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Microbial Genome Editing

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Early microbial genome editing mainly focused on random screening and simple rational screening, but the shortcomings of traditional methods that are time-consuming, labor-intensive, work-intensive, and non-directional mutagenesis results have gradually been exposed over time. With the development of modern molecular biology technology, there are many new methods of microbial breeding with more directional and positive mutation, which greatly promotes the accuracy and efficiency of microbial genome editing.

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Microbial Genome Editing, homologous recombination, CRISPR/Cas9

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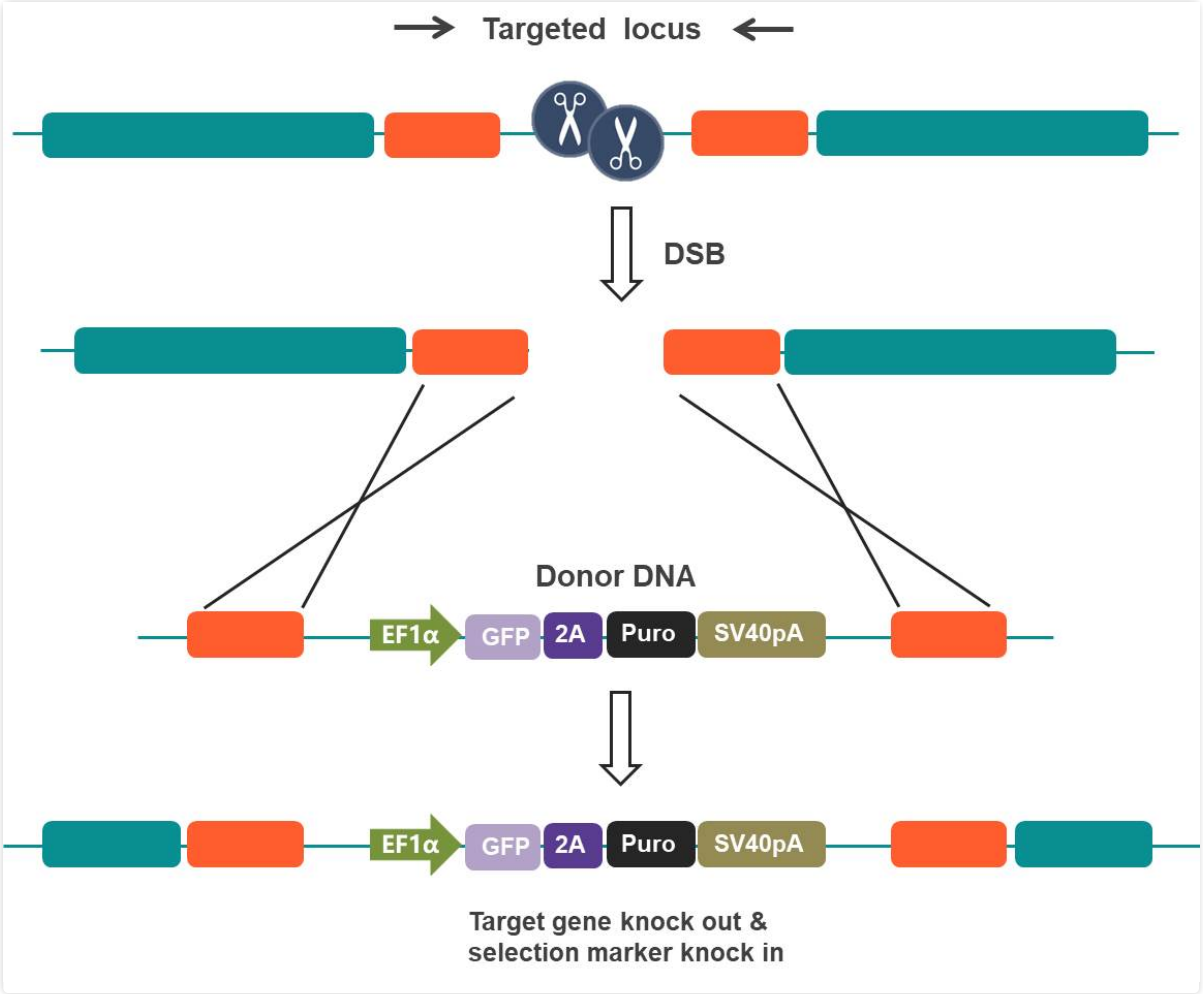
1 Microbial Genome Editing Based on Rec

Microbial genome editing based on homologous recombination uses its own Rec system to

carry out homologous recombination of exogenous DNA to achieve allelic replacement of target genes and recombination of genetic information between two homologous strands of DNA. By producing and isolating DNA fragments with genomic sequences similar to the part of the genome to be edited, these fragments are injected into monocytes. Once these fragments enter the cell, they can be recombined with the cell's DNA to replace the target part of the genome.



