

Researchers make progress on identifying people who will experience adverse responses to vaccinations

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Credit: National Cancer Institute

(MedicalXpress)—A team of researchers working in the U.K. has fingered a pattern in gene-expression immune cells that could help doctors predict which people are likely to have adverse responses to vaccinations. In their paper published in the journal *Nature Immunology*, the team describes their study of the response to flu vaccinations in 178

healthy adults in the U.K. and how they sifted out some of the gene-expression immune cells that were responsible for adverse reactions.

Despite gaining a lot of press, to date, no evidence has been found linking vaccinations as a cause for [autism spectrum disorder](#), but there are other less well-known adverse impacts—many people report feeling flu-like symptoms after receiving a flu shot, for example. Scientists are eager to understand why some people experience such adverse reactions while others do not, because they believe it could lead to better vaccines, or perhaps even breakthroughs in understanding infections and the immune response. In this latest effort, the team in the U.K. conducted a study of people vaccinated against the H1N1 influenza strain—the vaccination also included an adjuvant meant to enhance immune response. All participants were encouraged to report [adverse reactions](#) which led to follow up testing by the team members. The research group found that approximately 20 percent of those vaccinated experienced an adverse response to some degree—the team focused their efforts on these people, looking at changes in the [immune response](#), as compared to those who did not experience an adverse reaction. They also monitored white blood cell counts and gene expression in other blood cells.

The team reports that they found that age was not a factor regarding an adverse response, though they did find that those people reporting severe reactions had a brief increase in the expression of a small group of genes for just one day after they received the shot. The same group also showed over expression of several genes that are involved in the development of B cells, before and after they were vaccinated, which suggests it might be possible to test people for a likely adverse reaction to a vaccination.

It is still not clear if the same findings would occur with vaccinations for other diseases or even other strains of flu, but the team notes that the results do offer a pattern for testing that could be used going forward

that could eventually culminate in better [vaccinations](#) in general.

More information: Olga Sobolev et al. Adjuvanted influenza-H1N1 vaccination reveals lymphoid signatures of age-dependent early responses and of clinical adverse events, *Nature Immunology* (2016).

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Abstract

Adjuvanted vaccines afford invaluable protection against disease, and the molecular and cellular changes they induce offer direct insight into human immunobiology. Here we show that within 24 h of receiving adjuvanted swine flu vaccine, healthy individuals made expansive, complex molecular and cellular responses that included overt lymphoid as well as myeloid contributions. Unexpectedly, this early response was subtly but significantly different in people older than ~35 years. Wide-ranging adverse clinical events can seriously confound vaccine adoption, but whether there are immunological correlates of these is unknown. Here we identify a molecular signature of adverse events that was commonly associated with an existing B cell phenotype. Thus immunophenotypic variation among healthy humans may be manifest in complex pathophysiological responses.

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