

SureGuide Purified Chemically Synthesized CRISPR Guide RNA

Introduction

Agilent SureGuide Purified chemically synthesized CRISPR single guide RNAs (sgRNAs) are the industry standard for quality RNA oligonucleotides. Using our patented, proprietary synthesis chemistry¹ and proprietary “SureGuide Purified” purification method makes the custom synthesis of long RNA oligonucleotides robust and efficient. This combination of chemistry and purification methods allows for reliable, high-quality production of high-fidelity, long sgRNAs with a variety of available chemical modifications. These include modifications such as 3xMS, that have become widely used to improve editing efficiency, as well as other modifications that can further enhance stability and specificity of guide RNAs in a variety of cell types.^{2,3} Produced with stringent quality control under ISO 13485, fully customizable Agilent SureGuide Purified sgRNAs give you quick and easy gene editing, high indel frequency, and reproducible results.

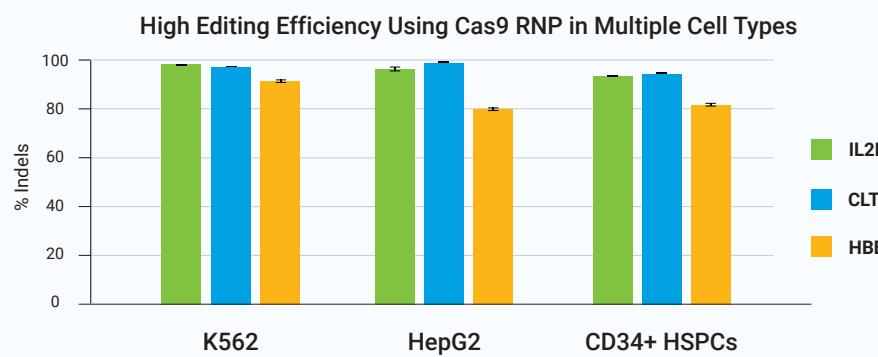


Figure 1. High levels of on-target editing are observed across multiple cell lines including K562 and HepG2 cells and in sensitive human primary cells such as C34+ HSPCs. SureGuide Purified sgRNAs containing 3xMS modifications (175 pmol) were precomplexed with *Streptococcus pyogenes* Cas9 (SpCas9) protein (50 pmol) and transfected into 0.2 million cells by electroporation. Three sgRNAs were tested in each cell line to perform editing of IL2RG, CLTA4, and HBB gene targets. Editing yields were measured by deep sequencing of PCR amplicons of the target locus. Bar charts display the mean of triplicate transfections with standard deviation represented as error bars.

Key Features of Agilent SureGuide Purified sgRNA

- High editing efficiencies across guide designs, cell types, and Cas enzymes
- Guides are manufactured using our proprietary chemistry and purification method under ISO 13485 to ensure high quality and high reproducibility across sgRNA sequences and orders
- Fully custom, de novo synthesis of every guide, including the tracrRNA sequence, to facilitate a wide variety of applications
- SureGuide Purified sgRNAs enable 90-120nt lengths and up to 10 chemical modifications, including 2'-O-methyl (M), 2'-O-methyl 3'-phosphorothioate (MS), Deoxy (D), and 2'-ribo 3'-phosphorothioate (S) (additional modifications and lengths available as HPLC purified custom requests)
- SureGuide Purified sgRNAs can include our patented 3xMS chemical modifications at the 5' and 3' ends for sgRNA stability and higher editing efficiency (Figure 2)
- Combine ribonucleotides and deoxyribonucleotides in SureGuides for broader applications
- Easy-to-use online sgRNA sequence upload and configuration tool with eCommerce checkout

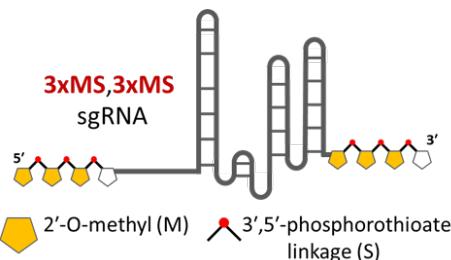


Figure 2. Agilent 3xMS Chemical Modification.