2 Microbial Genome Editing Based on CRISPR/Cas9

Microbes in nature always use various protection mechanisms that enable them to coexist with harsh environments and invasive nucleic acids. Many microbes can resist nucleic acid invasion through specific methods based on gene sequence. CRISPR/Cas9 is one of these protection mechanisms and the most widely used genome editing technology. The CRISPR/Cas9 method allows microbial genome editing such as gene knockout, site-directed mutation, site-directed insertion of foreign sequences, *etc.* Compared with traditional gene knockout methods, this method is more convenient for subsequent experimental research.

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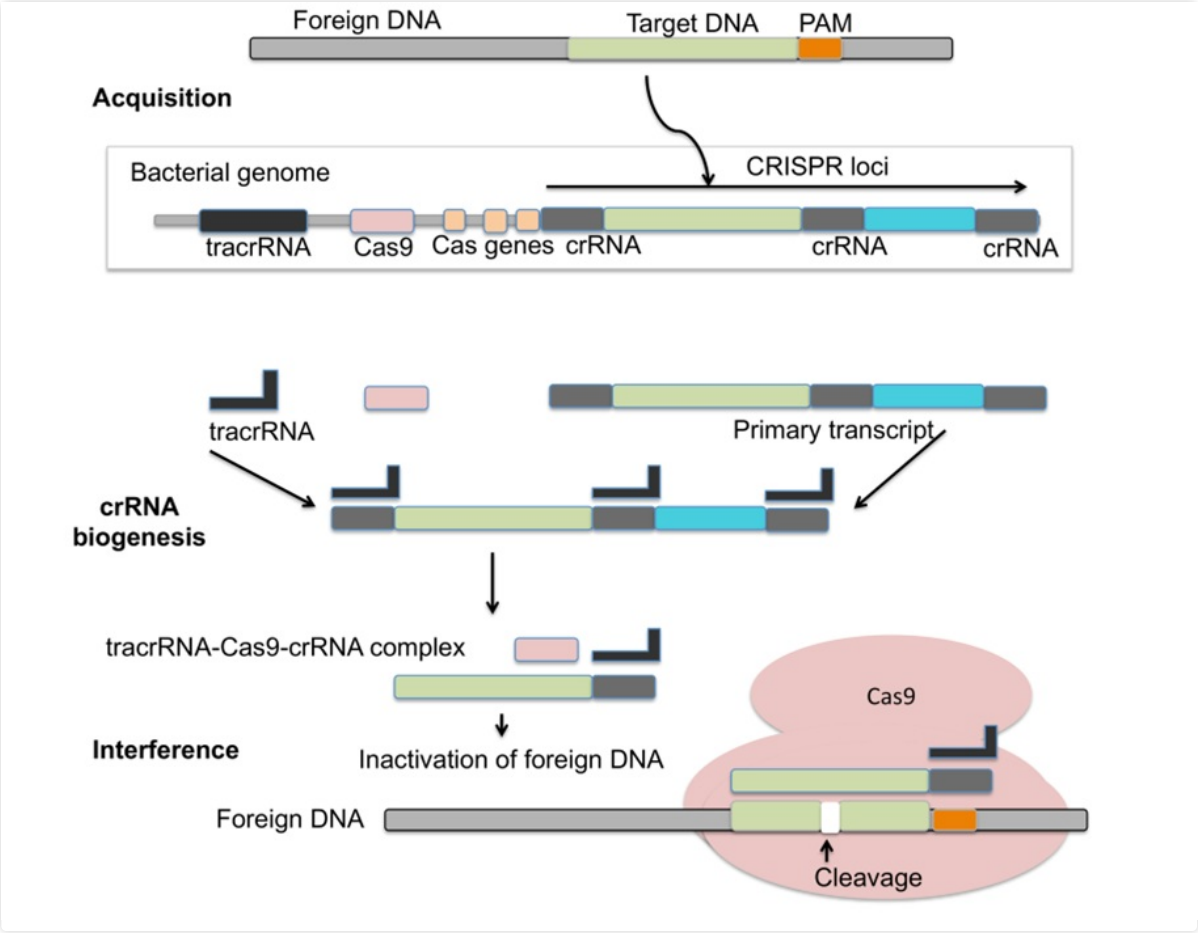

Fig.1 Mechanism of CRISPR/Cas9 action. Arora L*et al.* 2017)

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