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Gene Technology

Short Communication

CRISPR-Cas9

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ABSTRACT

Clustered regularly interspaced short palindromic repeats and CRISPR-associated protein 9. CRISPR-Cas9 is a unique technology that enables geneticists and medical researchers to edit parts of the genome? By removing, adding or altering sections of the DNA sequence.

Keywords: CRISPR; CAS9; DNA; RNA

CAN CRISPR–CAS9 BE USED ON HUMANS?

The CRISPR-Cas9 system works similarly in the lab. Researchers create a small piece of RNA with a short "guide" sequence that attaches (binds) to a specific target sequence of DNA in a genome. The RNA also binds to the Cas9 enzyme. Genome editing is of great interest in the prevention and treatment of human diseases.

7 Diseases CRISPR Technology Could Cure in humans:

- Cancer- The first applications of CRISPR could be in cancer
- Blood disorders
- Blindness
- AIDS
- Cystic fibrosis
- Muscular dystrophy
- Huntington's disease

CAN CRISPR–CAS9 BE USED ON ANIMALS?

CRISPR has also been used for other popular animal models such as pigs, primates, and canines. Apart from these common animal models, CRISPR has been used to genetically modify other rare animals.

CAN CRISPR –CAS9 BE USED ON PLANTS?

The CRISPR/Cas9 system has been successfully applied in various plant species. These include not only model plants, such as Arabidopsis, but also crops, such as rice, tobacco, sorghum, wheat, maize, soybean, tomato, potato, poplar, apple and banana.

ADVANTAGES of CRISPR CAS9

- The most important advantages of CRISPR/Cas9 over other genome editing technologies is its simplicity and efficiency
- Since it can be applied directly in embryo, CRISPR/Cas9 reduces the time required to modify target genes compared to Gene targeting technologies based on the use of embryonic stem (ES) cells
- It Could Correct the Genetic Errors That Cause Disease
- It Can Eliminate the Microbes That Cause Disease
- It Could Resurrect Species
- It Could Create New, Healthier Foods
- It Could Eradicate the Planet's Most Dangerous Pest

DISADVANTAGES OF CRISPR CAS9:

Recently, however, new research has shown that in some instances, the gene editing tool known as CRISPR-Cas9 could unintentionally damage DNA during the editing process or unintentionally edit regions that were not targeted. While these possibilities sound scary—and they could be—no one is in immediate harm. CRISPR/Cas9 still is not 100% precision, which means that still off-targets occur upon engineering the genome and this can result in undesired aberrant phenotype.

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SAFETY AND SECURITY RISKS OF CRISPR/Cas9
Containment Level:

Ensure adequate biosafety risk classification and implementation of adequate containment measures in biosafety-sensitive genome editing experiments. Develop "molecular containment" approaches when working with genome-edited high-risk pathogens.

Governance and Oversight level

Provide international guidance or amend existing guidance documents on biosafety and biosecurity to cover risks from genome editing. Map the status of existing biosafety and biosecurity legislation as well as its practical implementation in countries carrying out genome editing experiments.

Include stakeholders (e.g. funding institutions, research institutions, researchers) in the responsible governance of research involving genome editing. International Standardization. In case of gaps in legal oversight, develop international codes and guidelines for safe and secure work in genome editing.

CONCLUSION

CRISPR has its advantages and disadvantages ranging from ethical concerns to being known as the fastest, cheapest and most precise way of editing genes. This scientific breakthrough has the ability to eliminate diseases, solve world hunger, provide unlimited clean energy but at the same time get out of hand very easily. According to statistics about seven hundred and ninety five million people in the world do not have enough food to lead a healthy active life and as populations continue growing this problem might get worse beyond imagination (Wfp.org, 2016). Adding on eighty percent of rare diseases are caused by faulty genes. These figures alone show what a huge impact the technology would have in our lives if used appropriately and for the right reasons. Success with the permanent implementation of the technology will definitely change the world and make it a better place to live in.