Archives of Advances
in Biosciences

Letter to Editor:
Novel Therapeutic Methods Replacing Current Ones

Yara Elahi[1], **Ramin Mazaheri Nezhad Fard**[2, 3*]

1. Department of Genetics, Faculty of Life Sciences, Islamic Azad University Tehran North Branch, Tehran, Iran.
2. Department of Pathobiology, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran.
3. Food Microbiology Research Center, School of Public Health, Tehran University of Medical Science, Tehran, Iran.

Use your device to scan and read the article online

Cite this article as: Elahi Y, Mazaheri Nezhad Fard R. Novel Therapeutic Methods Replacing Current Ones.. Archives of Advances in Biosciences. 2022; 13:E37411. https://doi.org/10.22037/aab.v13i.37411

https://doi.org/10.22037/aab.v13i.37411

Article info:
Received: 17 Jan 2022
Accepted: 09 Feb 2022
Published: 10 Apr 2022

*** Corresponding author:**
Ramin Mazaheri Nezhad Fard
Address: Department of Pathobiology, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran.
E-mail: raminmazaheri@gmail.com

Abstract

With the advancements of science in recent years, novel therapeutic methods have been developed to treat microbial infections and improve medical performances. These novel methods are more accurate than the old ones; therefore, they are more effective. Technically, these methods may revolutionize science in the future. Some of these new therapies include phage therapy, precision medicine, next-generation sequencing, picotechnology, the use of recombinant proteins, microchips, and robotic surgery, each of which will in turn surprise the medical world. Although some of these treatments have been used in the past, researchers are now paying more attention to them because not only these newer methods are more accurate and efficient, but many of the older treatments, such as antibiotics, because of the increasing rate of the antibiotic resistance, are gradually losing its popularity. In this letter, some of the latest innovative medical therapies have been discussed; which you will hear more about soon.

Keywords: Therapeutic methods, Antibiotic, Phage therapy, Precision medicine

Dear Editor

With advancements in science over recent years, novel therapeutic methods have been developed to treat microbial infections and improve medical performance. These novel methods are more accurate than the old ones; therefore, they tend to be more effective. Technically, these methods may revolutionize science in the future. Some of these new therapies include phage therapy, precision medicine, next-generation sequencing, picotechnology, application of recombinant proteins, and microchips, each of which will in turn surprise the medical world. Although some of these treatments have been used in the past, researchers are now paying more attention to them because not only are these newer methods more accurate and efficient, but many of the older treatments such as antibiotics are gradually losing their popularity given the rising rate of the antibiotic resistance. In this letter, some of the latest innovative medical therapies are discussed; which you will hear more about soon.

Antibiotics have been one of the most important drugs in medicine since their discovery. In recent years, pathogenic bacteria have mostly become resistant to antibiotics, and if this resistance continues at the present rate, all bacteria soon become resistant to the available antibiotics. Therefore, researchers have been looking for alternatives. Examples of alternatives to antibiotics include antibodies, probiotics, bacteriophages, and antimicrobial peptides that are currently under clinical trials. Based on the previous studies, phage therapy with a history of more than a century is one of the most impor-

tant alternatives to antibiotics. Phage therapy is a bacteriophage-based method using viruses that kill bacteria with no effects on eukaryotic cells. Recent studies have shown that bacteriophages can be personalized; hence, patients can be phage treated according to the types of diseases and their characteristics [1]. Other studies have suggested that phage therapy may be effective against viruses such as coronaviruses of COVID-19. Another innovative method called the Next-Generation Sequencing (NGS) has been available since 2006 as a milestone in science that can sequence the entire human genome in one day. It is enabling effective tumor DNA sequencing, which has revolutionized cancer research and treatment. Technically, NGS is a precision medicine (PM) provider for the treatment of cancer that uses unique treatment based on the individual characteristics and conditions of the patients [2]. Because precision medicine (AKA personal medicine, personalized medicine, or P4) is a personalized treatment based on the individual patient's genome structure and gene content, it could be highly accurate and efficient. Using molecular diagnostics and analytics as well as imaging methods [3], it is possible to predict host susceptibility to diseases, accurately identify diseases, and effectively prescribe drugs to treat diseases. Machine learning is used as a statistical technique to match the models with data.

Precision medicine is the most commonly used machine learning application in the healthcare system, which is itself a sub-branch of Artificial Intelligence (AI) derived from computer sciences. Picotechnology is another novel biomedicine method, which is a combination of pico sizes (10-12) and recent technologies with fewer side effects of nanotechnology such as possible toxicity and inflammation [4]. Researchers are developing molecular-sized picoparticles that can precisely deliver drugs right to the diseased cells; thus, greatly decreasing drug-induced damages to healthy cells of the body. Another significant innovation is linked to recombinant proteins which are proteins encoded by recombinant DNAs and cloned into appropriate expression vectors, supporting gene expression and mRNA translation. Recombinant proteins used in treatments include recombinant hormones, interferons, interleukins, growth factors, tumor necrosis factors, curdling factors, thrombolytic drugs, and enzymes for treating major diseases such as diabetes, dwarfism, heart infarction, and cancer. Relatively, three generations of recombinant proteins have passed, the third generation of which includes high efficiency and safety presented as a brand-new treatment method. One of the innovative methods to deliver these proteins to the body includes the use of microchips. A microchip is a small electronic device of solid silicon with several reservoirs which can be filled with a maximum of 1 ml of the drug and is inserted under the skin using a specific needle. Once installed in their sites, these microchips can release the drug into the body when necessary throughout the biological signals of the body. These methods are a few examples of novel therapies that can open new windows on healthcare system. Further studies on these methods make them further efficient and cost-effective. With the rapid advances in science, medical therapies are evolving as well. Researchers always search for innovative cost-effective treatments with minimum side effects. With extensive clinical studies on these treatments especially with a greater focus on precision medicine, several diseases can effectively be treated and many others can be prevented.

Ethical Considerations

Compliance with ethical guidelines

There were no ethical considerations to be considered in this research.

Funding

This research did not receive any grant from funding agencies in the public, commercial, or non-profit sectors.

Author's contributions

Conceptualization, Supervision, Review and Editing:Ramin Mazaheri Nezhad Fard; Methodology, Investigation, and Writing – original draft:Yara Elahi.

Conflict of interest

The authors declare no conflict of interest.

References

[1] Górski A, Borysowski J, Międzybrodzki R. Phage therapy: Towards a successful clinical trial. Antibiotics. 2020; 9(11):827. [DOI:10.3390/antibiotics9110827] [PMID] [PMCID]

[2] Morganti S, Tarantino P, Ferraro E, D'Amico P, Viale G, Trapani D, et al. Role of next-generation sequencing technologies in personalized medicine. In: Pravettoni G, Triberti S, editors. P5 eHealth: An agenda for the health technologies of the future. Cham: Springer; 2020. [DOI:10.1007/978-3-030-27994-3_8]

[3] Jones DTW, Banito A, Grünewald TGP, Haber M, Jäger N, Kool M, et al. Molecular characteristics and therapeutic vul-

nerabilities across paediatric solid tumours. Nat Rev Cancer. 2019; 19(8):420-38. [DOI:10.1038/s41568-019-0169-x] [PMID]

[4] Pashazadeh-Panahi P, Hasanzadeh M. Revolution in biomedicine using emerging of picomaterials: A breakthrough on the future of medical diagnosis and therapy. Biomed Pharmacother. 2019; 120:109484. [DOI:10.1016/j.biopha.2019.109484] [PMID]