

Biological and Medical Sciences

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Abstract

With the end of the antibiotic era looming, alternative antimicrobial agents are desperately needed. Lytic bacteriophage specific for a variety of bacteria have been used for almost 100 years to successfully treat serious infections. Here we make the case for pursuing formal regulatory approvals for the use of bacteriophage as therapeutic antimicrobial agents. Following Alexander Fleming's discovery of penicillin in 1928, the world experienced an antibiotic renaissance in which previously deadly bacterial infections could be cured by a variety of antimicrobials. However, in the past three decades, bacteria have responded to the onslaught of new antibiotics with a deluge of mutations and gene acquisitions, as well as the means to transmit them to both their own and other bacterial species, such that they are rapidly becoming insensitive to all of the drugs. The U.S. Centers for Disease Control and Prevention (CDC) estimates that antibiotic resistant bacteria cause at least two million illnesses and 23,000 deaths annually in the United States. The speed at which bacteria replicate combined with their ability to transfer antibiotic resistance factors in the microbial community has led to an ever-expanding group of serious infectious threats. For rapidly emerging pathogens like carbapenem-resistant Enterobacteriaceae, the mortality rate can approach that of Ebola virus.

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