SYNOPSIS OF THESIS
Cholera is a widespread, severe diarrhoeic disease, both in developing and developed countries, which continues to be a global threat. It is primarily caused by toxigenic strains of *Vibrio cholerae* belonging to the O1 serogroup. Although oral rehydration remains the primary line of treatment, antibiotics are often used as an adjunct therapy as they shorten the duration of the disease but emergence of multiple drug resistant strains of *Vibrio cholerae* is thus a cause for global concern and is prompting the exploration for alternative ways of treatment.

To examine the potential usefulness of cocktail phages, it is important that the phenomenon is studied in a variety of animal models like rabbit and mice, using bacteria with different mechanisms of virulence as the challenge. Here, Removable Intestinal Tie–Adult Rabbit Diarrhoea (RITARD) model, Oral Rabbit Model and Oral Mice Model was chosen as the *in vivo* systems to evaluate the efficacy of phages.

This study has been approved by the Institutional Animal Ethics Committee (IAEC), National Institute of Cholera and Enteric Diseases (ICMR), Kolkata, India.

In this study, we have established a successful oral phage cocktail therapy in adult rabbit and mice model and also performed a comparative analysis between phage cocktail, antibiotic and oral rehydration treatment for orally developed *Vibrio cholerae* infection. It was observed that oral administration of the phage cocktail after oral bacterial challenge lowered the shedding of bacteria significantly but phage treatment prior to bacterial challenge had no such effect. Whereas, the oral rehydration solution application was not able to reduce the viable bacterial count but the disease progress was much more diminished. Histological results revealed that villi of control animals lost their normal shape and showed more inflammatory cellular infiltration in the lamina propria compared with the phage treated animals.

Our further investigation also revealed that both antibiotic and phage cocktail treated animals had a gradual decrease in IL-6 and TNF-α levels but the scenario was totally opposite in bacterial control and oral hydration treated animals.

A better way of delivery with suitable development of phage cocktail with the help of the technology may bridge the gap between antibiotics and phages Moreover, further scientific proof of the in vivo efficacy and safety of phage therapy will validate its clinical use in humans, thereby possibly critically dropping antibiotic use.