PLOS Science Wednesday: Hi Reddit, my name is Scott Hensley and I recently published a study showing that antibodies with the "original antigenic sin" phenotype are an important component of immune responses against influenza – Ask Me Anything!

PLOSScienceWednesday [1] and r/Science AMAs[1]

[1]Affiliation not available

April 17, 2023

Abstract

Hi Reddit, My name is Scott Hensley and I am an Associate Professor at the University of Pennsylvania. My research focuses on how our immune systems try to stop pathogens and how pathogens fight back. At our lab, we are particularly interested in figuring out how viruses evade antibody responses. We recently published a study titled 'Antibodies with Original Antigenic Sin Properties Are Valuable Components of Secondary Immune Responses to Influenza Viruses' in PLOS Pathogens. In this study, we used a mouse model to show that antibodies stimulated by past influenza virus infections can help fight against new antigenically distinct influenza viruses, despite binding poorly to these new viruses. We propose that these antibodies, classically termed 'original antigenic sin' antibodies, are an important component of secondary immune responses against influenza viruses. I will be answering your questions at 1pm ET – Ask Me Anything! Don't forget to follow our lab on Twitter @SCOTTeHENSLEY.

the WINNOWER

REDDIT

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PLOSSCIENCEWEDNESDAY R/SCIENCE

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Does this mean flu shots are more effective than thought even when they contain the "wrong" strains?

HighOnGoofballs

Flu vaccines usually provide some protection even in years where there is an antigenic mismatch between the vaccine strains and circulating strains. Mismatched vaccines might not fully prevent infection, but they usually limit viral replication and prevent severe disease. I receive my flu vaccine every year, even in years where the vaccine strain is not completely 'matched' to circulating strains.

Did you see the programmable RNA vaccine research out of MIT recently? What do you think of it in regards to fighting the flu?

Davidjhyatt

I think genetic vaccines show a lot of promise.

Is there any reason we don't give the population an annual vaccine with all known strains?

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dontdoitdoitdoit

This is a good question--a question that people ask me a lot. There is a finite amount of antigen that can be included in annual flu vaccines. If we put every viral strain in the vaccine, then each antigen would essentially be diluted to accommodate all of the strains. These diluted antigens would likely not elicit a good immune response. If we increased antigens amounts x1000 fold in flu vaccines, there would likely be increased inflammation, etc. So, the best option is to include a decent amount of antigen from a few strains, rather than a little bit of antigen from many strains.

Thanks for stopping by r/science. In the context of climate change and ever-increasing globalization (and because you like ADE), do you think the dengue vaccine (CYD-TDV) will ultimately be a boon or a bane for dengue control?

PHealthy

The CYD-TDV vaccine appears to have different effects in different aged individuals, and this likely is due to differences in past flavivirus exposures.

Thanks for taking the time to talk with us about your research!

In the author summary you mention "Influenza virus infections early in life...".

How early do you mean? Is it primarily children or is it more like 'before now'? Specifically, I'm in my mid 20's, if I came across a strain that I didn't have (similar enough) antibodies for, would the antibodies I created to fight that strain be used against future strains?

PapaNachos

I like your username--catchy. Most people are infected with influenza viruses ~ 3 years of age, and these early infections shape the way our immune systems respond to other influenza virus strains for the rest of our life. Since you are in your 20's, your first flu encounter was like in the late 90s/early 00s. It is likely that B cells primed 20 years ago will be recruited against new influenza virus strains that you are exposed to today, even though these new strains are quite different from the strains you were first exposed to.

How is wistar different as a faculty member than as a student. Other than the new building.

available_username2

We used to get free coffee at Wistar but they even took that away.

Thanks for doing this AMA! Do you think that ADCC or compliment could play an important role in the protection provided by OAS Abs? I would think that weakly binding Abs may not neutralize very well, but could provide other effector functions.

ynnusd

This is a very good question. Most of the OAS Abs in the PLOS Pathogens papers inhibit virus replication in vitro (in cell culture) which indicates that they act independently of ADCC. But ADCC might play a role in vivo, and this could be experimentally addressed with Fc receptor knockout mice, etc.

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