COMBATTING FUTURE BIOLOGICAL THREATS – HOST-DIRECTED INTERVENTIONS TO EMERGING THREATS FOR RAPID RESPONSE

Treatment Of Bacterial Biothreat Agents With A Novel Purified Bioactive Bovine Lactoferrin As A Medical Countermeasure

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Mammals rely on their innate immune system to protect against infectious diseases. One component of the innate immune system that helps combat these insults is the glycoprotein lactoferrin. Lactoferrin is known to exhibit broad spectrum activity against a multitude of bacteria, fungi, and viruses due to its multi-functional mode of action. Recently, Lactea Therapeutics and its affiliates have developed a novel patent-pending technology to purify naturally derived bovine lactoferrin (Lactea Lf) as a medical countermeasure, not previously available, to ultra-high purity having retained its native multifunctional activities.In Lactea's studies, Lactea Lf demonstrated both inhibition of growth and elimination of biofilm formation against multiple nosocomial bacterial pathogens. To assess Lactea Lf as a medical countermeasure against biothreat pathogens, dose-response curves against several select-agent bacteria were generated and their respective BSL-2 surrogate strains including Burkholderia psuedomallei (causative agent of melioidosis), Burkholderia mallei (causative agent of glanders), Burkholderia thailandensis, and Francisella tularensis (causative agent of tularemia). Here, it is shown that Lactea Lf can reduce the final culture density and inhibit growth in a dose dependent manner for all Burkholderia species tested. Of note, biofilm formed by B. thailandensis and B. pseudomallei was also reduced independent of growth inhibition, consistent with a multi-functional mode of action of Lactea Lf against these bacteria. Furthermore, Lactea Lf demonstrates growth inhibition with F. tularensis. Taken together, these data support that Lactea Lf is a promising new candidate for further studies as a broad-spectrum antimicrobial medical countermeasure with efficacy against several high priority biodefense-related bacterial pathogens. In addition, other ongoing studies are examining the ability of Lactea Lf to protect against high consequence viral pathogens. Ongoing studies in the laboratory for the biothreat bacterial pathogens include expanding upon testing Lactea Lf effects on additional bacterial pathogens, determining the efficacy of Lactea Lf in biofilm dispersion, and testing for activity against intracellular bacteria. Based upon these data, future small animal studies will be pursued. Overall, from the data to date, Lactea Lf shows potential to be part of a combined therapy to protect the warfighter against biothreat pathogens and emerging threats in a battlefield.

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