Preface

Continuously increasing the load of multi drug resistant (MDR) pathogenic strains are directed the researcher to investigate the new class of molecules which can circumvent this problem by their unique mechanisms. Antimicrobial peptides (AMPs) are well known innate defense molecule of almost all the organisms. These AMPs generally exhibit their activity by damaging the membrane organization of microbes; it is most unlikely that bacterial resistance will be developed easily against these peptides. However, its poor cell selectivity (between mammalian and bacterial cells) utter in the development of AMPs as a potential therapeutic candidate. Understanding the parameters which more selectively down regulate the cytotoxicity will probably open the door for generation of new antibiotic. Accordingly, the present work is focused to endeavor the factors which control the cytotoxicity of antimicrobial peptides and designing potent active peptides by taking them into account. This has been done by selective mutation in naturally occurring antimicrobial peptides, Melittin and BMAP-28 and designed some short novel peptides on the basis of an structural element leucine zipper heptad, it play crucial role in cytotoxicity, recognized firstly in our lab.

Introductory **Chapter 1** presents a brief background of the present work along with the objectives and rationale. **Chapter 2** reviews the available literature on antimicrobial peptides. **Chapter 3** describes the materials and methods used to carry out the investigations. **Chapter 4** The outcomes of designed short novel peptides on the basis of heptadic template. **Chapter 5** Deal with the importance of these heptadic analogues in neutralization of LPS induced pro-inflammatory response in macrophage. Outcomes of the substitution of heptadic leucine by similar hydrophobic amino acids valine on melittin is presented in **Chapter6**. Finally **Chapter 7** discusses the regulation of toxicity in BMAP-28 by interchanging the non-heptadic position proline with heptadic position's isoleucine.