

Vaccines for COVID-19: An Update

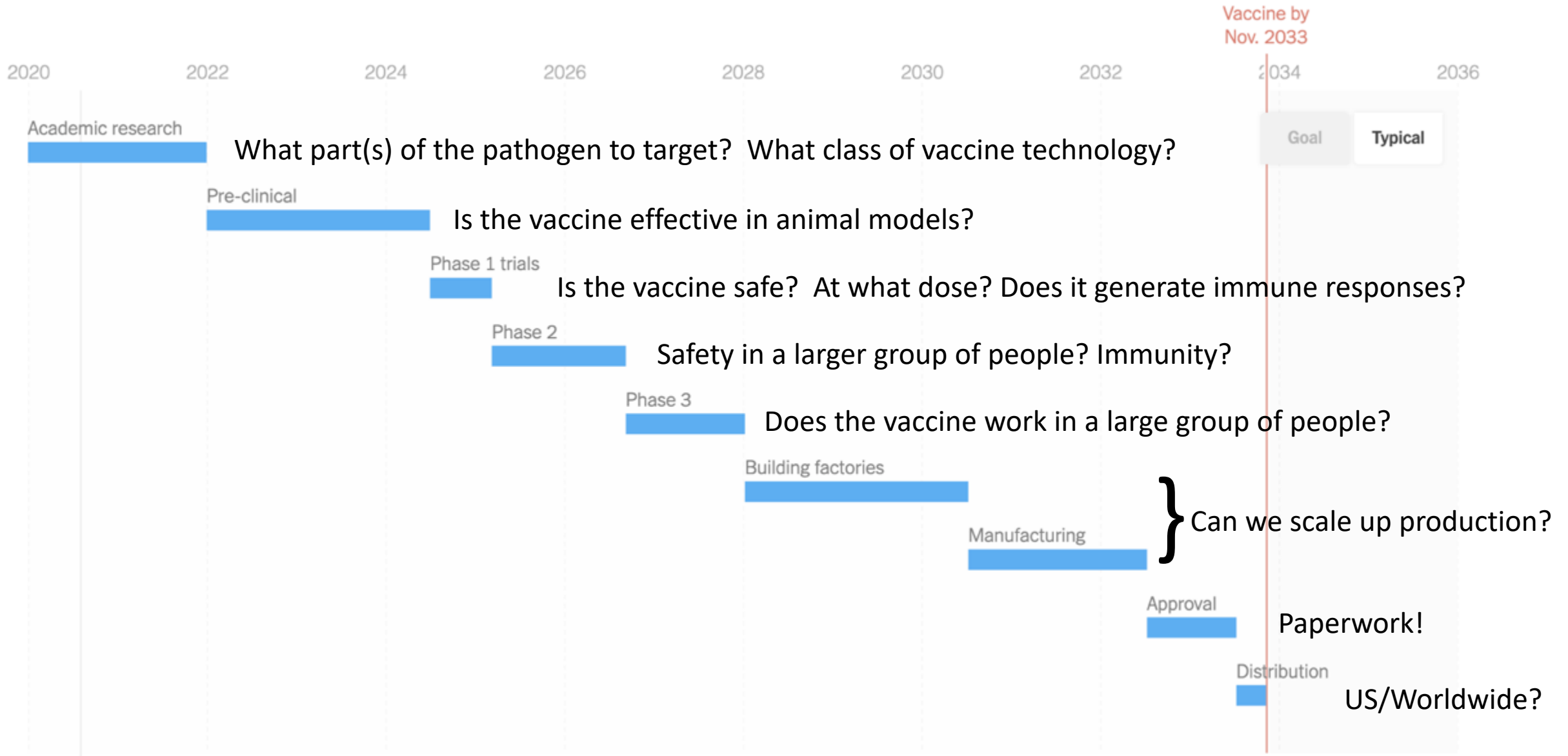
Bryce Chackerian, PhD
