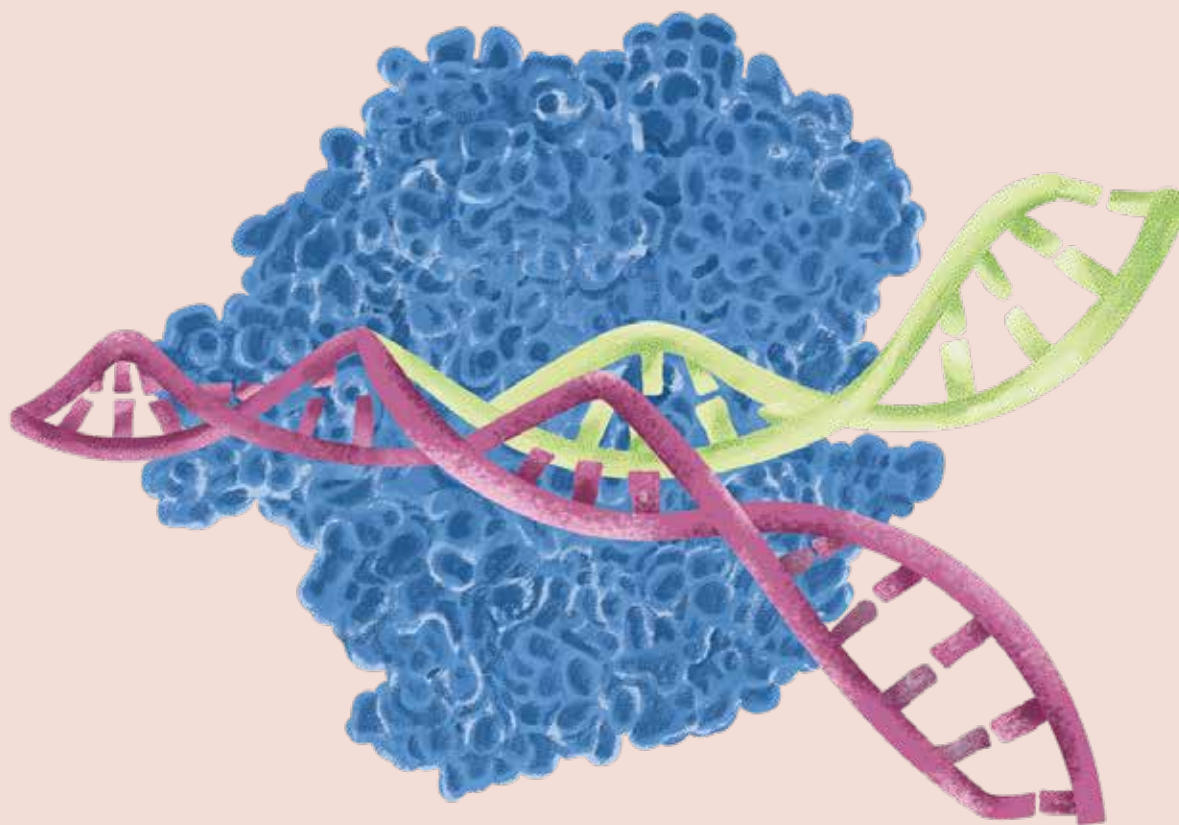




# Gene Editing Enzymes & Reagents

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GMP-Grade, GMP-Ready,  
& Research-Grade



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60 Hickory Drive  
Waltham, MA 02451  
United States

# GMP-Grade Cas9 Nuclease (#GMP-CAS-EE109)

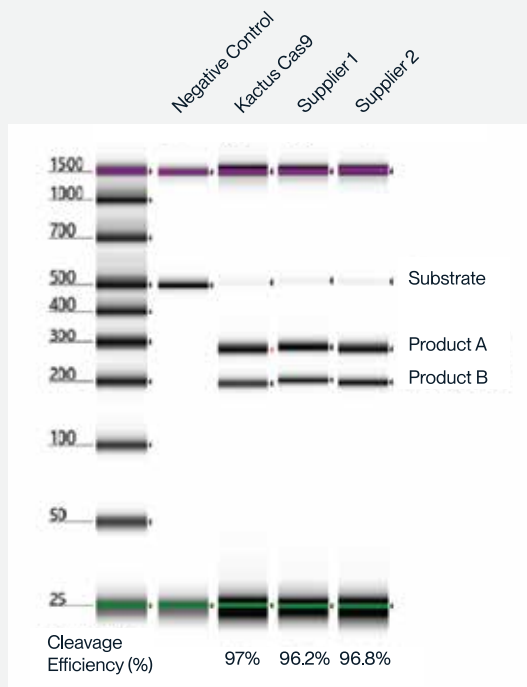
KACTUS has successfully designed a highly-active CRISPR Cas9 nuclease. Using our protein engineering platform, our Cas9 has undergone codon optimization, nuclear localization signal (NLS) design, and optimization of *E. coli* expression and purification.

