now called a prophage) and replicate with it as a unit without destroying the cell. Under certain stressful conditions, including the presence of some antibiotics, lysogenic phages can be induced to follow a lytic cycle.

19.5.2 Bacteriophage Therapy

Phage therapy, which refers to the utilization of phages to treat bacterial infections, has been around for almost a century. Phage therapy are considered safety, since they non-interacts with body tissues and non-target microbiota, showing minimal impact on the normal microbiota.

Félix d'Hérelle was the first to apply phages as a therapy to successfully treat child with severe dysentery caused by *Shigella dysenteriae*, and at the beginning of the twentieth century, he proposed the use of bacteriophages for the therapy of human and animal bacterial infections. In 1923, d'Hérelle and his assistant George Eliava founded the Eliava Institute. The institute played an important role in the elaboration of novel biological preparations and manufacturing products against almost all major bacterial and viral diseases, such as anthrax, rubies, TB, brucellosis, salmonellosis, dysentery, etc. The old Soviet literature indicates that phage therapy was used extensively to treat a wide range of bacterial infections in the areas of dermatology, urology, stomatology, pediatrics, and surgery. These approaches were not widely accepted in the West. After the discovery of antibiotics in the 1940s and the widespread use of penicillin during World War II, phages were reduced to being used only in Eastern countries, which had no access to antibiotics.

Due to the specificity of the phage, confers on them an advance over antibiotics and can be useful in this battle, and a wide variety of phage therapies has been used to treat. Lytic phages are preferred alternatives in phage therapies when compared with lysogenic phages for the following reasons: lytic phages will destroy their host cell, while lysogenic phages can transfer virulence and resistance genes due their life cycle.

One of the main applications of the phage therapies has been to eliminate pathogenic bacteria involved in infectious diseases in humans. Moreover, with the increase of MDR strains, there has been increased interest in alternative therapy, and phage therapy has been shown to be an effective strategy to prevent and control these strains, being employed alone or in cocktails or as supplement to conventional antibiotic therapies. Recently, *in vivo* and *in vitro* experiments showed the efficacy of the phage cocktail to control MDR *A. baumannii*. Data from Hirszfeld Institute in Poland showed promising results, with 40% rate of good response of phage therapy against several MDR bacteria.

To control the ESKAPE (*Enterococcus faecium*, *S. aureus*, *K. pneumoniae*, *A. baumannii*, *P. aeruginosa*, and *Enterobacter* species) pathogens associated to nosocomial infections around the world, the phage therapy showed to be