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Cytokine and T cell responses to seasonal influenza vaccination in adults

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The threat of newly emerging strains of influenza A highlights the need to better understand the immunologic basis of different vaccine strategies. Vaccination with either trivalent inactivated vaccine (TIV) or live attenuated influenza vaccine (LAIV) is the primary public health defense against seasonal influenza outbreaks. Although both vaccines are generally efficacious, the immunologic mechanisms which contribute to protective immunity are incompletely understood. We investigated the effects of TIV and LAIV on serum cytokine profiles, antibody titers and polyfunctional T cell responses in healthy adults from 2006-2008, prior to the 2009 H1N1 pandemic (pH1N1). Vaccination with TIV was associated with a small, yet significant, decrease in serum levels of both IL-8 and TNF-α at 14 and 28 days post-vaccination. LAIV, however, had no impact on serum cytokines. Similarly, analysis of serum antibody titers indicated that TIV recipients had a significantly higher sero-response rate compared to LAIV recipients.The capacity of TIV and LAIV to induce antigen-specific T cell responses to vaccine-matched and mismatched influenza strains was assessed by multi-color flow cytometry. Unlike antibody titers, we found broadly cross-reactive CD4 and CD8 T cell activity directed against both seasonal and pH1N1 viruses prior to vaccination. Interestingly, our results suggest that TIV, but not LAIV, induced antigen-specific T cells against seasonal matched and mismatched influenza A strains but not pH1N1. It will be important to define the relationship(s) between protective antibodies, cytokines and T cell responses to provide a more comprehensive understanding of the host response to vaccination.

Biography

After completing his Ph.D. at Penn State University, Dr. Bream was a postdoctoral fellow in the Laboratory of Experimental Immunology, Cellular and Molecular Immunology Section at the National Cancer Institute. Dr. Bream then became a Research Fellow in the Molecular Immunology and Inflammation Branch at the National Institute of Arthritis, Musculoskeletal and Skin Diseases. Currently, Dr. Bream is an Associate Professor of Molecular Microbiology and Immunology and Co-director of the Becton Dickinson Immune Function Laboratory at the Johns Hopkins Bloomberg School of Public Health.

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