To assist with detection of residual Cas9 nuclease in your drug product or ancillary materials, we've developed a Cas9 ELISA kit (Catalog #CAS-MM00B) for extracellular or intracellular detection. Our test kit has a detection range of 0.25 ng/mL to 16 ng/mL, with sensitivity reaching up to 0.125 ng/mL.

## Stability Testing at -20C: In Vitro Cleavage Activity

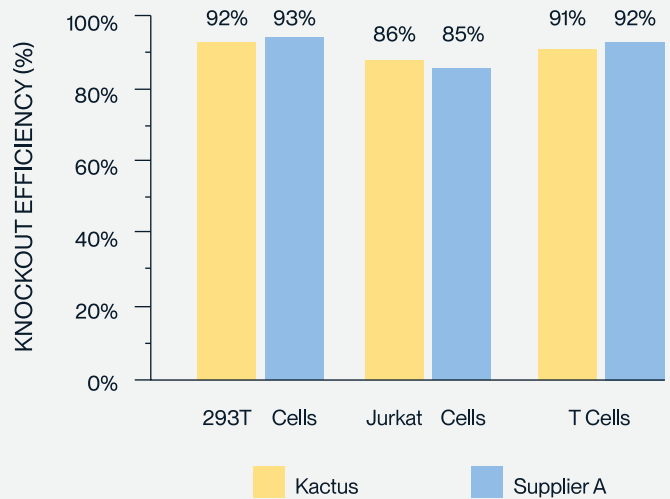
Time (Months)	Batch 1	Batch 2	Batch 3
0	97.1%	96.8%	96.3%
3	97.4%	98.9%	98.4%
6	97.4%	98.0%	97.6%
9	97.8%	98.0%	98.1%
12	98.9%	98.4%	98.8%
18	98.4%	98.5%	98.4%

Results of -20°C, 18-month stability testing for enzyme activity (in vitro cleavage activity) of GMP-Grade CRISPR Cas9.



### High in Vitro Cleavage Activity

Cas9 cleaves substrate DNA standard via *in vitro* cleavage experiment. Results show the cleavage activity of KACTUS Cas9 is equivalent to that of leading suppliers.



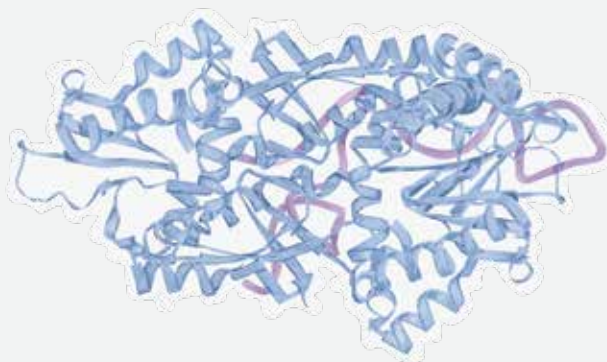
### High Editing Efficacy in Multiple Cell Types

Gene knockout efficiency analyzed in nucleofected 293T, Jurkat, and T cells using TIDE analysis. Results show greater than 85% editing efficacy across all three cell types, comparable to a leading supplier.

# CRISPR Enzymes & ELISA Kits

Due to the convenience of its design and operation, the CRISPR-Cas system has become the most widely used gene editing technology at present. In light of market demand, KACTUS has successfully engineered highly-active Cas9 and Cas12a nucleases. Our CRISPR enzymes offer high editing activity, high purity, and low endotoxin.

To meet the demands of our CMC customers, we offer small- and large-scale production with consistent quality control throughout so you can have a smooth transition scaling up from development to manufacturing.



## Available Products

Catalog Number	Product Name	Grade	Available Sizes
CAS-EE109	CRISPR Cas9 Enzyme	Research-Grade	100µg / 1mg
GMP-CAS-EE109	CRISPR Cas9 Enzyme	GMP-Grade	3mg
CAS-MM00B	CRISPR Cas9 ELISA Kit	Research-Grade	96 Tests
CAS-EE111	SpCas9 D10A Nickase	GMP-Ready	100ug / 1mg
CAS-EE121	AsCas12a Nuclease	GMP-Ready	100ug / 1mg

For bulk quotes, please contact [support@kactusbio.us](mailto:support@kactusbio.us)

## GMP-Grade Quality Control

### Example QC Specifications: Cas9 Nuclease

Assay	Specification
Activity ( <i>In Vitro</i> Cleavage Activity)	> 85%
Endotoxin (Chromogenic)	≤ 10EU/mg
Purity (Bis-Tris, RP-HPLC, & SEC-HPLC)	≥ 95%
Concentration (Non-interfering protein quantification)	9.5-12.5mg/mL
Residual DNase (Qubit Fluorometer)	≤ LOD
Residual RNase (Qubit Fluorometer)	≤ LOD
Residual Host Protein (ELISA)	≤100mg/mL
Residual Host Cell DNA (qPCR)	≤ 200ng/mL
Sterility (Membrane filtration)	Negative
Mycoplasma (qPCR)	Negative

Adhering strictly to cGMP guidelines, our comprehensive quality management system and quality controls ensure the provision of high-quality raw materials from development to manufacturing. Our protein engineering team also offers custom GMP-grade protein production and protein engineering services.

