COVID-19 Vaccines

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Abstract:
These are extraordinary times for immunology, vaccinology, and the world. In the few short months since its emergence, the devastating impact of the SARS-CoV-2 virus has radically transformed virtually every dimension of our lives and fueled an urgent global imperative to develop safe and effective vaccines. Since the emergence of SARS-CoV-2 in China in December 2019, some one hundred and eighty-five vaccine candidates, encompassing a multitude of platform technologies, are being developed. No fewer than 55 of these have already been tested in phase 1 and 2 clinical trials in humans, 22 candidates have been, or currently being tested in large phase 3 efficacy trials, and 3 vaccines have been given emergency use authorization in the United States and in several other countries, and at least 3 other vaccines are being deployed internationally. The stunning pace at which these vaccines are being developed is unprecedented in the history of vaccinology.

Yet, as of March 2021, only some 355 million vaccine doses have been administered worldwide – roughly 4.6 doses for every 100 people on the planet. Sadly, there has been a stark gap between the vaccination rates in different counties, with most counties in Africa, and several countries in the developing world, yet to report a single dose. Furthermore, the emergence of several variants of concern, including the B.1.351 lineage first identified in South Africa, has raised concerns that the immune responses induced by the current COVID-19 vaccines may confer only partial or limited immunity against such variants.

In this talk, I will discuss the emerging knowledge of the immunogenicity and efficacy of the numerous COVID-19 vaccine candidates, and also discuss how the lessons learned from the COVID-19 experience is redefining the way we conceive of, make, test, license and distribute vaccines.