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15th Annual Summit on

Vaccines and Immunization

February 20-21, 2017 Berlin, Germany



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The VCG platform facilitates mucosal and systemic vaccine delivery for induction of protective immunity in the female genital tract

Statement of the Problem: The delivery vehicle and route of vaccine administration play an important role in the induction of optimal immune effectors and their homing to the site of infection to achieve protective immunity. The choice of an adequate route of vaccine administration is desirable to avoid compromising a potentially efficacious vaccine. We have designed a versatile Vibrio cholerae ghost (VCG) platform, an effective self-adjuvanting delivery vehicle capable of simultaneously delivering multiple vaccine antigens from the same or different pathogens to the immune system. It offers an attractive approach for developing vaccines against a number of human pathogens. The present study was undertaken to compare the potential of rectal mucosal and intramuscular systemic immunizations for induction of female genital tract immunity in mice using a VCG-based chlamydial vaccine.

Methodology & Theoretical Orientation: Groups of mice were immunized rectally (IR) or intramuscularly (IM) with VCG expressing the Chlamydia trachomatis porin B and polymorphic membrane protein D proteins (rVCG-PmpD/PorB; PmpD-vac) or glycoprotein D from HSV-2 (rVCG-gD2 or gD2) as antigen control. Vaccine efficacy was assessed by evaluating the intensity and duration of genital chlamydial shedding following intra-vaginal challenge with live chlamydiae. Analysis of variance (ANOVA) was used to compare differences between groups.

Results: We demonstrated that both IM and IR immunization of mice with PmpD-vac elicited high levels of antigen-specific Th1 cell-mediated and humoral immune responses in mucosal and systemic tissues. Also, immunization reduced the length and intensity of genital chlamydial shedding following intra-vaginal challenge with live chlamydiae, irrespective of route of vaccine administration.

Conclusion & Significance: These results highlight the potential of the VCG platform for eliciting immunity in the female genital tract via both mucosal and systemic delivery of antigens in the absence of external adjuvants.

Biography

Francis Eko is a Professor of Microbiology and Immunology at Morehouse School of Medicine, Atlanta (USA). His expertise is in "The development of vaccines and vaccine adjuvants". His current research involves development of self-adjuvanting vaccines against chlamydia genital and respiratory infections and the effect of VCG-based adjuvants on immune responses to mucosal and systemic vaccines.

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