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Unlocking The Potential: CRISPR's Revolutionary Approach to Curing HIV: A Review

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Structured Abstract

Background: HIV infection continues to pose a health threat to the population and is spread mostly through the exchange of body fluids whereby it invades and compromises the body's CD4+ T cells leading to AIDS. This type rapidly infects through heterosexual contact, needle-sharing injection and sexual contact that often comes with transmission of infected fluids. This is because HIV enters the host's DNA and hence is not easily detected and eradicated by the immune system, or antiretroviral drugs and has a high mutation rate that enhances drug resistance. CRISPR-Cas9 has an excellent potential for use as a treatment since it could eliminate or neutralize the integrated HIV DNA. Thematically, new research is based on HIV's molecular mechanisms, CRISPR intervention efficacy, and eliminating side effects to advance HIV treatment and affect a cure.

Methods: The research paper focuses on the application of CRISPR-Cas9. This is a gene-editing tool derived from bacteria that work with gRNA to guide Cas9 in making specific incisions on DNA, possibly rendering HIV inactive. One strategy that is used focuses on the CCR5 receptor gene of the virus which prevents the virus from entering the T-cells. CRISPR-Cas9 also serves as a good means in amplifying immune cells for recognizing and wiping out the HIV-infected cells to counter HIV at their root.

Results: This research paper shows how HIV affects the T-cells resulting in AIDS, as well as how their functioning could be preserved or substituted. Although it is not specific to providing proof for how great CRISPR is in removing HIV DNA, it covers matters such as safety, efficiency, and even morality collectively, in asking for more investigation.

Conclusion: In conclusion, the findings of this study discuss HIV treatment's prospects of using CRISPR technology based on the molecular mechanisms of the method, its efficacy and risks, as well as the main future directions. It is understood that through the usage of CRISPR for genome editing, the virus which is HIV can be removed from infected cells or even effectively disabled.

Keywords: CRISPR-Cas, HIV, Immunopathogenesis

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