High Editing Efficiency Across Targets, Cell Types, and Cas Delivery

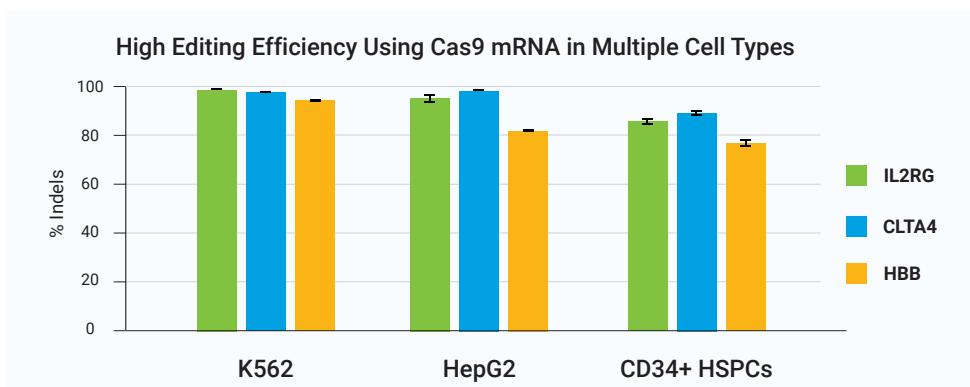


Figure 3. High levels of on-target editing are observed across multiple cell lines including K562 and HepG2 cells and in sensitive human primary cells such as CD34+ HSPCs. SureGuide Purified sgRNAs containing 3xMS modifications (125 pmol) were mixed with SpCas9 mRNA (75 µg) and transfected into 0.2 million cells by electroporation. Three sgRNAs were tested in each cell line to perform editing of IL2RG, CLTA4, and HBB gene targets. Editing yields were measured by deep sequencing of PCR amplicons of the target locus. Bar charts display the mean of triplicate transfections with standard deviation represented as error bars.

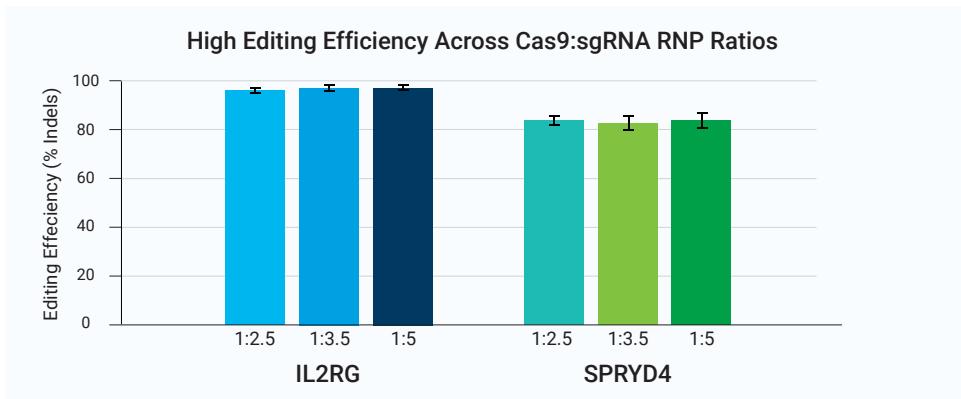


Figure 4. High levels of on-target editing are observed across multiple SureGuide designs when tested at RNP ratios ranging from more limiting to higher excess input of sgRNA. A constant amount of SpCas9 protein (10 pmol) was precomplexed with increasing amounts of two different SureGuide Purified sgRNAs containing 3xMS modifications targeting IL2RG and SPRYD4 genes at 25 pmol, 35 pmol, and 50 pmol to generate ratios of 1:2.5, 1:3.5 and 1:5, respectively. K562 cells were transfected with the different RNP mixtures using electroporation. Bar charts display the mean of quadruplicate transfections with standard deviation represented as error bars.

