INVITED SPECIAL LECTURE ON "CURRENT TRENDS IN ANTIBIOTIC RESISTANCE AND BACTERIOPHAGE"

BY

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DEPARTMENT OF MICROBIOLOGY

DKM COLLEGE FOR WOMEN(AUTONOMOUS)

VELLORE

Guest lecture on Antibiotic resistance and phage therapy

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Nowadays, the microbes are becoming resistant to vast majority of antibiotics, so it is difficult event to treat the common diseases of human. Antibiotic resistance happens when germs like bacteria and fungi develop the ability to defeat the drugs designed to kill them. It means that the germs are not killed and continue to grow.

Infections caused by antibiotic-resistant germs are difficult, and sometimes impossible, to treat. In most cases, antibiotic-resistant infections require extended hospital stays, additional follow-up doctor visits, and costly and toxic alternatives. Antibiotic resistance does not mean the body is becoming resistant to antibiotics, it is that bacteria have become resistant to the antibiotics designed to kill them.

Antibiotic resistance has the potential to affect people at any stage of life, as well as the healthcare, veterinary, and agriculture industries, making it one of the world's most urgent public health problems. Microorganisms that develop antimicrobial resistance are sometimes referred to as "superbugs". As a result, the medicines become ineffective and infections persist in the body, increasing the risk of spread to others. To handle these situations, the researchers go for alternative therapy which is called phage therapy. Bacteriophages are viruses that can infect and kill bacteria without any negative effect on human or animal cells. For this reason, it is supposed that they can be used, alone or in combination with antibiotics, to treat bacterial infections.

Use of bacteriophages to overcome the problem of increasing bacterial resistance to antibiotics is attractive. Phage exist in two different life cycles , as lytic and lysogenic cycle. Lytic cycle involves adsorption on host cell surface, inject their DNA and replicate. After replication, the host cell lysis and release of the progeny phages. In case of lysogenic cycle,

after entry into the host it integrate their genome with the host DNA. As a result, the genome is transmitted by cell division. So, for this therapy purpose the lytic phages are used to treatment the bacterial infection. Many in vitro studies have been conducted in recent years to evaluate the potential of phages against P. aeruginosa clinical isolates, including multidrug-resistant (MDR) strains.

A different approach for the treatment of bacterial infections is the combination of phages with other antimicrobials. Recently, Torres-Barceló et al. reported treatment using a combination of Podoviridae phage LUZ7 and streptomycin against P. aeruginosa. The combination of two or more phages with different host ranges in a single suspension is said to be a phage cocktail to be more effective than the use of a single phage alone. Multiphage therapy was revealed to be more efficient in reducing the bacterial density, and simultaneous application of phages was consistently equal or superior to sequential application with respect to efficacy.