

USF-1 CRISPR Activation Plasmid (h): sc-401345-ACT

BACKGROUND

The Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR) and CRISPR-associated protein (Cas9) system is an adaptive immune response defense mechanism used by archaea and bacteria for the degradation of foreign genetic material. This mechanism can be repurposed for other functions, including genomic engineering for mammalian systems, such as gene knock-out (KO) (1,2) and gene activation (3-6). CRISPR Activation Plasmid products enable the identification and upregulation of specific genes by utilizing a D10A and N863A deactivated Cas9 (dCas9) nuclease fused to a VP64 activation domain, in conjunction with sgRNA (MS2), a target-specific sgRNA engineered to bind the MS2-P65-HSF1 fusion protein (6). This synergistic activation mediator (SAM) transcription activation system provides a robust system to maximize the activation of endogenous gene expression (6).

REFERENCES

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- Mali, P., et al. 2013. RNA-guided human genome engineering via Cas9. *Science* 339: 823-826.
- Maeder, M.L., et al. 2013. CRISPR RNA-guided activation of endogenous human genes. *Nat. Methods* 10: 977-979.
- Hsu, P.D., et al. 2014. Development and applications of CRISPR-Cas9 for genome editing. *Cell* 157: 1262-1278.
- Van der Oost, J., et al. 2014. Unraveling the structural and mechanistic basis of CRISPR-Cas systems. *Nat. Rev. Microbiol.* 12: 479-492.
- Konermann, S., et al. 2015. Genome-scale transcriptional activation by an engineered CRISPR-Cas9 complex. *Nature* 517: 583-588.

CHROMOSOMAL LOCATION

Genetic locus: USF1 (human) mapping to 1q23.3.

PRODUCT

USF-1 CRISPR Activation Plasmid (h) and USF-1 CRISPR Activation Plasmid (h2) are each a SAM transcription activation system designed to specifically upregulate expression of the USF1 (human) gene.

USF-1 CRISPR Activation Plasmid (h) and USF-1 CRISPR Activation Plasmid (h2) each consist of the following 3 plasmids at a 1:1:1 mass ratio: the CRISPR/dCas9-VP64-Blast plasmid encoding the deactivated Cas9 (dCas9) nuclease (D10A and N863A) fused to the transactivation domain VP64, and a blasticidin resistance gene; the MS2-P65-HSF1-Hygro plasmid encoding the MS2-p65-HSF1 fusion protein, and a hygromycin resistance gene; the sgRNA (MS2)-Puro plasmid encoding a target-specific 20 nt guide RNA, and a puromycin resistance gene. The sgRNA (MS2)-Puro plasmids in USF-1 CRISPR Activation Plasmid (h) and USF-1 CRISPR Activation Plasmid (h2) each encode their own, unique, target-specific 20 nt guide RNA. The resulting SAM complex provides a robust transcription activation system for the upregulation of USF1 (human). Each vial contains 20 µg of lyophilized CRISPR Activation Plasmid DNA. Suitable for up to 20 transfections.

APPLICATIONS

Either USF-1 CRISPR Activation Plasmid (h) or USF-1 CRISPR Activation Plasmid (h2) is recommended to increase activation of gene expression in human cells.

SUPPORT REAGENTS

For optimal reaction efficiency with CRISPR Activation Plasmids, Santa Cruz Biotechnology's UltraCruz® Transfection Reagent: sc-395739 (0.2 ml) and Plasmid Transfection Medium: sc-108062 (20 ml) are recommended. Hygromycin B solution: sc-29067 (1 g), Blasticidin S HCl solution: sc-495389 (1 ml) and Puromycin dihydrochloride: sc-108071 (25 mg) are recommended for selection. Control CRISPR Activation Plasmid: sc-437275 (20 µg) negative control is also available.

GENE EXPRESSION MONITORING

USF-1 (G-2): sc-390027 is recommended as a control antibody for monitoring of USF1 (human) gene expression prior to and after activation by Western blotting (starting dilution 1:200, dilution range 1:100-1:1000) or immunofluorescence (starting dilution 1:50, dilution range 1:50-1:500).

STORAGE AND RESUSPENSION

Store lyophilized plasmid DNA at 4° C with desiccant. Stable for at least one year from the date of shipment. Once resuspended, store at 4° C for short term storage or -20° C for long-term storage. Avoid repeated freeze thaw cycles. Resuspend lyophilized plasmid DNA in 200 µl of the provided ultrapure, sterile, DNase-free water. Resuspension of the plasmid DNA makes a 0.1 µg/µl solution in a 10 mM TRIS EDTA, 1 mM EDTA buffered solution.

*SAM Transcription Activation System



RESEARCH USE

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