CHAPTER-12

CONCLUSION

Acinetobacter spp. have justifiably received significant attention from the public, scientific, and medical communities. Over recent years, Acinetobacter, particularly *A. baumannii*, has become a “red-alert” human pathogen, primarily because of its exceptional ability to develop resistance to all currently available antibiotics. This characteristic is compounded by its unique abilities to survive in a diverse range of environments, including those within healthcare institutions, leading to problematic outbreaks. Historically, the virulence of the organism has been questioned. Relative to other pathogenic Gram negative organisms, very little is known about its virulence mechanisms and host responses to infection. To gain greater insight into *A. baumannii* virulence factors, an ORF was identified in *A. baumannii* ATCC 17978, A1S_1032 that codes for a protein belonging to the trimeric autotransporter (TA) family, which was termed the Acinetobacter trimeric autotransporter, or Ata. Ata is surface exposed on the *A. baumannii* outer membrane, plays a role in the virulence of *A. baumannii* in mice, mediates adherence to ECM/BM proteins, and contributes to biofilm formation. Ata has all the typical features of TAs, including a long signal peptide followed by a surface exposed passenger domain and C-terminal translocator domain encoding 4 strands. With a size of 1,873 amino acids per monomer, the *A. baumannii* Ata is significantly larger than other well described TAs, such as YadA (455 aa), UspA1 (863 aa), Nhha (590 aa), and NadA (364 aa). It was demonstrated that this surface antigen, Ata of *A. baumannii* can elicit immunity to experimental infections associated with potent in vitro opsonic and bactericidal killing activities. Since 56.3% of the *A. baumannii* strains tested (43/75) produced variable but overall high levels of Ata [131], this surface protein represents a viable vaccine antigen with the potential to be used either alone or as part of multi component vaccine for active immunization in selected high risk populations such as military personnel or as a target for passive antibody and monoclonal antibody development.
Antibiotic resistance is recognized as one of the greatest threats to human health on the planet [149,150,151]. Indeed, 50–70% of \textit{A. baumannii} clinical isolates are now extensively drug resistant (XDR; i.e. resistant to carbapenems and all other antibiotics except colistin or tigecycline), reflecting a 15fold increase in just the past 10 years [152,153,154]. Infections caused by XDR \textit{A. baumannii} are associated with prolonged hospitalization, tremendous health care costs, and high rates of death despite treatment [155,156,157]. Even more concerning is the increasing resistance of \textit{A. baumannii} to both colistin and tigecycline [157,158]. Such pan drug resistant (PDR) \textit{A. baumannii} infections are resistant to every FDA approved antibiotic, and are hence untreatable. Since risk factors for \textit{A. baumannii} infections are understood [159,160,161], vaccination of acutely at risk patients is a promising method to prevent such infections, and antibody based immunotherapy has promise to improve outcomes from infection.