Exploring the effect of host factors on the relationship between pre-existing immunity and influenza vaccine response

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Most patients who have previous exposure to influenza antigens included in the seasonal influenza vaccine tend to have less of an immune response to the vaccine than patients without previous exposure. Recent modeling predicts that the relationship between preexisting immunity and increase in antibody titer following vaccination will exhibit a negative linear relationship on a log-log scale. (Zarnitsyna VI et al. Multi-epitope Models Explain How Pre-existing Antibodies Affect the Generation of Broadly Protective Responses to Influenza. PLoS Pathog. 2016.) The model also predicts that an increase in antigen dose will shift the curve upward, i.e. the increase in vaccine response will be larger for a given pre-existing amount of immunity. To test the model predictions and further explore the relation between pre-existing immunity, dose and vaccine responses, we used data from a human vaccine cohort study. We explored both homologous and heterologous responses, and evaluated interactions with other host factors, such as age, and sex. We find that while some of the observed patterns match the model predictions, some of the data show patterns that conflict with model predictions. Our observations suggest the need to further modify and refine the current model.

1. What is your pathogen? Multiple options possible (e.g. if working on coinfections)

Other viruses : influenza

2. On a scale of 1-5 is your work mostly eco/epidemiological or evolutionary? 1 (100% eco/epidemiological)

3. On a scale of 1-5 is your work mostly theoretical or experimental/empirical?
1 (100% theoretical)