February 2021



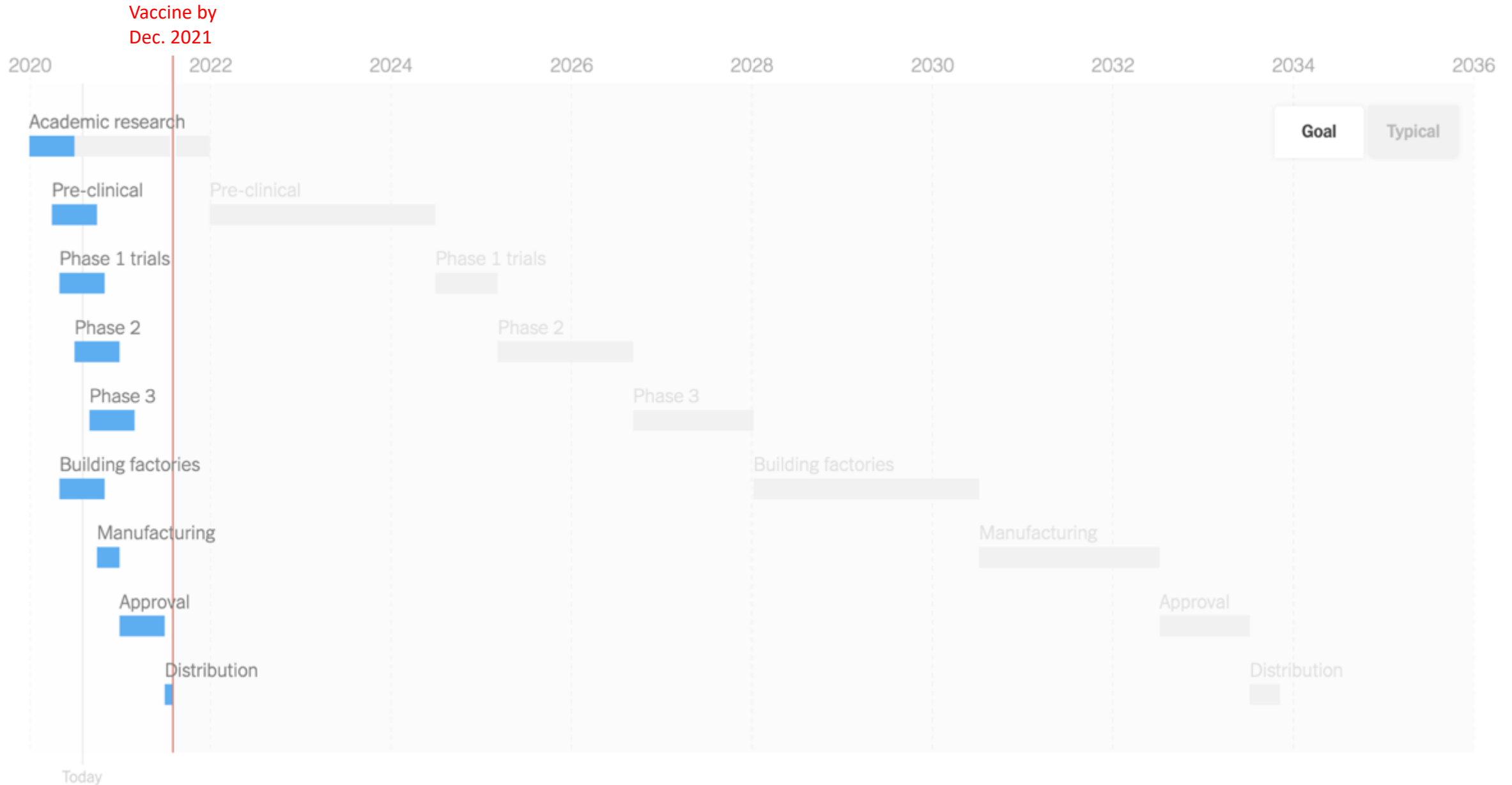
What are vaccines & how do they work?

