ISSN No:-2456-2165

CRISPR-Mediated Genetic Interventions for Augmenting Human Cognition and Bodily Function: A Transhumanist Exploration and A Recent Gene Editting Tool: CyDENT

Beril Saraç
Independent

Abstract:- The research delves into the burgeoning field of CRISPR-mediated genetic interventions and their implications foradvancements human cognition and bodily functions through a transhumanist lens. The advent of CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) technology [1] has revolutionized genetic engineering, offering unprecedented precision in modifying genetic material. This exploration aims to scrutinize the potential applications of CRISPR-based interventions in enhancing human capabilities beyond natural limits. Furthermore, paper includes a new approach to gene modifying called CyDENT.

Keywords:- *Clustered Regularly Interspaced Short Palindromic Repeats, Transhumanist, Genetic Engineering, CyDENT.*

I. CRISPR IMPLEMENTATIONS & TRANSHUMANISM

CRISPR (short for Clustered Regularly Interspaced Short Palindromic Repeats) is a revolutionary gene-editing technology [2] derived from a natural defense mechanism found in bacteria.

Initially, discovered as part of the bacterial immune system, scientists harnessed CRISPR [3] to manipulate DNA with remarkable precision.

The CRISPR system consists of two main components: guide RNA (gRNA) and a CRISPR-associated protein (Cas). The guide RNA is designed to target a specific sequence of DNA within a genome, while the Cas protein acts as a molecular scissors, capable of cutting the DNA at that specific targeted location [4].

Transhumanism is a philosophical and intellectual movement centered around the idea of using technology and scientific advancements to enhance and transcend the limitations of the human condition. It advocates for the use of technology, science, and other rational means to improve human capabilities, both physical and mental, in order to evolve beyond the current limitations of humanity.

II. INTRODUCTION

CRISPR, as a powerful gene-editing tool, has sparked discussions within the transhumanist community due to its potential to significantly impact human evolution and capabilities. While CRISPR itself doesn't inherently aim to strengthen transhumanism, its capabilities align with some of the fundamental goals and beliefs within the transhumanist movement.

- *Why it Seems Reasonable?*

Transhumanists aspire to extend human lifespan and improve health through scientific interventions. Advancements in medical technology could potentially reduce diseases, disabilities, and age-related ailments, leading to healthier and longer lives. For instance, technology could be used to improve hearing or eyesight through the use of technological devices implanted in the body [5].

CRISPR's efficiency extends beyond human enhancement. It has implications in disease treatment, drug development, and creating disease models for research. The ability to correct genetic mutations associated with diseases aligns with transhumanists' desires to improve health and mitigate genetic disorders.

This usage has evoked the potential chances to avoid any disease or disability in humans. Beside the existed afflictions, it even holds a solution view through the placenta. Moreover, CRISPR's appeal lies in its precision for technological innovation, and translational opportunities in agriculture and other various fields.

- *Latent Drawbacks*

Despite its promise, the CRISPR/Cas9 editing system faces several constraints and potential risks. These challenges hinder its clinical trial applications due to its recent discovery and limited usage in humans. Immunogenicity, off-targeting, polymorphism, delivery method, and ethics are only several major concerns with the CRISPR/Cas9 system [6].

Another aspect is CRISPR carries a potential, previously undiscovered danger, finds a new Boston Children's–led study. Researchers led by Roberto Chiarle, MD, and Jianli Tao, PhD, in the Department of Pathology performed multiple runs of classical CRISPR/Cas9 in

ISSN No:-2456-2165

different human cell lines. They found that CRISPR increased the chance of large rearrangements of DNA. While this was uncommon — occurring up to 5 to 6 percent of the time in the study's experimental model — such rearrangements can theoretically trigger cancer [7].

III. ETHICAL DILEMMAS OF CRISPR-CAS9: NAVIGATING HUMAN GENOME EDITING

The advancements in CRISPR-Cas9 technology have revolutionized genetic research and raised hopes for groundbreaking medical treatments. Yet, amid its promise, the ethical implications surrounding CRISPR gene editing remain at the forefront of scientific and societal discussions.

- *Germline Editing*

Altering the germline (sperm, eggs, embryos) raises ethical concerns as these changes would be heritable, affecting future generations. There are debates over the morality, safety, and implications of permanently altering the human gene pool.

- *Eugenics Concerns*

The potential use of CRISPR for creating "designer babies" with desired traits raises concerns about eugenics and the ethical implications of selecting specific genetic attributes.

The use of the CRISPR-Cas9 system to edit the human germline should be legally prohibited on account of the system's potential for generating an unjust eugenic future. Its use in nongermline experimentation and applications, however, should not be constrained on eugenic grounds [8].

- *Social and Ethical Implications*

CRISPR raises broader societal questions about the definition of normalcy, human nature, and equity. It prompts discussions on the potential impacts on societal values, cultural norms, and the concept of disability.

- *Ecological Imbalance*

In investigations employing RNA-focused gene editing techniques utilizing CRISPR-Cas9, thorough scrutiny of unintended impacts beyond the target site is imperative.

As genetic variations persist within a population, potential unintended genetic changes outside the intended area will persist in successive generations.

The possibility that genes can be transferred to other species in the environment. Transferring the regulated sequences to other species may result in the transmission of negative characteristics to the associated organisms (Esvelt et al., 2014). The distribution of the properties of the entrained genes among the populations can make control very difficult [9].

IV. NEW GENE EDITING TOOL: CYDENT

CyDENT is a novel gene-editing tool that can perform strand-specific editing without any cuts, which may offer some advantages over CRISPR-based systems.

CyDENT is a protein-based tool that does not rely on a guide RNA. Instead, it uses a protein signal to transport the editor inside the cell, bypassing the need for a guide RNA. This makes CyDENT more efficient than CRISPR-Cas9, especially for editing DNA in mitochondria and chloroplasts.

CyDENT works by first binding to the target DNA sequence with the transcription-activator-like effector (TALEs). The FokI nickase then cuts the DNA at that location, creating a single-stranded DNA substrate. The single-strand-specific cytidine deaminase then converts the cytidines in the single-stranded DNA to uracils. The uracils are then recognized by the cell's DNA repair machinery, which replaces them with cytosines. This process is called base editing. This new tool could lead to new therapies for diseases caused by mitochondrial DNA mutations and it could also be used to engineer crops with higher yields [10].

V. CONCLUSION

CRISPR genomic applications are valuable for variety of cases, including but not limited to daily assistances, medical researches, disease preventions, biotechnology, agriculture, etc. The consequences of this implementation links itself through the transhumanism statements, which is the philosophical perspective that admires the improvements onto human beings' lives in order to extend the period of living time.

However, several substantial drawbacks has shown with the increased numbers CRISPR usage. It may mark permanent unfavourableness in the society, particularly to the genetic heritages. Furthermore, it contains surplus steps; therefore, scientists has been focused on new approaches.

It led them to created CyDENT: a better tool for editting gene. Upon CyDENT, many many research studies are expected to be conducted in the further time.

REFERENCES

[1]. www.frontiersin.org
[2]. www.sickeconomics.com
[3]. Submitted to Southern Illinois University Edwardsville
[4]. Submitted to HBIT
[5]. oxfordpoliticalreview.com
[6]. molecular-cancer.biomedcentral.com
[7]. answers.childrenshospital.org
[8]. www.coursehero.com
[9]. www.ncbi.nlm.nih.gov
[10]. www.isaaa.org