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Cite This:Int. J.of Med. And Clini Tril. 2021, 1, 1-2

Sciforce

International Journal of Medicine And Clinical Trials

Journal homepage: www.sciforce.org

How Current RNA Research Impacts the Future of Medicine

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ARTICLE INFO

Article history:
Received 20210610
Received in revised form 20210620
Accepted 20210630
Available online 20210710

Keywords:
RNA;
RNA research;
how current RNA research impacts the future of medicine;

ABSTRACT

Hearing the word RNA a lot these days? Here's how it's helping medical researchers fight against Covid 19 and develop novel technologies in the field of medicine.

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Introduction

The In the past couple of years, the field of medicine has overcome huge scientific challenges to showcase advances in gene therapy. One of the most significant of these is CRISPR technology that enables the manipulation of one's DNA to cure genetic disorders. However, its use has put forward an ethical debate because of the uncertainty surrounding the effects it poses once genes are permanently edited.

A lesser-known brother of DNA, RNA might help avert this dilemma. It was long thought that RNA biochemistry was too complex to understand, making most scientists stay clear of it, but current technology and circumstances have called for scientists to delve back into RNA research to develop medical approaches that have the potential to change the landscape of future medicine.

Here's how current RNA research impacts the future of medicine.

Disease Prevention

Perhaps the biggest boost to RNA research came from COVID-19. Researchers quickly scrambled to create a vaccine to fight the pandemic, with many vaccines coming to the market in record time. Unlike vaccines of the past that require an inoculated version of the virus or parts of the virus with similar antigens, a new RNA-based vaccine showed us the future of disease prevention.

The aim of vaccines is to train our body to identify the virus before an infection takes place. Our bodies produce antibodies specific to the invader, allowing us to fight it. Antibodies are

Special proteins that bind to the invader, inhibiting its function. RNA allows our cells to manufacture these proteins without the need for having the pathogen on hand. This can usher a new era of disease control whereby custom vaccines can be developed and deployed quickly, averting pandemic level events.

Figure 1.

An image showing two covid-19 vaccines in vials with an injection

RNA Based Therapy

Our genome is a code for the proteins that our bodies produce. In some cases, our bodies may produce proteins that

are defectiveas a result of genetic disorders. Instead of permanently changing the genome, we can change the RNA. The RNA (messenger RNA in particular) is an intermediary molecule that takes an image of the protein forming part of the DNA and helps cellular machinery translate it into proteins. Introducing the correct molecule for the job makes the right protein, helping manage hereditary and genetic conditions more effectively.

Few drugs like patisiran, eteplirsen, and nusinersenare already on the market as treatments for potentially fatal disorders. The treatment is expensive, but developments in manufacturing technology may enable us to purchase over-the-counter medication. Additionally, it has the added advantage of circumventing the ethical dilemma that comes with gene splicing.

Patient-Centric Care

Currently, proteins are mass-produced by taking advantage of bacteria and fungi. We encode their DNA with sections of our DNA to produce desirable proteins, like insulin, to combat diabetes. With RNA research in protein production, doctors will be able to provide a more patient-centric approach to treatment. RNA-based medication allows them to account for variations in DNA to produce medication tailored for the patient. Moreover, it makes one's body the factory for making its own proteins instead of relying on industrial processes to fulfill the need.