J Vaccines Vaccin 2012, 3:4
http://dx.doi.org/10.4172/2157-7560.S1.014

OMICS Group Conferences
Accelerating Scientific Discovery

2nd International Conference on
Vaccines and Vaccination

August 20-22, 2012 Hilton Chicago/Northbrook, USA

A universal platform to characterize and stratify the humoral responses to infection and vaccination

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Characterization of an immune system's responses to an infection or vaccination includes analyses of antibodies, immune cells, and cytokines. However, methods are too costly, labor-intensive, or sample-demanding for large-scale screening. We developed "immunosignaturing" which displays host antibody responses using tens of thousands of random sequence peptides and small amounts of sera. Comprehensive immune-profiles can be generated by measuring sera-binding reactivities against microarrayed random peptides. We have conducted many analyses of sera from mice and humans vaccinated or infected with pathogen or tumor. The resulting patterns of antibody-binding are highly unique to the immune exposure yet consistent for the particular exposure; therefore, immunosignatures have the power to classify individuals based on their health status

We hypothesize that sera immunosignatures can be also used to predict the efficacy of vaccine candidates prior to expensive, time-consuming clinical trials, or even instead of them. A universal system to diagnose disease, characterize infection or evaluate the response to vaccination would be useful. Toward this aim, we determined the immunosignature to influenza A/PR/8/34 immunization and subsequent challenge. Next, we determined whether the immunosignature could distinguish different flu vaccine formulations and discern vaccine efficacies. Indeed the immunosignature was sufficiently sensitive to distinguish mice immunized with a protective A/PR/8/34 vaccine from those immunized with the heterosubtypic strains contained in two non-protective seasonal flu vaccines. This platform was similarly applied to pigs immunized and challenged with a pox-like virus. The data demonstrate that immunosignatures enable broad measurement and classification of responses to infection or vaccination.

Biography

Sykes received her doctorate in Biochemistry/Genetics from Duke University Medical Center and then did postdoctoral fellowships in Biochemistry and Medicine at the University of Texas, Southwestern Medical Center. She was Director of Vaccine Research at Macrogenics, Inc. for several years before arriving at Arizona State University as an Assistant Professor in the Biodesign Institute and School of Life Sciences. She has had a longstanding role in new gene vaccine systems and using innovative molecular approaches to explore and manipulate the immune system toward better health. Her most recent venture is transitioning to a new biotech company, HealthTell, as CSO.

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