

## Bacteria and Bacteriophage-the Incessant Feud for Supremacy

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**Background:** The first organisms to appear on the earth were unicellular prokaryotes from where the present day bacteria evolved. The origin of virus is not yet known. Viruses may have evolved from bacteria or plasmids. In order to survive bacteria has to prove their mettle against a type of viruses called bacteriophages which infects the bacterial cell and kills it. In course of time bacteria evolved different mechanisms to evade the infection by bacteriophages and phages also developed ways to infect these resistant bacteria. This constant co-evolutionary arms race for existence led to the diversification of bacterial and bacteriophage species with advanced adaptive features. This review deals about the antagonistic co-evolutionary relationship of phage and bacteria, impact of it on each other and on the life of humans.

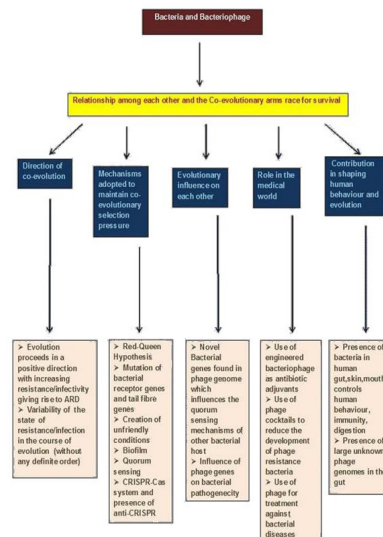
**Methods:** The review paper is written after reading a list of research papers from the NCBI (PubMed) database.

**Results:** The co-evolutionary arms race generally follows a directional route of evolution with increase in resistance/infectivity. But there are also fluctuations in the state of infection/resistance in course of evolution where there is no fixed order of increase or decrease of the infectivity and resistance of the parasite and host respectively. Bacteria employ different methods for protection against phage attack and the phages also adopt different mechanisms to overcome bacterial resistance.

Novel bacterial genes are found in phage genome which influence quorum sensing of other bacteria. It was also seen presence of phage genes controls pathogenicity of bacteria. These findings showed the evolutionary impact of the organisms on each other.

Phages can be used as therapeutic agents against bacterial infection. Apart from this application, a large amount of unknown phage genomes were discovered in human gut whose probable role in shaping human behaviour are yet to be revealed.

**Conclusion:** The co-evolutionary struggle for existence paved the way for diverse group of organisms of phage and bacteria with increased adaptive characters. A part from the antagonistic relationship both the organisms have influence on each other which is of evolutionary significance.



### Biography:

Aparajito Sen from Kolkata, India and he applying for a paper presentation in the symposium in Valencia, Spain on Microbiology. He completed his Master's degree in Genetics in 2017 from University of Calcutta, Kolkata, India and wish to pursue PhD in future. He completed his Bachelor's degree in Botany from Scottish Church College affiliated to University of Calcutta and he completed his school level secondary and higher secondary examination from St Lawrence High School, Kolkata India. His medium of education was English throughout. He is very fluent in English from both speaking and writing aspects. He want to present a review paper on co-evolutionary arms race between bacteria and phages which he wrote in the final semester of his Masters as a dissertation project. He is currently working in University of Calcutta as a research trainee in Dr Sreya Chattopadhyay's lab (Cancer biology lab) in Department of Physiology, University of Calcutta, India.