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Conjugate rPA-PGA anthrax vaccine induces protective antibodies

Anthrax is a lethal infectious disease caused by *Bacillus anthracis*. The two major virulence factors of *B. anthracis* are the poly- γ -D-glutamic acid (PGA) capsule and the exotoxin. Three components of the exotoxin form two bipartite toxins causing edema and organ failure. The anti-phagocytic PGA capsule disguises bacilli from macrophages, allowing unimpeded growth in the host. PA is a target of anthrax vaccine development as it elicits a toxin-specific protective immune response; however PA based anthrax vaccines only address toxin-induced disease and not capsule mediated virulence. Recent effort has been made to include PGA in 2nd generation anthrax vaccines, resulting in a promising vaccine providing comprehensive protection. Antibody to PGA fully neutralizes the capsule but PGA must be conjugated to a carrier protein to provide immunogenicity against both antigens. We have undertaken advanced development of an rPA-PGA conjugate vaccine for adult and pediatric populations. Our hypothesis is that by targeting the two virulence factors of *B. anthracis*, we can create an anthrax countermeasure that is more comprehensive and efficacious than currently available vaccines. We have shown by ELISA that our conjugate vaccine candidate produces significant levels of antibody to PA and PGA in mouse and rabbit immunogenicity studies. Compared to the approved anthrax vaccine, antibodies produced in response to the rPA-PGA vaccine are more protective in the toxin neutralization assay. We have produced cGMP vaccine and performed a challenge study in rabbits with this vaccine lot, demonstrating 100% protection against lethal aerosol *B. anthracis* spore challenge in vaccinated rabbits. There is also an increasing need to develop an anthrax vaccine for use in children. We have developed a neonatal rabbit model to simulate the pediatric immune response, showing three week old rabbits generate antibody to both antigens in response to immunization with rPA-PGA that is neutralizing in TNA.

Biography

Lallan Giri is currently the CEO of Biologics Resources LLC (BRLLC) which is a Vaccine and Biopharma Company focused on the development of biodefense vaccines for adults and children. He is a Vaccinologist and has made contributions to the development of several pediatric vaccines as Director at Glaxo Wellcome, Director at Sanofi Pasteur, Vice President at Emergent Bio-solutions, and CEO at BRLLC. The current ongoing research projects at BRLLC include work on "Biodefense vaccines and therapeutics".

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