

Abstract

This Thesis title “**Development of novel sulfonium containing drug carriers with inherent antimicrobial activities to combat drug resistance**” deals with the study of sulfonium containing liposome and polymers which contains membrane directed bactericidal activity and hence it can counteract different drug resistance mechanism of the drug resistance due to efflux transporter, reduced number of porins, metabolic drug inactivation and hence it can rejuvenate the activity of the clinically proven antibiotics against drug resistant bacterial strains.

Chapter 1 elaborates the history of antibiotic development and its resistance mechanism in different bacterial strains followed by the strategy to cope up with the drug resistant bacterial superbugs. Here it also elaborates the rationale behind designing the antimicrobial drug carrier with bactericidal activity

Chapter 2 deals with the development of sulfonium containing liposome with antimicrobial and antibiofilm activity against gram-negative and gram-positive bacterial strains. Potent compound forms liposome that can be used to encapsulate the other antibiotic drugs. After encapsulation it shows the synergistic activity with very less toxicity against host cells.

Chapter 3 is pact with the characterization and drug encapsulation study of sulfonium and lauryl amine conjugated albumin protein. This antibacterial nano aggregate is entrenched with the antibiofilm and synergistic efficacy test after encapsulation of ciprofloxacin drug in it. This nano aggregate reveals the antibacterial and antibiofilm activity in mice model by reducing the number of colony forming unites in liver and spleen.

Chapter 4 elaborates the design of stimuli responsive sulfonium cross linked hyaluronic acid hydrogel with self-healing and drug entrapment property. It exhibits antibacterial and antibiofilm activity against drug sensitive and resistant bacterial strains. This study also corroborates the wound healing property of the hydrogel. Proposed gel material can be used to coat the fabric in order to make it band-aid for wound dressing.