Alt-R™ A.s. Cas12a (Cpf1) *ULTRA* NUCLEASE

Enhanced performance and high editing efficiency even at low temperatures

Achieve higher on-target potency with editing as efficient as Cas9

Simplify your workflow with Cas12a guided by a short, single guide RNA

Target organisms with AT-rich genomes

High activity at temperatures optimal for ectothermic organisms

Maximize precision edits with improved rates of HDR using Cas12a *Ultra*

Alt-R A.s. Cas12a (Cpf1) Ultra enzyme is a high purity, recombinant *Acidaminococcus sp.* Cas12a protein that is the result of protein engineering and directed evolution. The improvements to the Alt-R A.s. Cas12a Ultra enzyme now make it as reliable as the Cas9 nuclease.

The new Alt-R A.s. Cas12a Ultra nuclease can recognize many TTTT PAM sites in addition to TTTV motifs, expanding the target range for genome editing studies (Figures 1 and 2). Alt-R A.s. Cas12a Ultra is also active at room temperature, making it a powerful tool for applications requiring editing at lower temperatures. The Alt-R A.s. Cas12a Ultra enzyme easily replaces existing A.s. Cas12a (Cpf1) nuclease in related applications, with no need for protocol changes (Figure 3). The enzyme is compatible with other components of the Alt-R CRISPR-Cas12a system to enable precise genome editing through the same advantageous ribonucleoprotein (RNP)-based workflow.

Alt-R A.s. Cas12a Ultra protein demonstrates enhanced activity with TTTV target site selection

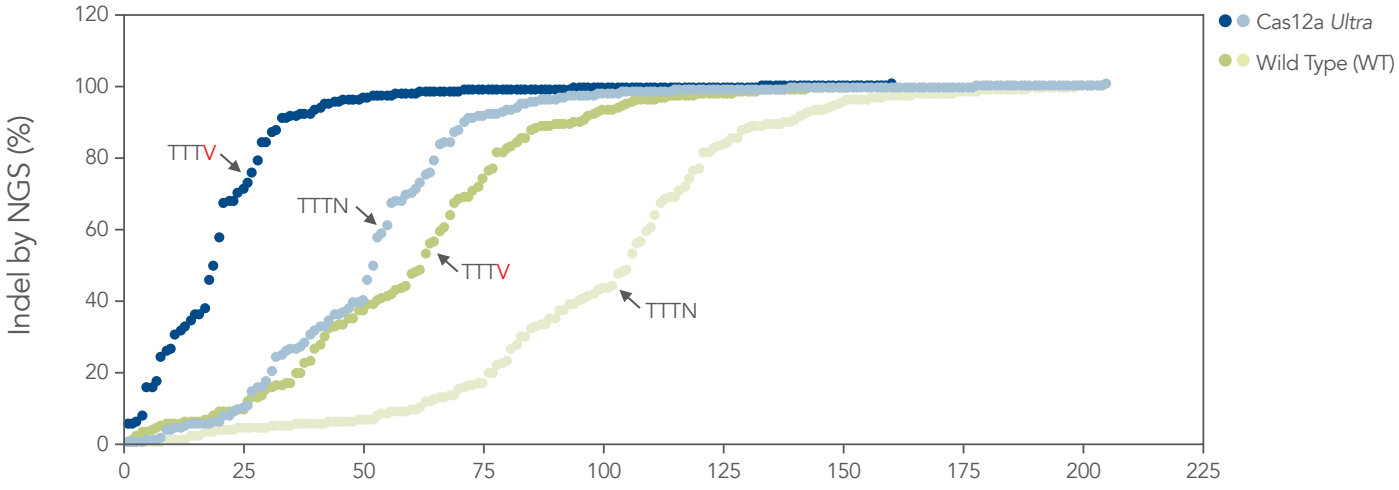

Figure 1. Alt-R A.s. Cas12a Ultra protein demonstrates enhanced activity with TTTV target site selection. Dots represent rank-ordered editing efficiency of 216 guides (n = 1 per guide) that target TTTV (dark shading) or TTTN (light shading) PAM sites and that were complexed to wild-type Cas12a V3 (green) or Cas12a Ultra (blue) before delivery into HEK-293 cells (96 sites) and Jurkat cells (120 sites). Human cells were transfected with RNP as instructed in the user guide for Alt-R CRISPR-Cas12a—RNP electroporation with a 4D-Nucleofector™ system (Lonza). Editing efficiency was determined 48 hr after electroporation using NGS (rhAmpSeq amplicon sequencing).

