CHAPTER - 1

INTRODUCTION

Acinetobacter is a strictly aerobic, Gram negative coccobacillus that is now a major cause of nosocomial infections worldwide, particularly in patients who are critically ill, and in those requiring mechanical ventilation in intensive care units [1, 2]. Acinetobacter has emerged as an important nosocomial pathogen involved in outbreak of hospital infection. This ubiquitous organism can be recovered from hospital environment, from colonized or infected patients or from staff [3, 4, 5]. Acinetobacter has emerged as one of the most troublesome pathogen for health care institutions globally. Its clinical significance has been propelled by its remarkable ability to up regulate or acquire resistance determinants, making it one of the organisms threatening the current antibiotic era. Acinetobacter strains resistant to all known antibiotics have now been reported, signifying a sentinel event that should be acted on promptly by the international health care community. Acting in synergy with this emerging resistance profile is the uncanny ability of A. baumannii to survive for prolonged periods throughout hospital environment, thus potentiating its ability for nosocomial spread. The organism commonly targets the most vulnerable hospitalized patients, those who are critically ill with breaches in skin integrity and airway protection. Hospital acquired pneumonia is still the most common infection caused by this organism. However, in more recent times, infections involving the central nervous system, skin and soft tissue, and bone have emerged as highly problematic for certain institutions. A.baumannii causes serious and sometimes fatal epidemics in intensive care units of hospitals. The most common clinical manifestation of A.baumannii infections in the ICUs are ventilator associated pneumonia (VAP) and septicemia, which are associated with morbidity and mortality rates as high as 52%. Other hospital acquired A.baumannii infections include urinary tract infections, wound infections and meningitis [1].
The greatest current interest in this genus arises from the ease with which clinically relevant Acinetobacter have developed resistance to antibiotics such as ampicillin, carbapenems, aminoglycosides, tetracyclines and quinilones. Particular concern is the emergence of *A. baumannii* strains resistant to all commonly used antibiotics, including colistin, polymyxin B or tigecycline [1, 6, 7, 8]. Furthermore, *A. baumannii* displays an extraordinary tolerance to desiccation and disinfectants, which contributes to its long term persistence in hospital environment and the occurrence of outbreaks of infection [9, 10, 11, 12].

Although *A. baumannii* is a pathogen of considerable health care interest, surprisingly little is known about this organism's virulence determinants, bacterial regulatory networks and host defence mechanism. Recently DNA genome sequencing revealed that this organism harbours an extraordinary number of putative virulence associated genes and elements homologous to the Legionella/Coxiella type IV secretion apparatus [13]. Several virulence determinants involved in biofilm formation [14, 15], iron acquisition [16], lipopolysaccharide synthesis [17], resistance to bactericidal activity of human serum [18], adherence, host cell invasion [19] and death [20] have been reported in previous studies. While this encompass just a minor fraction of elements involved in *A. baumannii* virulence, new approaches are needed to expand our understanding of the basic features of this organism which will ultimately be essential to control the spread of *A. baumannii* infections and to develop effective means to prevent or treat infections with this harmful pathogen.