



# CRISPR LifePipe®

The first CRISPR application to design both gRNA and donor template sequences required for genome editing.

CRISPR LifePipe® is a complete and fully customizable solution to facilitate and optimize your CRISPR experiments.

The introduction of targeted genomic sequence changes by CRISPR technology into living cells has become a powerful tool for gene therapy or disease modelling. Since CRISPR only requires a nuclease and customized nucleic sequences, this system can be easily used. Preliminary bioinformatics analysis for both gRNA design and donor templates can greatly improve the success of the experiment. This is where the CRISPR LifePipe® will make sequence design for genome editing as simple as using a text editor.

## GUIDE RNA DESIGN

The guide RNA (gRNA) is a short RNA sequence which guides the Cas9 endonuclease to the targeted region to cut the genome. gRNA is crucial for CRISPR gene editing because it provides targeting efficiency on the genomic region of interest while limiting the number of off-targets.

Our gRNA design tool targets different genomic regions:

- Specific single nucleotide sequence or genomic coordinates
- All exons from all transcripts of a gene
- Specific exon or intron of a transcript
- 5' or 3' UTR regions of a gene
- Adjustable region around an amino acid

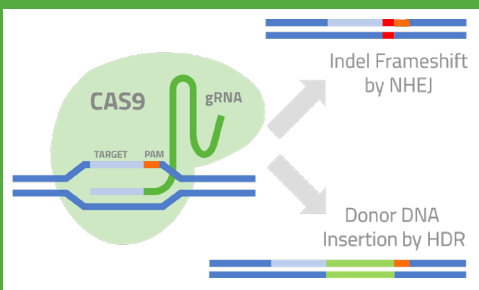
The tool is also configurable with advanced design options like the GC percent of the sequence or sequence pattern, and off-targets identification options like maximal number of off-targets per gRNA and mismatches to best meet the user's needs.

Our tool selects gRNA sequences with the lowest number of off-targets to avoid side effects within the cell. It also predicts the gRNA efficiency with several annotations like the estimation of secondary structures, detection of frequent SNPs or computing efficiency prediction scores described in scientific literature. Finally, a ranking is also provided within the results interface to help the user choose the best gRNA candidate.

## DONOR TEMPLATE DESIGN

The donor template is a DNA sequence inserted into the cell along with the gRNA and the endonuclease. It acts by homologous recombination during DNA repair (HDR) to replace the host DNA with the donor template sequence.

CRISPR/Cas9 technology is a genome engineering technology which allows accurate genome modification of a cell.



It modifies specific DNA sequences using a **gRNA**. This short RNA sequence guides the Cas9 endonuclease to cut the targeted genomic region and create a knock-out after double strand DNA repair by Non-homologous end joining (NHEJ) mechanism.

A **donor template** sequence uses the homologous recombination (HDR) mechanism to modify host DNA.



## CRISPR: GENE EDITING IS JUST THE BEGINNING

The real power of the biological tool lies in exploring how genomes work”

Nature, 2016

Our tool can design plasmid donor sequences with variable length homology arms as well as ssDNA oligos (ssODN). Different modes are available to insert modifications into the host:

- Insertion of a mutation into a gene
- Gene tagging in 5' or 3'

The tool computes the best location on the host genome to insert an exogenous DNA fragment like a selection cassette to avoid disruption of transcription or splicing of targeted gene.

A donor template quality control is systematically performed to inactivate the gRNA sequence on the donor template which prevents the endonuclease cutting.

### WHY CHOOSE CRISPR LIFEPIPE®?

The CRISPR tools have been developed by the Life&Soft team to meet all the needs of CRISPR users. These tools will facilitate and improve all steps required for a high quality and successful CRISPR experiment preparation.



Convenient	Our application combines different tools required to perform CRISPR genome editing, from gRNA and donor template design to the identification of off-targets after NGS
Flexible	All our CRISPR design tools are entirely customizable to consider your specific and evolving needs: design mode, organism and PAM... A <b>batch mode</b> is also available to help you to parallelize several designs
Complete & Supported	Our application has been developed to include the new findings and ideas published in scientific literature. CRISPR LifePipe® is supported and regularly updated by our team
Easy to use	Intuitive web form is fully customizable by the user for his specific design needs. An interface is also available with a <b>genome browser</b> to help the user to visualize and download the designs' results
Easy to deploy	CRISPR LifePipe® is based on best-in-class open source technologies and is run as a Docker® container which can be easily deployed on any infrastructure running a Docker® engine.

<https://crispr.lifeandsoft.com>



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