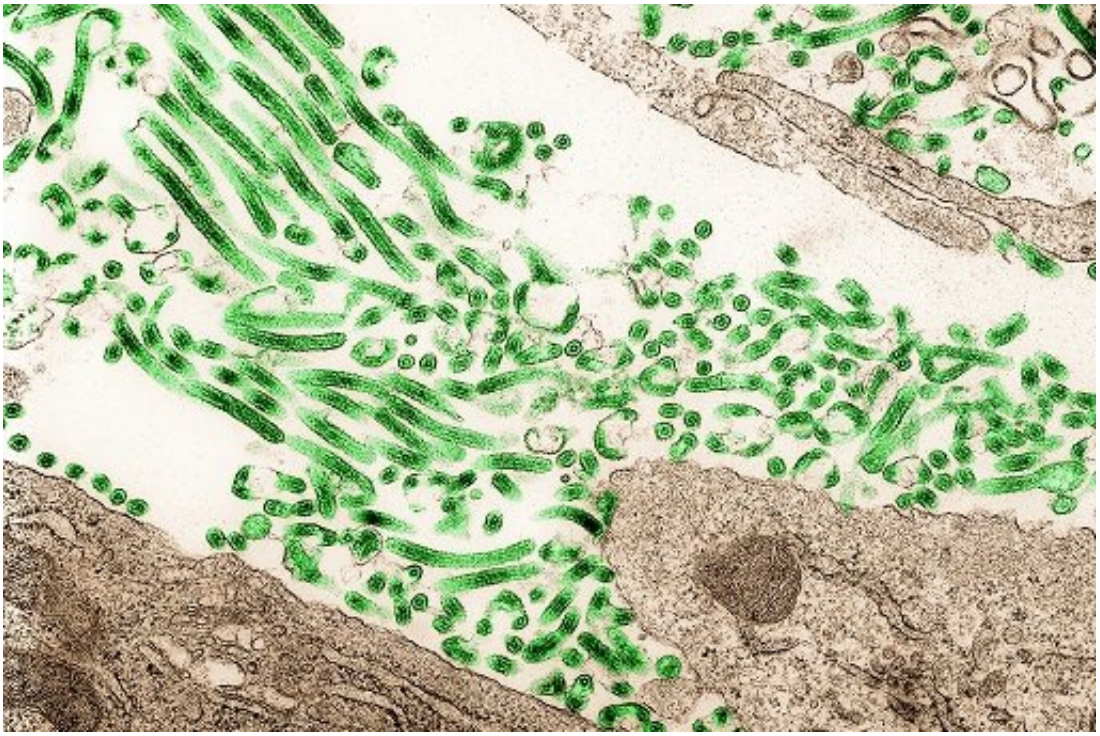
New study provides data on protections of Ebola vaccines

July 14 2021



Ebola virus. Credit: NIAID

A new study published in *Science Translational Medicine* reports on the Ebola vaccine-mediated protection of five mucosal vaccine vectors based on the human and avian paramyxoviruses. The study comprehensively characterized the antibody response to each vaccine, identifying features and functions that were elevated in survivors and that could serve as vaccine correlates of protection.

The multi-year study, led by Alexander Bukreyev, Ph.D., of the University of Texas Medical Branch (UTMB) Galveston National Laboratory looked at whether all the vaccines conferred protection and produced robust antibody responses. The team also explored 139 different immune and vaccine response parameters to see which ones were responsible for improving the "quality of survival."

"Testing during outbreaks is difficult because of their sporadic nature, and yet much needs to be studied in order to determine the most effective vaccine for combatting this disease. Establishing the signatures of vaccine-generated immunity remains crucial for vaccine design, assessment and application," said Bukreyev.

Research Scientist Michelle Meyer, Ph.D., of UTMB served as lead author of the paper, Ebola vaccine-induced protection in non-human primates correlates with antibody specificity and Fc-mediated effects, which reports the efficacy results of the vaccines in cynomolgus macaques challenged with EBOV. The five mucosal vaccines tested differed in the degree of protection against death and disease, ranging from disease-free survival to only partial protection.

Meyer notes vaccines need to do more than allow for survival, with an ideal result being to arrest virus replication and abate disease. To evaluate antibody features that are relevant and potentially predictive of protection, the team employed a survival index in the analysis which incorporated several parameters of EBOV disease to allow for correlations with improved infection outcomes.

"Through in-depth characterization of the antibody response, we found that even though all vaccines express the same antigen, they differed in multiple aspects, with the correlates of protection appearing to be unique to the vaccine platform. Our analysis defined RBD-specific antibodies and Fc-mediated immune functions as contributing factors to improved

survival," said Meyer. The lack of correlation with neutralizing antibody titers suggests that the conventional means of predicting efficacy does not apply to all vaccines.

During the most recent ebola outbreaks in Sierra Leone and the Democratic Republic of Congo, more than 300,000 people were vaccinated. Deciphering the immune responses to vaccination that correlate with protection is imperative to predict efficacy of vaccines in humans, says Meyer.

More information: M. Meyer el al., "Ebola vaccine–induced protection in nonhuman primates correlates with antibody specificity and Fc-mediated effects," *Science Translational Medicine* (2021). stm.sciencemag.org/lookup/doi/ … scitranslmed.abg6128

Provided by University of Texas Medical Branch at Galveston