Iranian Journal of Virology 2022;16 (1):66-67
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Letter to Editor

Personalized Phage Therapy as a Novel Treatment Method for the Bacterial Infections

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Dear Editor

Bacteriophages are lethal viruses that can act specifically to lyse only one bacterial species or non-specifically to lyse various bacterial species. Although the discovery of bacteriophages is more than one hundred years old and isolation sources of bacteriophages are very diverse, their bactericidal potentials have not been used in infection treatments. Nowadays, with the rapid development of bacterial antibiotic resistance, attention has been drawn to bacteriophages as alternative medicines. Personalized bacteriophage or personalized phage therapy is a topic that has recently been used by researchers in clinical trials. In this study, recent studies on this novel treatment method have been reviewed. In 1896, Ernest Hanbury Hankin first stated entities in Indian rivers that could be effective against cholera. British and French microbiologists later discovered the existence of bacteriophages as killer entities of bacteria. One of these microbiologists, Felix D'Herelle, greatly studied bacteriophages and introduced phage therapy. Bacteriophages were used as a treatment for bacterial infections in the 1920s and 1930s and later during the Cold War. With the discovery of antibiotics and their widespread use worldwide, the use of bacteriophages in treatment or phage therapy was almost forgotten. Nowadays, side effects of antibiotics have further been addressed, especially in compromised patients and in severe infections. Due to the indiscriminate use of antibiotics and bacterial mutations over time, many pathogens have become resistant to antibiotics, which led researchers to investigate alternatives for the available antibiotics. Relatively, researchers have recommended that phage therapy is highly desirable in monomicrobial diseases (1).

In a study in 2020, the use of phage therapy as precision medicine was assessed. This personalized phage therapy that involves specific phages to the bacterial isolates needs a set of bacteriophages, commonly called phage banks (2).

Recent studies have shown that phage therapy is an effective and safe treatment for bacterial infections and that phage therapy in children can lead to the eradication of bacterial infections with long-term benefits (3). In USA, 2017, a personalized phage therapy cocktail containing nine lytic bacteriophages was used to treat a diabetic patient with resistant *Acinetobacter baumannii* infection (4). Based on a study in 2021, a personalized bacteriophage called phage Ab_SZ3 of the *Siphoviridae* family was used to treat carbapenem-resistant *A. baumannii* lung infection; from which, results were satisfactory and the pathogen was completely cleared from the patient's body (5). Based on the studies and ongoing projects worldwide on personalized bacteriophages and phage therapy, it can be suggested that in the future personalized bacteriophages may not only be able to replace antibiotics and possibly antiviral drugs but can be used in precision medicine.

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With the advancements in medical sciences, personalized phage therapy can quickly accomplish its evolutionary process and be used as an effective safe treatment for acute and challenging bacterial infections. The future of personalized bacteriophages in medicine needs extensive clinical studies.

Acknowledgment

None.

Conflict of interest

No conflict of interest is declared.

Funding

None.

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