

CRISPR Reagents

TOCRIS
a biotechne brand

Tocris offers a range of reagents that improve or decrease the efficiency of the CRISPR–Cas9 mediated gene editing process.

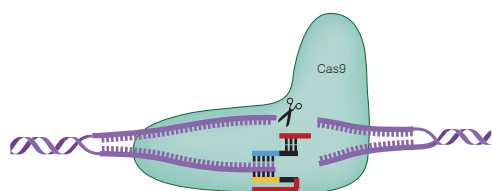
Introduction to CRISPR–Cas9

CRISPR (clustered regularly interspaced short palindromic repeats) are sections of prokaryotic DNA that mediate an acquired immune response against invading plasmids and viruses. The CRISPR system has been adapted to create a revolutionary gene editing technique that enables the insertion/deletion of DNA into the genome of mammalian cells.

The first step in the gene editing process is to perform double-stranded breaks (DSB) in DNA, which are repaired by the endogenous mechanisms, non-homologous end joining (NHEJ) and homology-directed repair (HDR). HDR and NHEJ are utilized following DSBs to edit the cell's genome. HDR is more precise than NHEJ, but less efficient.

Tocris supplies reagents that enhance the efficiency of HDR, which is essential for more accurate gene editing.

Key Advantages of CRISPR:



- Simpler, cheaper and more accurate than other gene editing processes
- A versatile system that can be used to edit, activate or reversibly switch off genes

CRISPR Reagents Available from Tocris

Enhance HDR Efficiency:

Brefeldin A (#1231)

Enhances CRISPR-mediated HDR efficiency

(Z)-4-Hydroxytamoxifen (#3412)

Activates intein-linked inactive Cas9, reducing off-target CRISPR-mediated gene editing

KU 0060648 (#4840)

Enhances HDR efficiency and attenuates NHEJ frequency

L-755,507 (#2197)

Enhances CRISPR-mediated HDR efficiency

NU 7441 (#3712)

Enhances HDR efficiency and attenuates NHEJ frequency

RS 1 (#5810)

Enhances HDR efficiency and increases CRISPR-mediated knock-in efficiencies

SCR7 pyrazine (#5342)

Enhances HDR efficiency by up to 19-fold

Reduces HDR efficiency:

Azidothymidine (#4150)

Decreases CRISPR-mediated HDR efficiency

For a complete list of available products, please visit

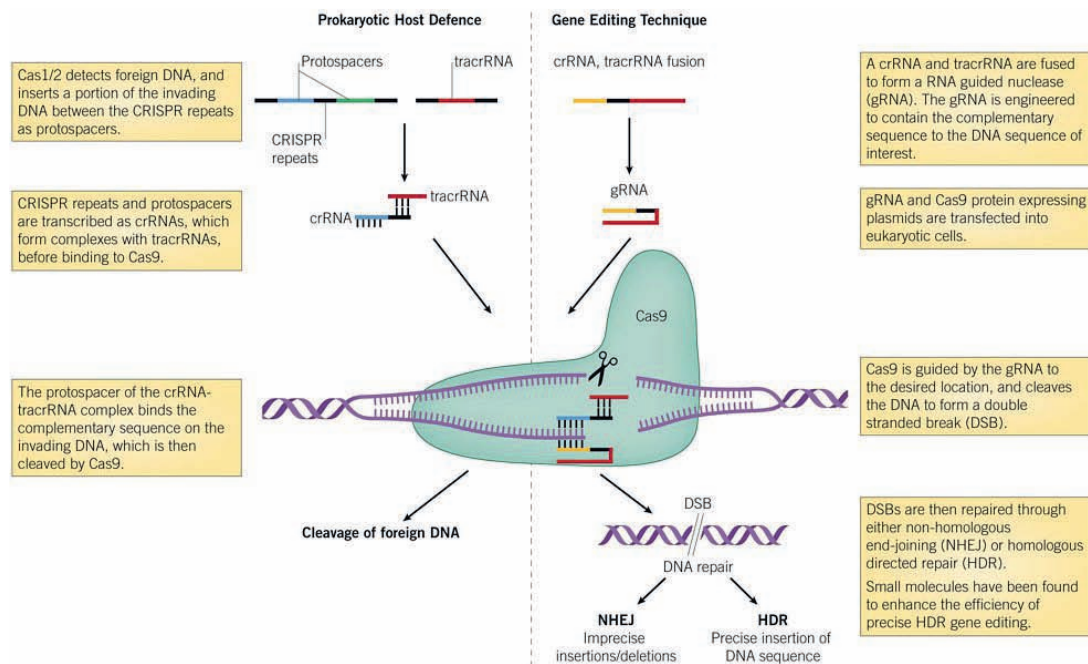
www.tocris.com/CRISPR

CRISPR Explained:

CRISPR are naturally occurring sections of prokaryotic DNA that mediate an acquired immune response against invading plasmids and viruses. The CRISPR locus is composed of Cas (CRISPR associated) genes, a leader sequence and repeat spacer arrays (CRISPR repeats). The Cas genes encode nucleases that are capable of cleaving DNA. In type II CRISPR systems, invading DNA is detected by Cas1/2, which inserts a portion of the invading DNA into the cell's CRISPR array, between the CRISPR repeats, as a protospacer. The CRISPR array is then transcribed to form crRNA, which forms a complex with transactivating (tra)crRNA and Cas9. The protospacer section of the crRNA then binds to the complementary sequence on the invading DNA, which is cleaved by Cas9.

The CRISPR system has been adapted to create a technique for targeted gene editing at specific locations in the genome. The first step of gene editing is to perform a double-stranded break (DSB) at the desired DNA sequence. In order to achieve this, Cas9 is complexed with a guide RNA (gRNA), which consists of a crRNA and tracrRNA, to create a RNA guided nuclease. The gRNA contains a complementary sequence to the DNA sequence of interest, and guides Cas9 to the desired location. Cas9 then cleaves the DNA to create a DSB.

DSBs can be repaired by endogenous non-homologous end-joining (NHEJ) and homology-directed repair (HDR). CRISPR-Cas9-mediated genome editing through NHEJ is imprecise but can reach efficiencies of 20-60%, whereas gene editing by HDR is more precise, but efficiency has been shown to reach only 0.5-20%. As HDR is more precise than NHEJ, improving the efficiency of HDR is vital for the use of the CRISPR-Cas9 system in many applications.



Schematic showing the CRISPR-Cas system as a prokaryotic host defense mechanism and as a gene editing technique. The CRISPR system mediates an acquired immune response against invading plasmids and viruses in prokaryotes, and has been adapted for the insertion and deletion of genes and DNA sequences in eukaryotic cells.

Innovative Products

Our product range is continuously growing. We have a dedicated team of scientists working to find the best and most relevant chemical tools available, so we can be first to market with the latest research tools.



(주)웅비메디텍
WOONGBEE MeDiTech, Inc.

Tel: 031-776-3300
Fax: 031-776-3303
Mail: woongbee@woongbee.com