MedicalXpress

Norovirus candidate vaccine induces broad antibody responses in trial participants

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A multivalent candidate vaccine elicits broad antibody responses to a range of norovirus strains, including strains not included in the vaccine or previously encountered by participants, according to a new study published this week in *PLOS Medicine*. The results of the study, led by Lisa Lindesmith and Ralph Baric of the University of North Carolina at Chapel Hill, indicate that a vaccine to norovirus may be available in the future.

Worldwide, noroviruses cause one in five cases of viral gastroenteritis. An estimated annual 300 million cases of norovirus infection contribute to roughly 260,000 deaths, mostly in low-income countries. Over time, noroviruses evade natural immunity by antigenic drift, which allows them to escape from antibodies produced in response to earlier infections.

Recent efforts to develop a norovirus vaccine have focused on virus-like particles (VLPs), which are constructed from molecules of the virus's capsid (outer shell). In a phase I clinical trial, one multivalent VLP vaccine elicited antibody generation, but did not confer immunity to the tested strain of virus. In the current study, Lindesmith and colleagues characterized serum specimens from ten multivalent VLP vaccine clinical trial participants for antibodies to vaccine VLPs and also to VLPs representing viruses that were not contained in the vaccine.

The researchers found that VLP vaccine can rapidly elicit antibody responses to a broad range of vaccine and non-vaccine VLPs, including

to two VLPs representing human noroviruses that they could not have previously encountered. Overall, antibodies to norovirus strains to which participants had previously been exposed dominated the immune response.

These findings provide evidence that, if achieved, VLP-vaccine-induced norovirus immunity may overcome the ability of noroviruses to evade immunity by antigenic drift. These results must be interpreted cautiously. The study is small, and the assays used may not replicate how the immune system of a vaccine recipient will respond to true norovirus infection. Additionally, the study participants were all adults aged 18 to 49 years, while a vaccine is most needed for young children (who account for the majority of severe infections) and the elderly (who are most likely to die from infection). Next steps include further development of VLP-based vaccines and additional clinical trials. The authors state: "These data reveal new information about complex norovirus immune responses to both natural exposure and to vaccination, and support the potential feasibility of an efficacious multivalent norovirus VLP vaccine for future use in human populations."

More information: Lindesmith LC, Ferris MT, Mullan CW, Ferreira J, Debbink K, Swanstrom J, et al. (2015) Broad Blockade Antibody Responses in Human Volunteers after Immunization with a Multivalent Norovirus VLP Candidate Vaccine: Immunological Analyses from a Phase I Clinical Trial. *PLoS Med* 12 (3): e1001807. DOI: 10.1371/journal.pmed.1001807

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