Antibody responses to the virus, the safety and immunogenicity of an mRNA vaccine.

Recent research highlights include articles on SARS-CoV-2 genetic variants, their implications for vaccine development, and T-cell responses to the virus.

His team is now exploring T-cell responses that develop in response to more severe COVID-19 disease. For these second-generation COVID-19 vaccines candidates, he thinks it is important to consider T cells. "T cells may play as big, if not a bigger role," said Crotty.

Researchers do not yet know what levels of neutralizing antibodies will be required for these second-generation COVID-19 vaccines. Crotty's team is now working with vaccine developers to determine the best approach to measure levels of these cross-reactive T cells in volunteers at the start of vaccine trials.

Almost all licensed vaccines work because they induce protective levels of antibodies (NAbs). Although some designs will induce cellular immunity at varying levels, preclinical studies are just beginning to provide data on the immune responses to new vaccines.

Crotty's team recently published a study showing that recovered COVID-19 patients had SARS-CoV-2-specific CD4 and CD8 T cells. Of the 20 percent of those samples that were positive for CD4, 64 percent were positive for CD8. The team used a receptor-dependent activation induced marker assay or AIM assay, which the team believes accurately measures T-cell responses. Crotty speculates that these cross-reactive T cells are likely the result of an immune response to a previous coronavirus.

To date, the majority of work has focused on NAbs; however, T-cell responses are also important. The mechanisms of these responses are not always well understood, but there are replete with examples of exacerbated disease, including lung pathologies, post-infection. While these observations are encouraging, they are not sufficient to preclude the possibility of problems in humans, particularly older individuals.

It is now clear that the generation COVID-19 vaccines do not induce sterilizing immunity, but rather reduce the severity of disease in any individual. The mechanisms of these responses are not always well understood, but there are replete with examples of exacerbated disease, including lung pathologies, post-infection. While these observations are encouraging, they are not sufficient to preclude the possibility of problems in humans, particularly older individuals.

Sterilizing immunity, or the complete absence of infection (or NAbs), is possible but not always achievable with current vaccines. Typically, existing constructs were repurposed to now use SARS-CoV-2 gene sequences. These first-generation vaccines include ones based on mRNA and non-replicating adenovirus vectors. DNA vaccines are also being developed, as they too can be designed and produced rapidly. The SARS-CoV-2 immunogen expressed by the vaccine might consist of a binding domain of the spike protein (S) that can be inserted into the plasmid of an adenovirus vector or expressed as a naked DNA vaccine.

The recent Warp Speed candidates to enter human trials involve vaccine designs that can be produced rapidly. These vaccines usually involve an intersection between the infecting virus and vaccine-induced immunity, with the goal of minimizing disease.

Here, I reiterate some of these concerns. Every vaccine supporter wishes to see this program end successfully as soon as possible. The Trump administration has repeatedly stated that the candidate vaccine(s) for use by billions of people globally. Multiple editorials, perspectives, and reviews were reassuring, as they were consistent with the data. The Trump administration has repeatedly stated that the candidate vaccine(s) for use by billions of people globally. Multiple editorials, perspectives, and reviews were reassuring, as they were consistent with the data.

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