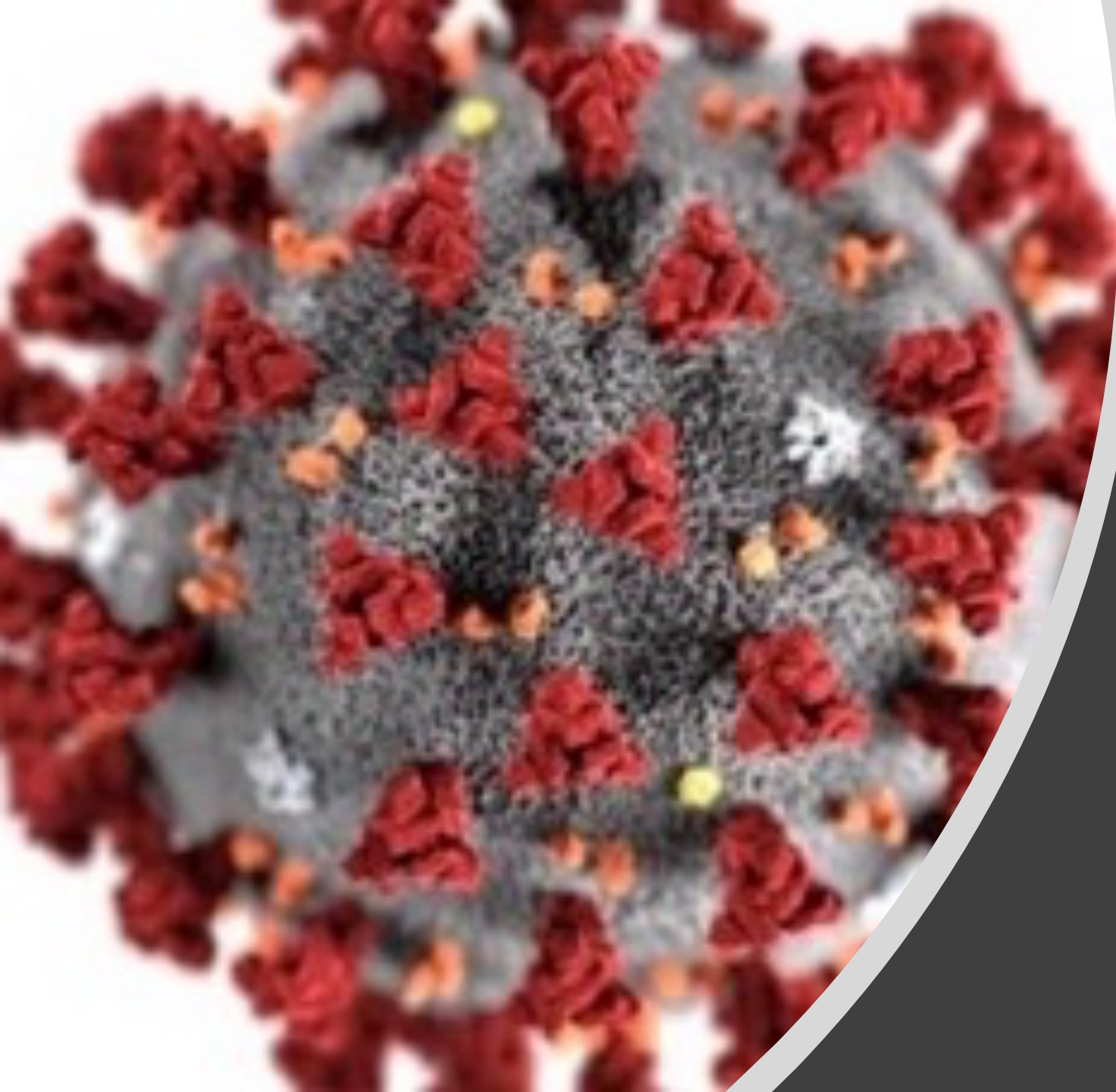
- Vaccines are harmless agents that elicit immune responses.
- The consequences of immunization are (typically):
 - Antibodies (the longer they last, the better)
 - Immune memory, (special cells that provide a more rapid response to infection).
- These immune responses can **prevent** infection or lead to more **rapid clearance**
- If enough people are vaccinated, herd immunity can reduce the spread of disease

