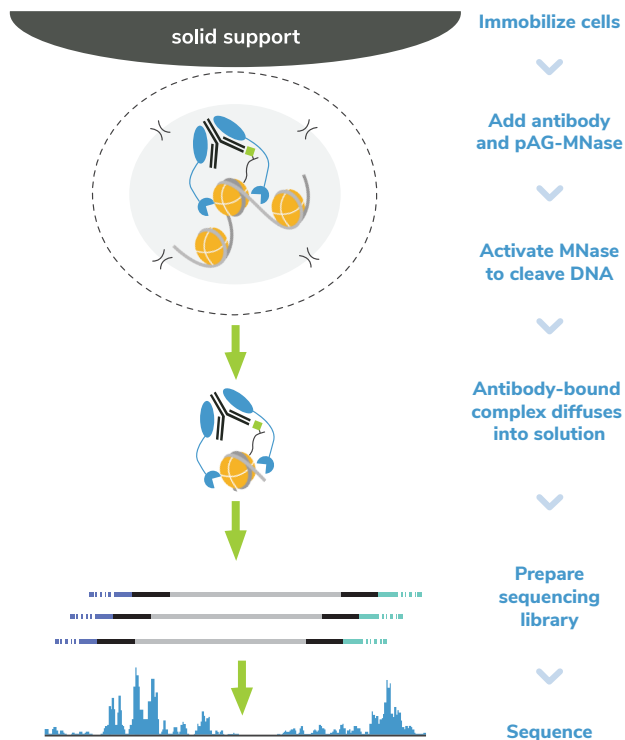
## Overview of the CUTANA CUT&RUN approach

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

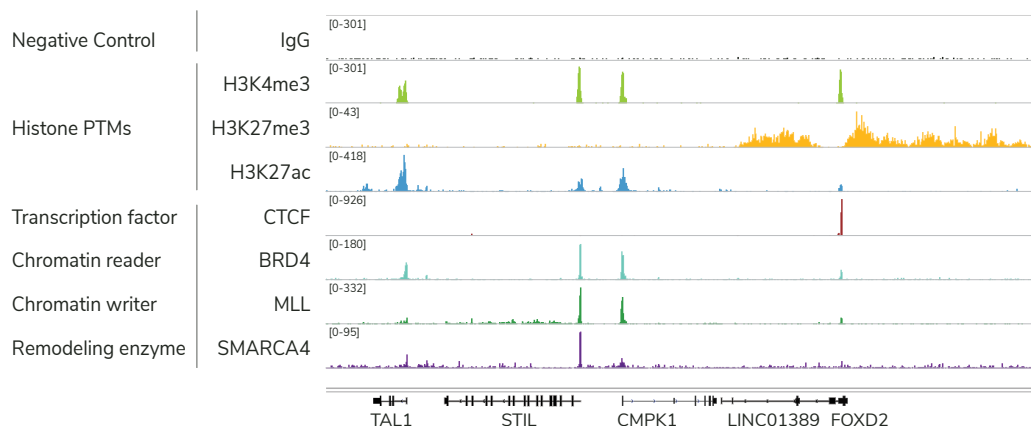
**FIGURE 2**

Immobilized cells/nuclei are permeabilized and labeled 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

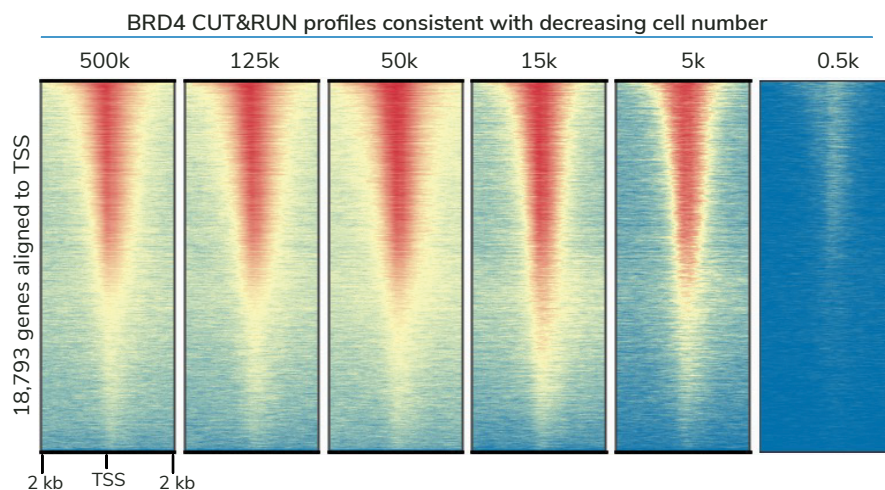


Access targets that are historically difficult to study, including chromatin remodeling enzymes.

