

Phage Therapy: A Magic Pill in the Fight against Different COVID-19 Variants

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BLOG

The coronavirus pandemic has caused the death of more than 3,293,120 people, as reported by 10th May 2021 by the World Health Organization (WHO). Due to the emergence of different COVID-19 variants, there is a dire need of effective treatments to combat this pandemic. COVID-19 patients become susceptible to secondary infections such as caused by bacteria. Around 70% of hospitalized COVID-19 patients worldwide receive antibiotics as part of their treatment. Extensive use of antibiotics results in the emergence of multidrug-resistant bacteria. Use of drugs may also cause significant side effects limiting their clinical efficacy in the COVID-19 treatment.

COVID-19 drugs and vaccines are using spike proteins as a prime target, but spike genes get mutated in different variants which could make the spike-targeted drugs and vaccines less effective. According to the senior author Michael S. Diamond, MD, PhD, the Herbert S. Gasser Professor of Medicine, people who have been vaccinated against one variant might not have protective level of antibodies against the new variants. Therefore, researchers are concerned to develop alternative treatments against coronavirus infections.

Recent studies have shown that phages (Viruses that infect bacteria) possess antibacterial as well as antiviral potential. This has ignited the use of phage therapy to treat multi-drug resistant bacteria and viral infections. Phages act by inhibiting the adsorption of virus to human epithelial cells and protect the eukaryotic cells from virus induced apoptosis. Phages also regulate the expression of protective cellular chaperones and inhibit viral replication inside the cells. Alongside, phages can downregulate the production of NF kappa B transcription factor and reactive oxygen species associated with the inflammatory reactions. Moreover, phage therapy induces immunity against viruses by producing the antiviral protein phagocin and upregulating the expression of defensin 2. Interestingly, phages can also be combined with antibiotics to treat bacterial and COVID-19 infections. It seems that there are trends to conduct more studies to shed light on the potential of phages to help combat the COVID-19 pandemic.

Adaptive Phage Therapeutics (APT) is a clinical-stage biotechnology company involved in the development of phage-based COVID-19 vaccine against the novel coronavirus (SARS-CoV-2).

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The company is dedicated to provide these therapies because phage-based strategies can adapt new vaccines to potential mutations in the coronavirus making it an effective technique against different variants. Additionally, these vaccine candidates are self- adjuvating to enhance immune response and provide excellent safety profile of phage.

Marcin W. Wojewodzic, a systems biologist at the Cancer Registry of Norway, Institute of Population-Based Cancer Research, Etiology Group suggested the use of cocktails of bacteriophages and phage

display techniques to prepare synthetic antibodies that target SARS-CoV-2 in the early stages of infection.

They also highlighted the potential advantages of bacteriophages as they can be stored and transported easily. Due to their minimal side effects, bacteriophages may play a significant role in mitigating the COVID-19 pandemic. This shows the beauty of nature how bacteriophages can rescue human beings.