High Reproducibility for Confidence in Quality

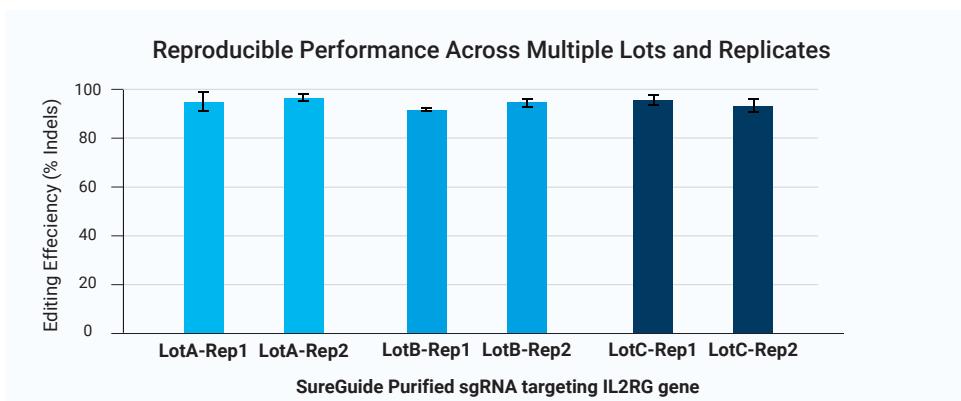


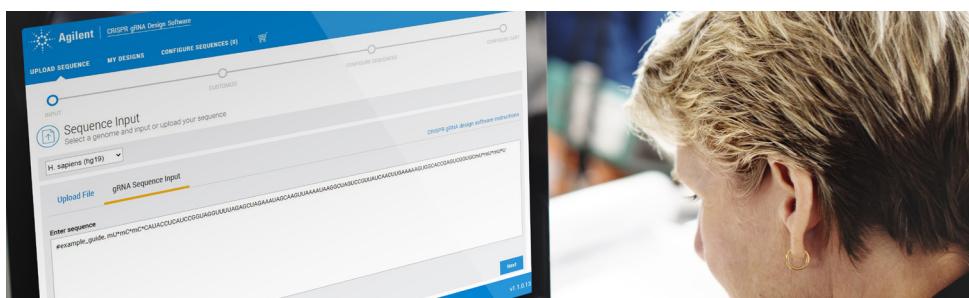
Figure 5. High levels of on-target editing are observed across multiple replicate syntheses within a lot and across multiple lots of SureGuide Purified sgRNA produced by high quality Agilent manufacturing processes. SureGuide Purified sgRNAs with 3xMS modifications targeting the IL2RG gene were produced in 3 lots with 2 replicates within each lot and transfected at 2.5x molar ratio of sgRNA (125 pmol) to SpCas9 protein (50 pmol) in K562 cells. Bar charts display the mean of quadruplicate transfections with standard deviation represented as error bars..

Easy to Use CRISPR sgRNA Online Ordering Tool

Use the Agilent CRISPR sgRNA ordering tool to customize and configure your synthetic single guide RNA sequences for easy online ordering or quote request.

Start using the software today at:

<https://crispr-tool.agilent.com/home>



References

1. Dellinger, D. J., et al. Streamlined Process for the Chemical Synthesis of RNA Using 2'-O-Thionocarbamate-Protected Nucleoside Phosphoramidites in the Solid Phase. *J. Am. Chem. Soc.* **2011**, 133 (30), 11540–11556. <https://doi.org/10.1021/ja201561z>.
2. Hendel, A., et al. Chemically Modified Guide RNAs Enhance CRISPR-Cas Genome Editing in Human Primary Cells. *Nat. Biotechnol.* **2015**, 33 (9), 985–989. <https://doi.org/10.1038/nbt.3290>.
3. Ryan, D. E., et al. Improving CRISPR-Cas Specificity with Chemical Modifications in Single-Guide RNAs. *Nucleic Acids Res.* **2018**, 46 (2), 792–803. <https://doi.org/10.1093/nar/gkx1199>.

Ordering Information

To learn more about Agilent's CRISPR gRNA portfolio, online design software, and user manual, visit:

<http://www.agilent.com/chem/crispr-sgrna-info>

Part Number	Product Name
G7250B	SureGuide sgRNA, 100µg, 90-120nt
G7250C	SureGuide sgRNA, 200µg, 90-120nt
G7250D	SureGuide sgRNA, 500µg, 90-120nt
G7250E	SureGuide sgRNA, 1mg, 90-120nt

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<http://www.agilent.com/chem/sgrna-patent-info>

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