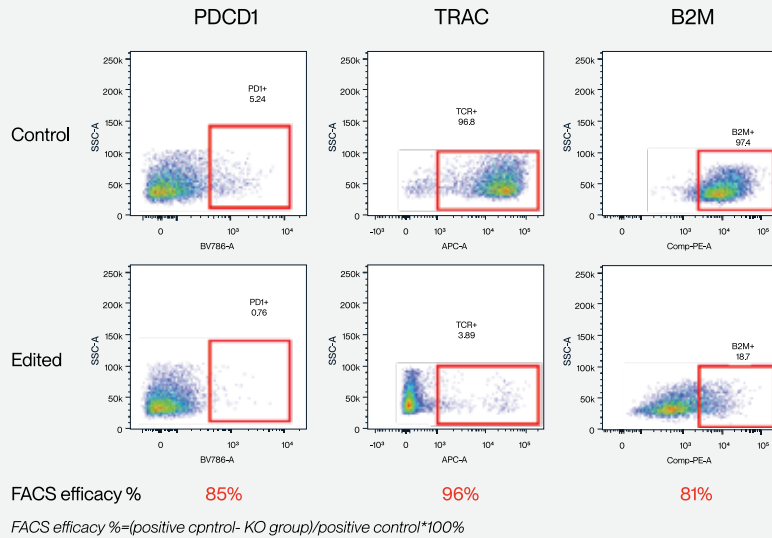
### GMP-Grade Manufacturing

- Produced and quality control tested in adherence with cGMP standards
- Manufacturing Execution System (MES) digital production management system
- Process and analytical method validation
- Testing for stability & batch-to-batch consistency
- Free from antibiotic residues
- Free from raw materials of animal origin
- Comprehensive records for batch production and control
- Supporting regulatory documentation reviewed & approved by Quality Assurance

# AccuBase™ Cytosine Base Editor

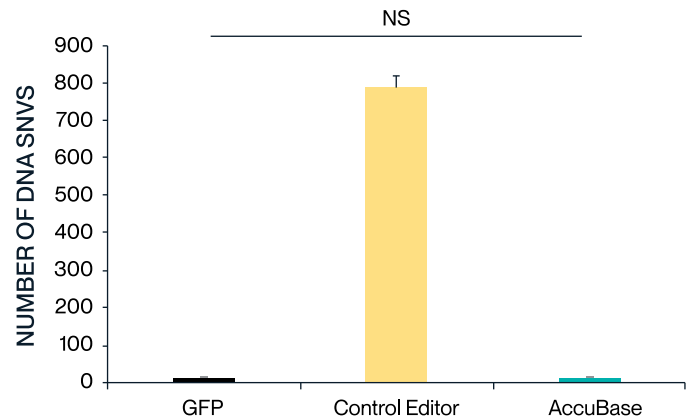
## Engineered base editor to minimize off-target effects

AccuBase™ is a cytosine DNA base editor engineered by Base Therapeutics and expressed and manufactured by KACTUS. It creatively embeds a deaminase inside the Cas protein to prevent random binding of deaminase to non-target sites, significantly reducing off-target occurrence while still maintaining high editing efficiency. KACTUS has successfully developed a GMP-grade manufacturing process for the DNA base editor with high stability, purity, and activity.



AccuBase™ RNP was electroporated into activated primary T cells. According to flow cytometry, AccuBase™ can efficiently knock out PD1, B2M, and TRAC proteins on the membrane of activated primary T cells at the protein level. For PD1 and B2M, the knockout efficiency exceeded 80%, while the knockout efficiency of TRAC reached 96%.

Measurement of off-target effects were analyzed by genome-wide off-target analysis by two-cell embryo injection (GOTI). By leveraging GOTI to measure off-target effects throughout the whole genome, it was shown that compared to the control base editor (with 700 SNVs detected), the number of SNVs obtained after editing with AccuBase™ is similar to the negative control group (GFP), suggesting a near-to-zero off-target effect by AccuBase™.



## Available Products

Catalog Number	Product Name	Grade	Available Sizes
KD-0001	AccuBase™, RUO	Research-Grade	200µg / 500µg / 1mg
GMP-KD-0001	AccuBase™, GMP	GMP-Grade	1mg

Learn more

