

Age-related response to the hepatitis B vaccine linked to inflammation

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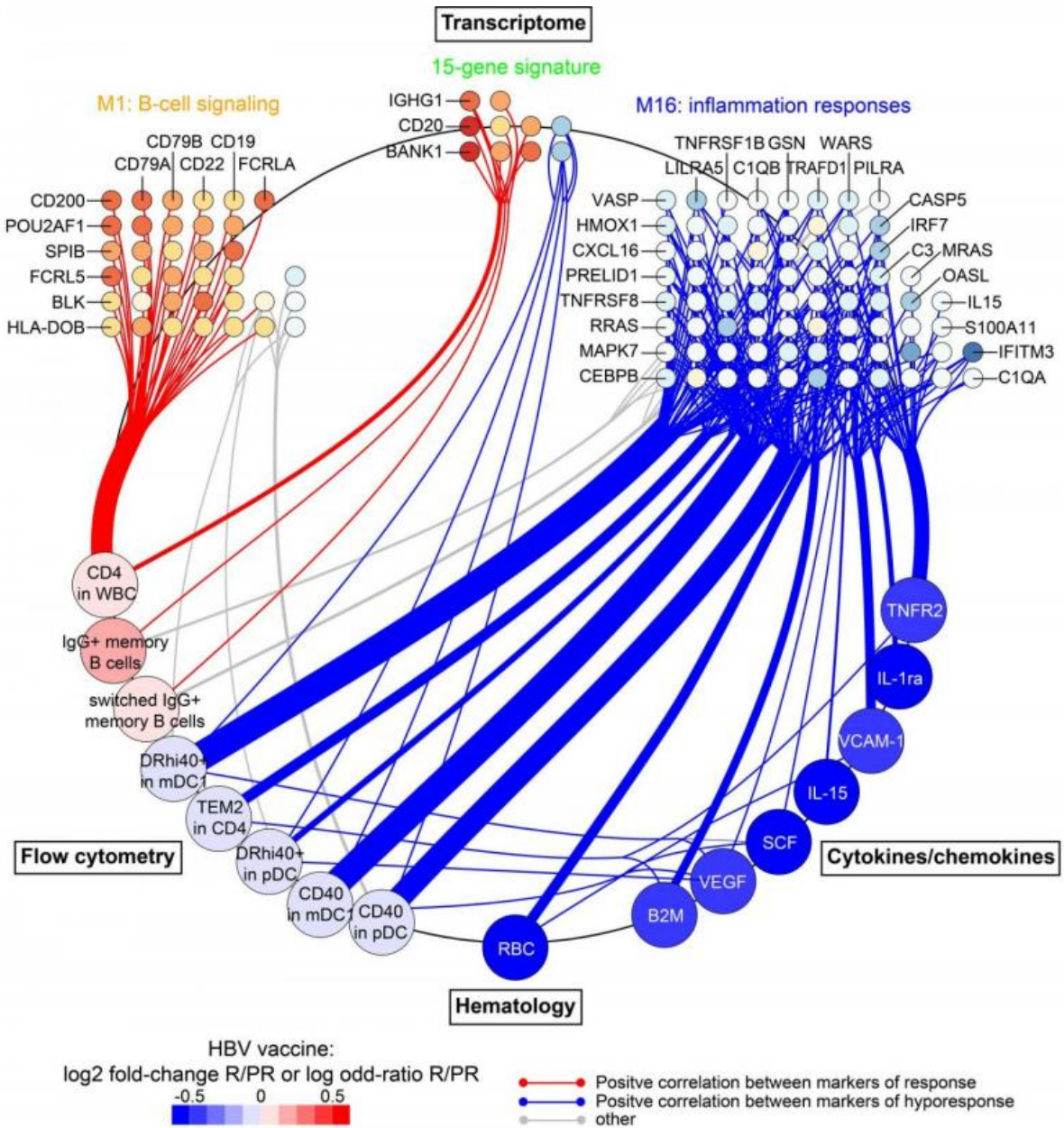


Figure 6

First of its kind study identifies predictors and response mechanisms to the hepatitis B vaccine

Physicians have known for years that patients respond differently to

vaccines as they age. There may soon be a new way to predict and enhance the effectiveness of vaccinations, in particular the hepatitis B vaccine. Researchers at Case Western Reserve University School of Medicine and Merck Research Laboratories have found that common biomarkers of inflammation can help to identify which patients might respond to vaccination and inform age-related vaccination schedules as well as interventions that might boost effectiveness, such as anti-inflammatory drugs.

Their new study, "Pre-Vaccination Inflammation and B-cell Signaling Predict Age-related Hyporesponse to Hepatitis B Vaccination," was published in the current issue of *Nature Communications*.

Aging confers elevated risk of illness and death from infection. In industrialized countries, a large and growing population of older individuals has compounded the need for better prevention of severe or poorly treatable infections among the elderly. Vaccination is a proven approach to preventing diseases such as [hepatitis B](#), but low age-related response caused by changes to the immune system can limit the effectiveness in the elderly. Researchers at Case Western and Merck now outline a new model to help predict age-related response to the hepatitis B [vaccine](#), showing that relatively common biomarkers of immune response and inflammation can be used to predict response. This information can help with the development of new vaccine schedules for older patients and determine whether additional interventions—in some cases as simple as aspirin or rapamycin—should be used to address inflammation and maximize [vaccine effectiveness](#).

"We have known for some time that vaccine response changes with age, but we have not been clear on the mechanism nor the important role of inflammation," said Rafick-Pierre Sékaly, PhD, Department of Pathology, and the Richard J. Fasenmyer Professor of Immunopathogenesis at Case Western Reserve University School of

Medicine. "By understanding the gene expression of immune inflammatory pathways, we believe that we are close to creating models to predict and improve vaccine response."

In the study, hepatitis B virus-naïve older adults received three vaccines, including one against HBV. The researchers found that heightened expression of genes that augment B-cell responses and higher memory B-cell frequencies correlated with stronger responses to the hepatitis B vaccine. In contrast, higher levels of inflammatory response transcripts and increased frequencies of pro-inflammatory innate cells correlated with weaker responses to this vaccine. Increased numbers of erythrocytes and the heme-induced response also correlated with poor response to the hepatitis B vaccine.

Provided by Case Western Reserve University

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