Chromium Single Cell CRISPR Screening

by analyzing tens to thousands of perturbations at once.

• Scale CRISPR screens by simultaneously assessing hundreds of edits in tens
• Reduce time to results from weeks to days with streamlined workflows

10x Genomics

Our rapidly expanding suite of products, which include instruments, consumables, and software, have enabled customers to make fundamental discoveries across multiple research areas, including cancer, immunology, and cell engineering.

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Cellecta

Cellecta is a leading provider of genomic products and services. Our broad portfolio includes gene functional analysis, disease modeling, and discovery research in cell or animal models.

• CloneTracker™
• DriverMap™
• CRISPR / RNAi

What is your superpower? Gene functional analysis is ours.

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The CRISPR-Cas system is a powerful tool for genome editing and has been used to achieve targeted gene modifications by Cas9 in a variety of organisms. Cas9 has been engineered to improve targeting by engineering (dsDNA) cuts with blunt ends. System, Cas9 generates double-stranded DNA protospacer adjacent motif (PAM). As a type II restriction enzyme, Cas9 recognizes 5'-NGG (where N represents any nucleotide) and cuts DNA at that site, potentially allowing by hemolytic nicking and cutting down to the ultimate goal of cellular suicide.

Cascade-Cas3
Cascade is a type I system, consisting of Cascade-Cas3, Cas3, Cas12a, and Cas12b. Cascade recognizes X-and Y-specific PAMs followed by a unique 5'-TTTV sequence. Cascade-Cas3 recruits Cas3 to generate a single-strand nick, followed by degradation of the targeted DNA. Cascade complex targets at specific locations and is still the most commonly used genome editing tool outside of prokaryotic cells, and it is expected to become widely used for genome editing in the near future. Cascade is a multimeric DNA-targeting complex that binds DNA via PAM and spacer recognition and then recruits Cas3 to generate a single-strand nick. Following 3'-attached 5'-degradation of the targeted DNA.

CRISPR-Cas: The Next Generation
The development of CRISPR-Cas systems has transformed genome editing and provided a powerful tool for understanding cellular processes. Cas9-derived versions of Cas3 have been used to target RNA, epigenetic modifications, or chromatin structural dynamics.

TARGETING RNA
Cas13
Cas13 is a class II Cas protein that is an RNA-guided nucleases. It is part of the CRISPR-Cas system and is capable of recognizing and degrading RNA targets. The CRISPR-Cas system has been engineered to target RNA, and Cas13 has been shown to target RNA in the absence of a PAM sequence.

Modifying Cas9
Cas9 normally targets DNA, but it can also target single-stranded (ss) nucleic acids if PAM-recognized. By engineering the Cas9 nuclease, it is possible to target RNA. This is achieved by fusing the Cas9 endonuclease domain to an RNA-specific Cas9 domain. Cas9 can then target ssRNA in the absence of a PAM sequence.

Beyond On/Off: Dynamic Genetic and Epigenetic Regulation
CRISPRi/Cas9
CRISPRi/Cas9 is a powerful tool for regulating gene expression in mammalian cells. It uses a catalytically deficient Cas9 (dCas9) fused to a transcriptional activator or repressor domain. This allows for the specific regulation of gene expression without the need for genome modification. The CRISPRi/Cas9 system has been used to regulate the expression of a wide range of genes, including those involved in disease pathways.

An Eye on the Clinic
The clinical utility of CRISPR-Cas technology is rapidly expanding. Cas9 has been used in a variety of genetic diseases, including inherited disorders and cancer. Cas9 has also been used to correct genetic mutations in the human genome, providing a potential cure for genetic diseases.

Beyond CRISPR-Cas, there are many other genome editing technologies currently under development. These include ZFNs, TALENs, and genome editing using transposable elements. These technologies have the potential to revolutionize the treatment of genetic diseases and other disorders. However, they also raise significant ethical and safety concerns. It is therefore important to carefully consider the potential risks and benefits of these technologies before they are widely used in clinical practice.