Glossary

CRISPR

Clustered Regularly Interspaced Short Palindromic Repeats – Repeats of DNA sequences within bacterial genomes. Commonly used term for the gene editing technique based on the underlying bacterial defense mechanism. Screens using normal CRISPR use a Cas9 protein that leads to double strand brakes on the genomic DNA specified by the target sequence of the sgRNA.

crRNA

Part of the crRNA/tracrRNA complex incorporating the target sequence and part of the crRNA/tracrRNA backbone. Hybridizes with tracrRNA to form the active CRISPR crRNA/tracrRNA complex in bacteria.

tracrRNA

Part of the crRNA/tracrRNA complex incorporating the part of the crRNA/tracrRNA backbone. Hybridizes with crRNA to form the active CRISPR crRNA/tracrRNA complex in bacteria.

sgRNA

Abbreviation for single guideRNA.

This term is commonly used in screenings for the target sequence only.

However, it describes the combination of the target sequence and the constant backbone that was made for creating a single RNA out of the crRNA/tracrRNA hybridized complex specifically for gene editing purposes. (MAYBE USE similar images: http://dharmacon.gelifesciences.com/gene-editing/crispr-cas9/crispr-guide-rna/)

gRNA

see sgRNA

Scaffold

Scaffold refers mostly to the constant backbone part of sgRNAs.

Backbone

A constant sequence of nucleotides.

Target Sequence

A target sequence is the unique nucleotide sequence chosen to target to your gene of interest. For CRISPR using spCas9, this sequence is usually between 18 and 21 nucleotides in length.

spCas9

Cas9 Protein originating from S. pyogenes. Commonly used for normal CRISPR Screens.

dCas9

A modified spCas9 protein which lacks nuclease activity. Can be used for CRISPRi.

PAM

The Protospacer adjacent motif (PAM) is a several base pair long sequence on the genomic DNA next to the target region of the Cas9 nuclease. The PAM sequence depends on the Cas9 protein used and is only present on the genomic DNA and not part of the target sequence.

CRISPRa/CRISPRi

Compared to normal CRISPR screens which focus on the introduction of double strand breaks, CRISPRa and CRISPRi do not rely on DNA damage. For both types, Cas9 proteins lacking nuclease activity are used, which can be fused to proteins/protein-binding domains that fulfill transcriptional activation or repression of the targeted gene.

CRISPRactivation

See CRISPRa/CRISPRi

CRISPRinhibition

See CRISPRa/CRISPRi

Genetic Perturbation

A genetic perturbation is the change of a gene activity e.g. reduction, activation, overexpression. This can be done by knocking down gene activity, knocking out a gene or overexpress a gene.

Selection Screen

A selective agent is applied to the cell population in addition to the genetic perturbation.

In this case, one looks for cells showing either a gain in phenotype (positive selection screen) or a reduction in phenotype (negative selection screen) in the presence of both the selective agent and the genetic perturbation.

The selective agent can be a drug or any other marker. Commonly used cases of selection screens are Viability/Dropout screens (negative selection) or Drug Resistance screens (positive selection).

Negative Selection Screen

A selection screen in which the selection outcome is a reduction in phenotype, e.g. cell viability.

Positive Selection Screen

A selection screen in which the selection outcome is a gain in phenotype, e.g. cell viability.

Dropout Screen

Same as Viability Screen. In this screening setup one is interested in genetic perturbations resulting in decreased cell viability. Since those cells will be deleted (drop out) from the cell population over time, it is also called a Dropout screen. A Dropout Screen is a special case of a Negative Selection screen, as no external agent is required in addition to the genetic perturbation.

Viability Screen

See Dropout Screen.

Enrichment Screen

See Positive Selection Screen.

Drug Screen

See Selection Screen.

Treatment

Depending on the type of screen, the treatment is the type of selective pressure applied to the cell population.

Condition

See Treatment.

P-Value

A p-value describes the probability of obtaining the observed result in case the null hypothesis is true.

Fold Change

Describes how a measured quantity changes between to states, e.g. the control and treatment group.

Threshold

An arbitrary value which defined a limit.

FASTQ

Text-based format to store Next-Generation Sequencing data.

FASTA

Text-based format to store DNA sequence information.

Identifier

Series of numbers or letters used to uniquely identify an object.