Understanding Bioterrorism Agent *Francisella Tularensis* Virulence Through Capbca Protein

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Francisella tularensis is categorized as a Tier 1 Category A bioterrorism agent by the Centers for Disease Control and Prevention due to its high virulence. It's the causative agent of Tularemia, a bacterial disease that has been recognized as a significant public health concern. This disease is naturally occurring in the United States, primarily in the western and central parts of the country, and it can infect both humans and animals such as rodents, rabbits, and hares. *F. tularensis* can be transmitted to humans through various routes, including direct contact with infected animals, ingesting contaminated food or water, inhalation of contaminated aerosols, or even insect bites. The symptoms of tularemia vary depending on the route of transmission. In severe cases, tularemia can lead to pneumonia, sepsis, and even death if left untreated.

Despite the severity of the disease, there is no effective vaccine available for tularemia, and the current treatment options are limited to antibiotics such as gentamicin. However, the emergence of drug-resistant strains of *F. tularensis* highlights the urgent need to develop new therapeutic agents against this pathogen. One promising target for the development of such drugs is the CapBCA membrane protein complex, which has been identified as a crucial factor in the virulence of *F. tularensis.* Hence, understanding the structural and functional properties of the CapBCA protein complex is crucial for the development of such drugs. CapBCA protein structures will be studied in detail using X-ray crystallography and cryo-electron microscopy. These structural studies will provide valuable insights into the mechanism of action of the CapBCA complex in *F. tularensis* virulence and could help identify potential drug targets for the development of new therapeutic agents against tularemia.