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Defense and anti-defense mechanisms of bacteria and bacteriophages

Key words: **Bacteriophage; Phage resistance; Abortive infection; Phage therapy**

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Research Summary

This review mainly summarize recent research on bacterial phage resistance and phage anti-defense mechanisms, as well as collaborative win-win saytems involving both virus and host.

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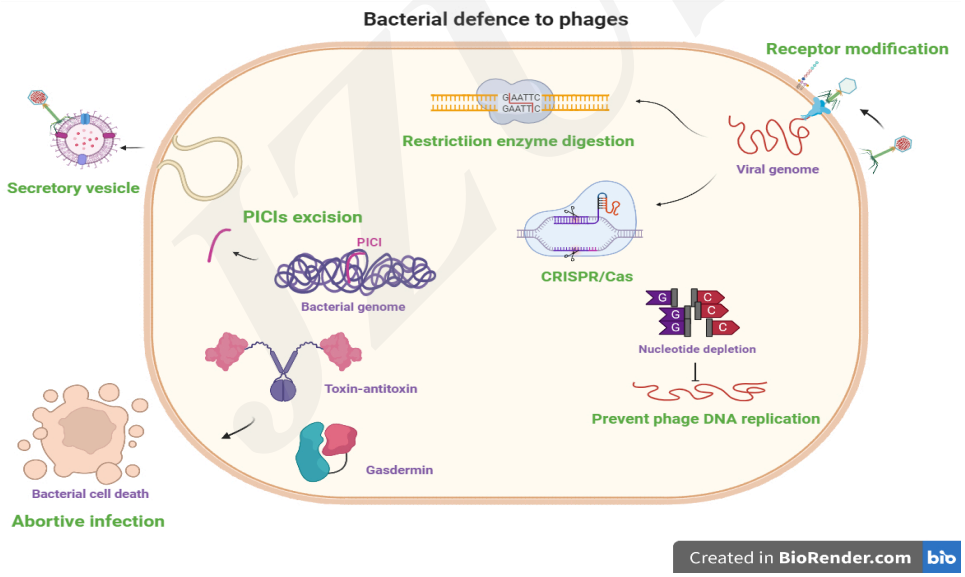
Mechanisms of by which bacteria escape phage infection

- 1. Modification of cell surface structure.
- 2. Preventing entry of the phage genome.
- 3. Cutting the phage genome or preventing phage DNA replication.
- 4. Preventing the release of mature phage particles by earlier self-lysis.
- 5. Promoting phage adsorption by producing extracellular “bait”.
- 6. Toxin and anti-toxin systems.
- 7. Phage-inducible chromosome islands.



Mechanisms of phage resistance to bacterial immunity

- 1. Changing the receptor binding proteins of the phage.
- 2. Forming a physical barrier to avoid the degradation of bacteriophage DNA by bacteria.
- 3. Anti-CRISPR systems.
- 4. Resisting the RM system by preventing DNA methylation of host bacteria.
- 5. Degradation of the chromosome of host bacteria.
- 6. SOS mediated prophage induction.
- 7. Inhibiting TIR-gcADPR signaling.

