Bacteria-infecting viruses, or bacteriophages, may influence microbial communities in the mammalian gut in various ways, some of which are illustrated here. Through predation, phages can influence the abundances of specific bacterial taxa, with indirect effects on the rest of the community, and can drive the evolution of specific bacterial phenotypes. Phages can also incorporate their genomes into bacterial chromosomes, where the viral sequences lie dormant as prophages until reactivated. Researchers have found that phages interact directly with mammalian cells in the gut, too. These cross-kingdom interactions could affect the health of their eukaryotic hosts.

Some phages prompt a direct response—triggering, among other things, the production of phage-specific antibodies—from the mammalian immune system, and may worsen inflammatory disease.

GUT WARS

Predation by phages can deplete populations of specific bacterial taxa and help regulate bacterial communities.

Phages incorporated into the bacterial chromosome may give the microbe new traits, such as the ability to produce particular toxins.

Some bacteria produce phages as weapons against other taxa.

Glycoproteins

Some phages can interact with glycoproteins on the surface of mammalian cells in the gut and could form an antibacterial barrier that protects the gut wall from potential attacks by bacteria.

Phages may traverse the gut cell wall, perhaps ending up in the bloodstream of their hosts.

Over generations of bacteria, phage predation can drive the evolution of phage-resistant phenotypes that could alter those bacteria’s interactions with the mammalian immune system.

Phages incorporated into the bacterial chromosome may give the microbe new traits, such as the ability to produce particular toxins.

Some bacteria produce phages as weapons against other taxa.

Phage-encoded toxins

Bacteriophage

Bacterial genome

Phage genome

Prophage

Bacterial genome

Phage-uncoded toxin

Predation by phages can deplete populations of specific bacterial taxa and help regulate bacterial communities.

Phages incorporated into the bacterial chromosome may give the microbe new traits, such as the ability to produce particular toxins.

Some bacteria produce phages as weapons against other taxa.