

CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) is a powerful tool for gene editing that allows scientists to make precise alterations to DNA. Challenges and Considerations Ethical Concerns: The potential to edit human embryos raises significant ethical questions about genetic modification and designer babies. Provide a donor DNA template for homology-directed repair (HDR), enabling precise edits like gene corrections or the introduction of new genes. Applications of CRISPR in Gene Therapy Genetic Disorders: CRISPR holds potential for treating genetic disorders like sickle cell anemia, cystic fibrosis, and muscular dystrophy by correcting mutations at the DNA level. Infectious Diseases: CRISPR can be used to target and edit the genomes of viruses (like HIV) in infected cells, potentially leading to new antiviral therapies. Agricultural Biotechnology: Beyond human health, CRISPR is used in agriculture to create crops with desirable traits, such as disease resistance or enhanced nutritional profiles. Regulatory Hurdles: The use of CRISPR in clinical settings faces regulatory challenges and requires extensive safety evaluations.