Enabling the Evaluation of COVID-19 Vaccines with Correlates of Protection
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I have worked with vaccines since the initiation of my research career at the NIH. One particular focus has been on vaccines for the prevention of viral respiratory disease. RSV has been an abiding interest since starting at NIH where we initiated work on temperature-sensitive mutants as potential live-attenuated vaccine candidates. These progressed to a series of trials in infants and young children that defined the significant protection afforded by prior infection, the optimal level of attenuation, and the importance of genetic stability. Using cohorts of children at Vanderbilt and Dartmouth we defined the clinical impact of RSV in normal, otherwise healthy children. We have demonstrated that primary epithelial cells derived from adenoids are a surrogate for predicting attenuation and replication in young children and shared in the demonstration of the human pathology associated with RSV.

Another interest grew out of a sabbatical year at the World Health Organization establishing the capacity within the Expanded Programme on Immunization to assess the introduction of new vaccines into the EPI, a precursor of the GAVI effort. During that year I looked at the performance of polio vaccine in the developing country setting, and I assessed the impact of the effort to eradicate polio. I more recently served as chair of the Polio Research Committee for WHO and in that capacity directed the research supportive of the eradication effort.

Both of these interests have coalesced into in-depth studies of the mucosal immune system. With support from the Gates Foundation we have successfully developed a mucosal neutralization test for polio that predicts inhibition of recovery of virus and influences the thinking about choices of inactivated or live, oral vaccine.

The nature of this protection is clearly IgA and an immune system can be defined that is separate and distinct from humoral immunity. Working with Dr. Ackerman's group we are taking this interest in mucosal immunity into the field of COVID-19 in documenting the height and duration of mucosal responses to natural infection and vaccines.