

*Molecular & Cellular Proteomics*, 2016, 15, 1610-1621.

Doi: 10.1074/mcp.M115.054601

## General Assessment of Humoral Activity in Healthy Humans

Pjillip Stafford<sup>‡</sup>, Daniel Wrapp<sup>§</sup> and Stephen Albert Johnston<sup>§</sup>

From the <sup>‡</sup>Biodesign Institute, Center for Innovations in Medicine, Arizona State University, Tempe, AZ;

<sup>§</sup>Department of biochemistry, Geisel School of Medicine at Dartmouth, Hanover, NH

### Abstract

The humoral immune system is network of biological molecules designed to maintain a healthy homeostatic equilibrium. Because antibodies are an abundant and highly specific effector of immunological action, they are also an important reservoir of previous host exposures. Antibodies may play a major role in early detection of host challenge. Unfortunately, few practical methods exist for interpreting the information stored in antibody variable regions. Immunosignatures use a microarray of thousands of random sequence peptides to interrogate antibodies in a broad and unbiased fashion. The pattern of binding between antibody and peptide is reproducible. Once the system has been trained on a disease cohort, blinded samples can be reliably predicted. Although immunosignatures of both chronic and infectious disease have been extensively tested, less has been done to demonstrate how healthy immunosignatures change over time or between individuals. Here, we report the results of a study of immunosignatures of healthy persons over brief (12 h sampled once per hour), intermediate (32 days sampled once per day), and long (5 years sampled once every year) time spans. Using this information, we were also able to detect intentional and unintentional immunological perturbations in the form of a vaccine and an infection, respectively. Our findings suggest that, even with the variability inherent in healthy immunosignatures, a single person's immunosignature will remain constant over time. Over this healthy signature, vaccines and infections create subsignatures that are common across multiple people, even subsuming healthy fluctuations. These findings have implications for disease monitoring and early diagnosis.

[Full text](#)

