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Protection against bioterrorism

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Bioterrorism involves the intentional release of dissemination of deadly biological agents in the cities and communities. Terrorism has become a common and easier way of causing harms to innocent public. At present time, it has caused serious concerns and insecurity in the public domain. One of the sources or methods used by terrorists is through dissemination of deadly bacteria, viruses, and chemicals. Bioterrorism agents are found typically in nature and can be grown easily. It is also possible that they can be mutated or altered to increase their ability to cause deadly diseases causing mass casualty of human lives. Anthrax letter attacks after September 11, 2001 demonstrated the ease of using the anthrax spores as a weapon of mass destruction in a bioterrorist attack. Anthrax is lethal infectious disease caused by the spore forming Bacillus anthracis. The two major virulence factors of B. anthracis are the poly-y-glutamic acid (Y-D-PGA) capsule and exotoxin. The three components of the exotoxin, Protective Antigen (PA), Lethal Factor (LF) and Edema Factor (EF) are produced and secreted separately and form two bipartite toxins that cause massive edema and organ failure. The anti-phagocytic y-D-PGA capsule disguises the bacilli from immune surveillance by macrophages and allows unimpeded growth of the bacilli leading to anthrax disease caused by both, the capsule and toxins. However, the currently licensed Anthrax Vaccine Adsorbed (AVA) or rPA based anthrax vaccines only address the toxin- induced disease, and not the capsule mediated virulence factors related disorders which contribute to the severity of the anthrax infection leading to death. The newly proposed anthrax vaccine, an antibody response triggered specially by y-D-PGA can fully neutralize the disguising capsule. However, the capsule is not immunogenic by itself and must be conjugated to a carrier protein such as PA. The conjugate vaccine concept embodies the paradigm of combining both, antibacterial (prophylactic) and antitoxin (therapeutic) components into a single vaccine. This has contributed much success in inducing protective levels of antibodies in infants and children against systemic infection with encapsulated pathogens. The development of this conjugated anthrax vaccine will fill an urgent void, delivering a well-defined and characterized biodefense countermeasure potentially suitable for infants and children. The proposed work will lead to the characterization, testing, and manufacturing of a promising conjugated anthrax vaccine candidate. This will potentially lead to the development of a conjugated anthrax vaccine with dual antigens, namely PA and PGA (polyglutamic acid).

Biography

Lallan Giri is currently CEO of Biologics Resources LLC (BRLLC) which is a Vaccine and Biopharma Company focused on the development of biodefense vaccines for adults and children. Professionally, he is a Vaccinologist and has made contributions to the development of several pediatric vaccines during his employment as Director of Glaxo Wellcome, as Director at Sanofi Pateur, and as Vice President at Emergent Biosolutions, Inc, and as CEO at BRLLC.

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