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

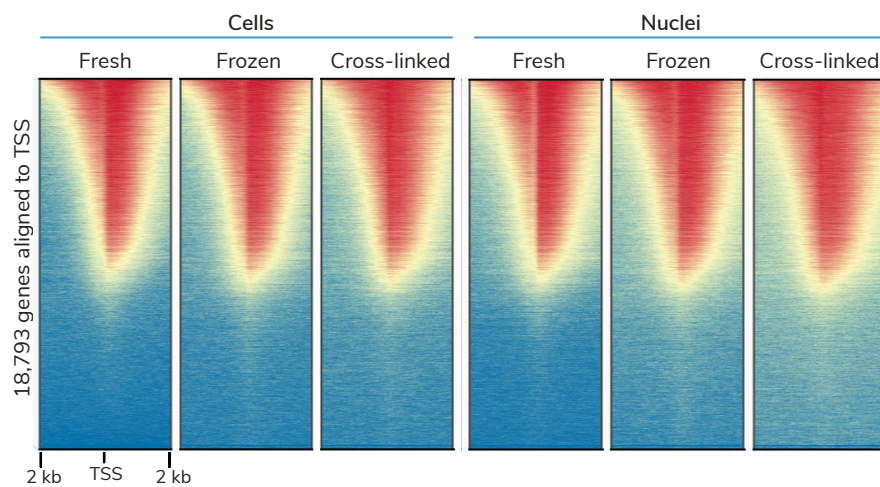


Generate data with high signal-to-noise using as few as 5,000 cells.

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

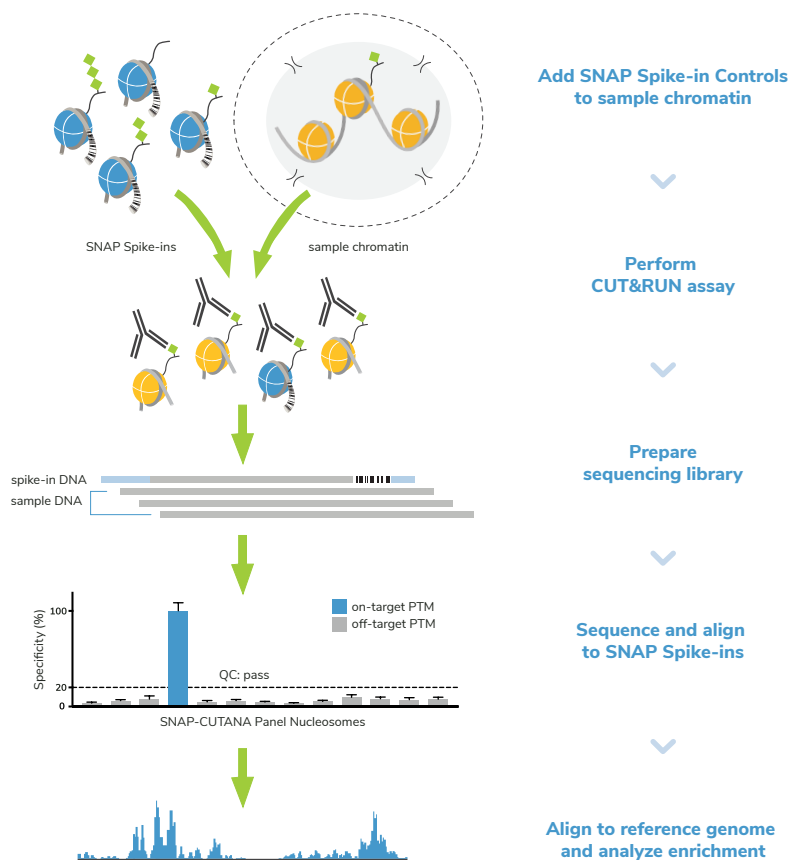
SNAP-CUTANA™ Spike-in Controls are defined panels of highly pure, DNA-barcoded nucleosomes carrying widely-studied histone PTMs. These panels provide unparalleled troubleshooting support for truly quantitative and reliable CUT&RUN assays.

