

The Impact of Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR) In Pharmacy

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INTRODUCTION

Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR) are deoxyribonucleic acid (DNA) segments present in prokaryotes that contain short repetitive sequences, serving as a defence mechanism against viral DNA. Conditions like Huntington's disease, cancer, cystic fibrosis, type 1 diabetes, and sickle cell anaemia result from genetic mutations. Many of these diseases currently lack effective treatments. CRISPR/Cas technology holds substantial promise as an effective tool to address these conditions.

AIM

To highlight conditions for which CRISPR can be successfully applied in pharmacy practice.

METHOD

Literature review on CRISPR's role in pharmacy was conducted using PubMed as the primary source of information. The articles chosen for this study were published between "01/01/2013 and 31/12/2023". The keywords used in the search were: "CRISPR", "genome editing", "hereditary diseases", "cancer", "chronic illness".

Articles were chosen based on their direct relevance to CRISPR's applications in treating hereditary and chronic diseases, diagnosing infectious diseases and targeted drug development. The review aimed to elucidate CRISPR's multifaceted role in pharmacy, with particular emphasis on its potential in treating chronic and hereditary diseases.

RESULTS

- CRISPR technology targets genetic defects in various diseases like sickle cell, beta-thalassemia, and cystic fibrosis, showing promising results in clinical trials.
- In cancer, CRISPR has been explored for precise gene editing in tumors.
- Advanced detection techniques have been developed for infectious diseases like tuberculosis, HIV, and hepatitis B.
- CRISPR's precision in gene editing improves cell survival, protein production, and therapeutic efficacy

These results signify CRISPR's potential in revolutionizing diabetes and cardiovascular disease treatment

Application of CRISPR in Disease Management

Condition	Outcome
Cancer	Destruction of glioma cells
Infectious diseases	Detection of Hepatitis B, HIV, and tuberculosis
Diabetes	Insulin synthesis and regulation of blood sugar levels
Cardiovascular diseases	Elimination of hypertrophic cardiomyopathy symptoms
Sickle-cell disease	Absence of vaso-occlusive crises
Biopharmaceutical production	Enhanced cell survival and therapeutic efficacy

CONCLUSION

The utilisation of CRISPR technology heralds a new era in precision medicine, offering hope for different patients. Leveraging pharmacists' expertise in drug therapy and patient care can position them as valuable contributors to the successful integration of CRISPR technology in healthcare.