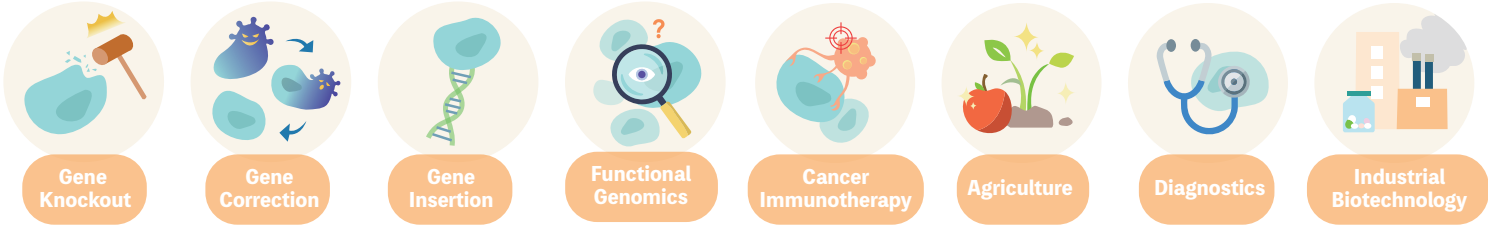
UNLOCKING PRECISION CRISPR/CAS GENE EDITING AND THE POWER OF CAS9 VARIANTS

CROYEZ

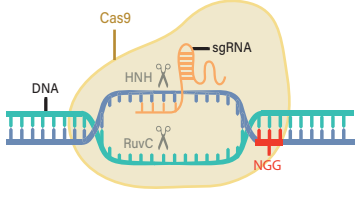
Applications of CRISPR Technology

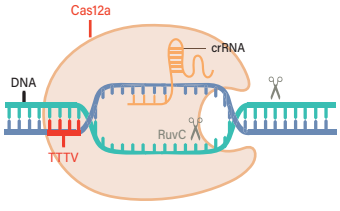
CRISPR technology has revolutionized gene editing with its wide-ranging applications in both research and clinical development. Key applications include.



SpCas9 (Streptococcus pyogenes Cas9)

SpCas9 is a widely used CRISPR nuclease that creates targeted DNA double-strand breaks guided by a single guide RNA, enabling gene disruption or precise edits via NHEJ or HDR.



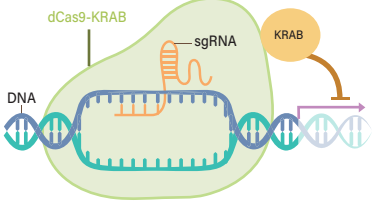


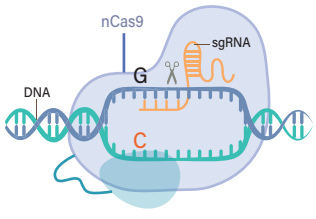
Cas12a (formerly Cpf1)

Cas12a is a CRISPR-associated endonuclease distinct from Cas9. It recognizes T-rich PAM sequences (typically TTTV) and introduces staggered DSBs with 5' overhangs. It uses a single crRNA (without the need for tracrRNA), and its sticky-end cuts facilitate certain types of precise DNA insertion.

dCas9 (Dead Cas9)

dCas9 is a catalytically inactive version of Cas9 that binds to target DNA without cutting it. It enables gene regulation rather than genome modification by serving as a DNA-binding platform.



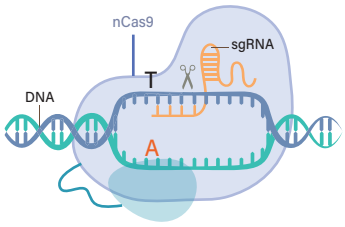


Cytosine Base Editors (CBE)

CBEs enable conversion of C▪G base pairs to T▪A without inducing DSBs. They consist of a cytidine deaminase enzyme fused to dCas9 or a Cas9 nickase. The edit occurs within a defined window of the target site.

Adenine Base Editors (ABE)

ABEs convert A▪T base pairs to G▪C with high precision. They employ an evolved adenine deaminase fused to a Cas9 nickase, offering efficient and targeted base editing without DNA cleavage.



Further Reading

CRISPR/Cas9 Gene Editing Mechanism ▶▶

CRISPR/Cas9 All Gene Editing Tools ▶▶