

# **Bacteria and bacteriophage - are they fighting or are they dancing?**

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## **Abstract**

Bacteriophage are often described as obligate predators of their bacterial hosts. This aspect of bacteriophage-bacterial interactions is important in that their ruthless predation represents one of the leading forces controlling the density and distribution of bacterial populations in the biosphere. It has been estimated that every 48 hours roughly half of all bacteria on earth are killed by bacteriophage infection. The efficient killing of bacteria by phage forms the basis of phage therapy in humans, animals and in food protection. Bacteria can combat phage attack through a plethora of resistance systems, but the evidence garnered in genomic and laboratory-based studies suggests that very few bacterial species, if any, have entirely escaped bacteriophage predation. In complex communities and environments like the human gut, this antagonistic model of attack and counter-defence does not fully describe the scope of bacteriophage-bacteria interactions. Here I will explore some of the more mutualistic aspects of bacteriophage-bacteria interactions in the human gut, the source of many recent insights into bacteria-bacteriophage dynamics. I suggest that the relationship between bacteriophage and their bacterial hosts is best characterised not as a fight to the death between enemies, but more as a mutualistic relationship between partners.