### 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.



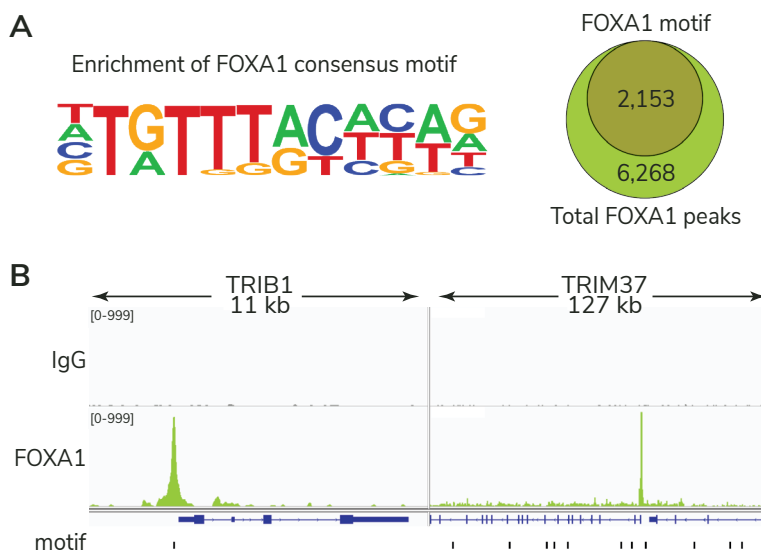
## Robust antibodies directly validated in CUT&RUN applications

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

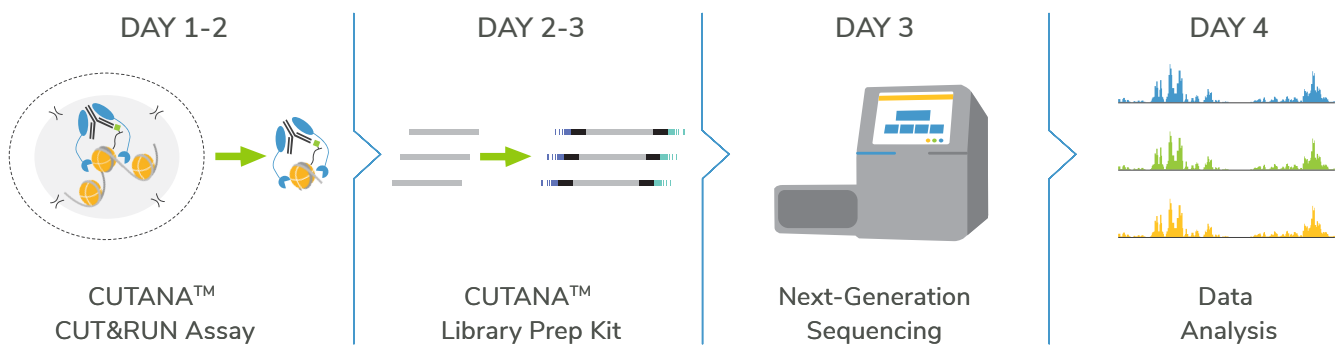
FIGURE 7

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](http://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

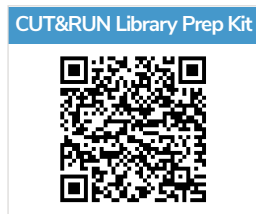


# CUTANA™

## 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.



### 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.

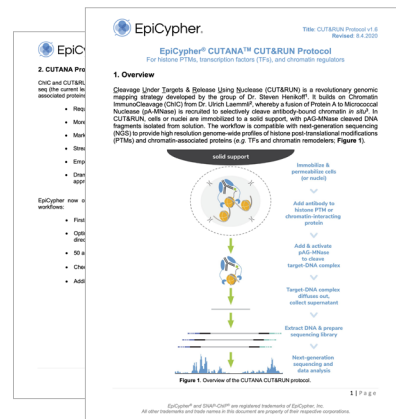
CUT&RUN Protocol: [epicypher.com/protocols](http://epicypher.com/protocols)

CUT&RUN Protocol Video: [youtu.be/hze84YxZJU8](https://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](mailto:info@epicypher.com) to learn more about CUT&RUN services.



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](http://epicypher.com/cut-and-run-antibodies)