Alt-R A.s. Cas12a Ultra demonstrates increased editing efficiency at TTTN PAM sites

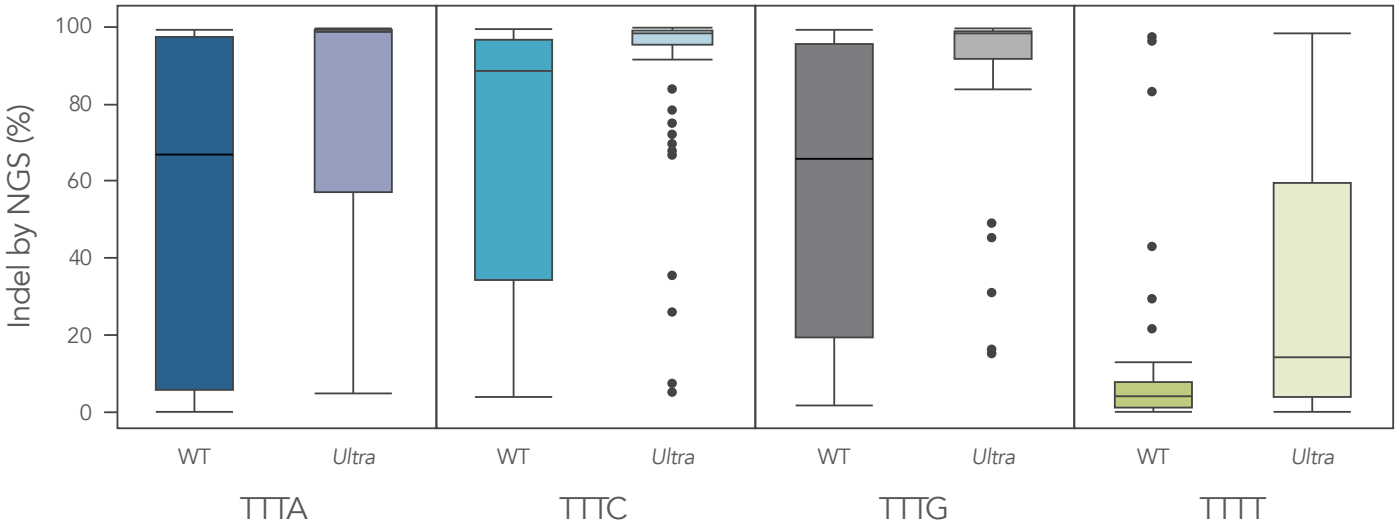

Figure 2. Alt-R A.s. Cas12a Ultra demonstrates increased editing efficiency at TTTA, TTTC, TTTG, and TTTT PAM sites. RNPs were formed with wild-type A.s. Cas12a V3 or A.s. Cas12a Ultra, complexed to 216 individual crRNAs targeting distinct loci on the human genome. RNP complexes (4 µM) were delivered into Jurkat cells (n = 120 sites) or HEK-293 cells (n = 96 sites) using a 4D-Nucleofector System (Lonza) in the presence of Alt-R Cas12a (Cpf1) Electroporation Enhancer. Editing efficiency was determined 48 hr after electroporation using NGS (rhAmpSeq amplicon sequencing).

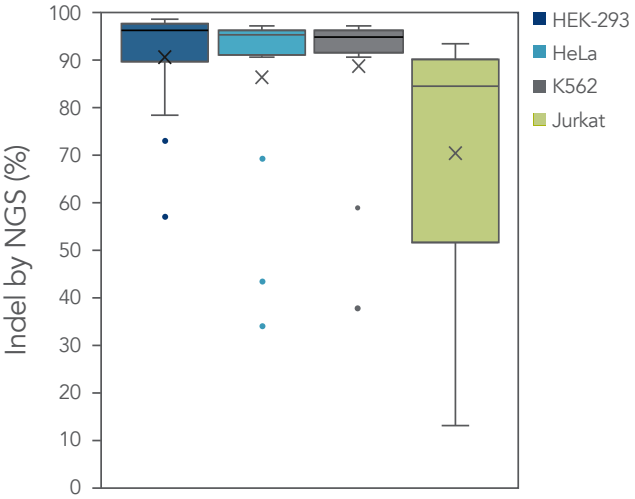

Figure 3. Alt-R A.s. Cas12a Ultra demonstrates high activity in multiple human cell types. RNPs were formed with A.s. Cas12a Ultra, complexed to 16 individual crRNAs (n = 16) that target distinct loci on the human genome. RNP complexes (4 µM) were delivered into the indicated cell types using a 4D-Nucleofector™ system (Lonza) in the presence of Alt-R Cas12a (Cpf1) Electroporation Enhancer. Editing efficiency was determined 48 hr after electroporation using NGS (rhAmpSeq amplicon sequencing).

ORDERING INFORMATION

CRISPR guide RNAs

Product	Size	Catalog#
Alt-R CRISPR-Cpf1 crRNA	2, 10 nmol tubes or plates	Order at www.idtdna.com/CRISPR-Cpf1

Cas12a (Cpf1) nuclease

Product	Size	Catalog#
Alt-R A.s. Cas12a (Cpf1) *Ultra*	100 µg	10001272
	500 µg	10001273

> FOR MORE INFORMATION, VISIT **WWW.IDTDNA.COM/CRISPR-CPF1**