Typical Vaccine Timetable




Accelerated Vaccine Timetable for COVID-19





How did we
move faster
with COVID-19?



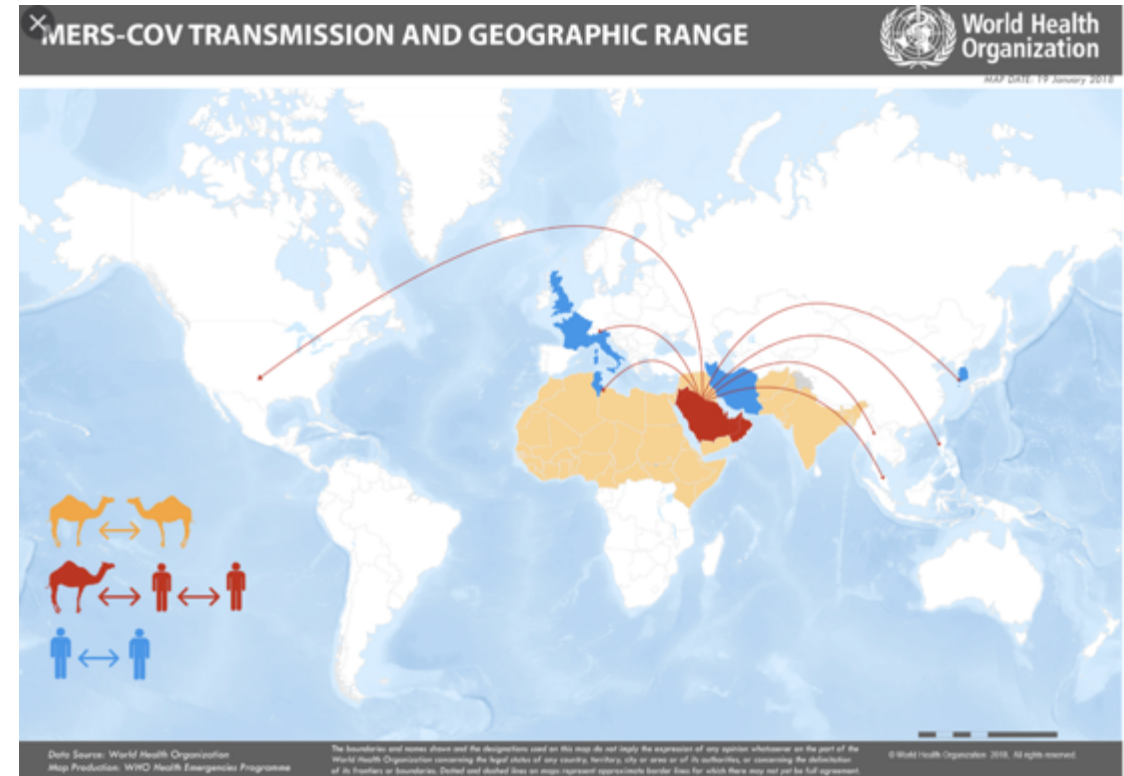
How did we move faster with COVID-19?

- We know a lot about other Coronaviruses
- Advances in Vaccine Technology that allowed candidates to be produce more rapidly (mRNA vaccines)
- Major investments in Vaccine development
- The magnitude of the COVID pandemic allowed efficacy data to be generated more rapidly

We know a lot about Coronaviruses



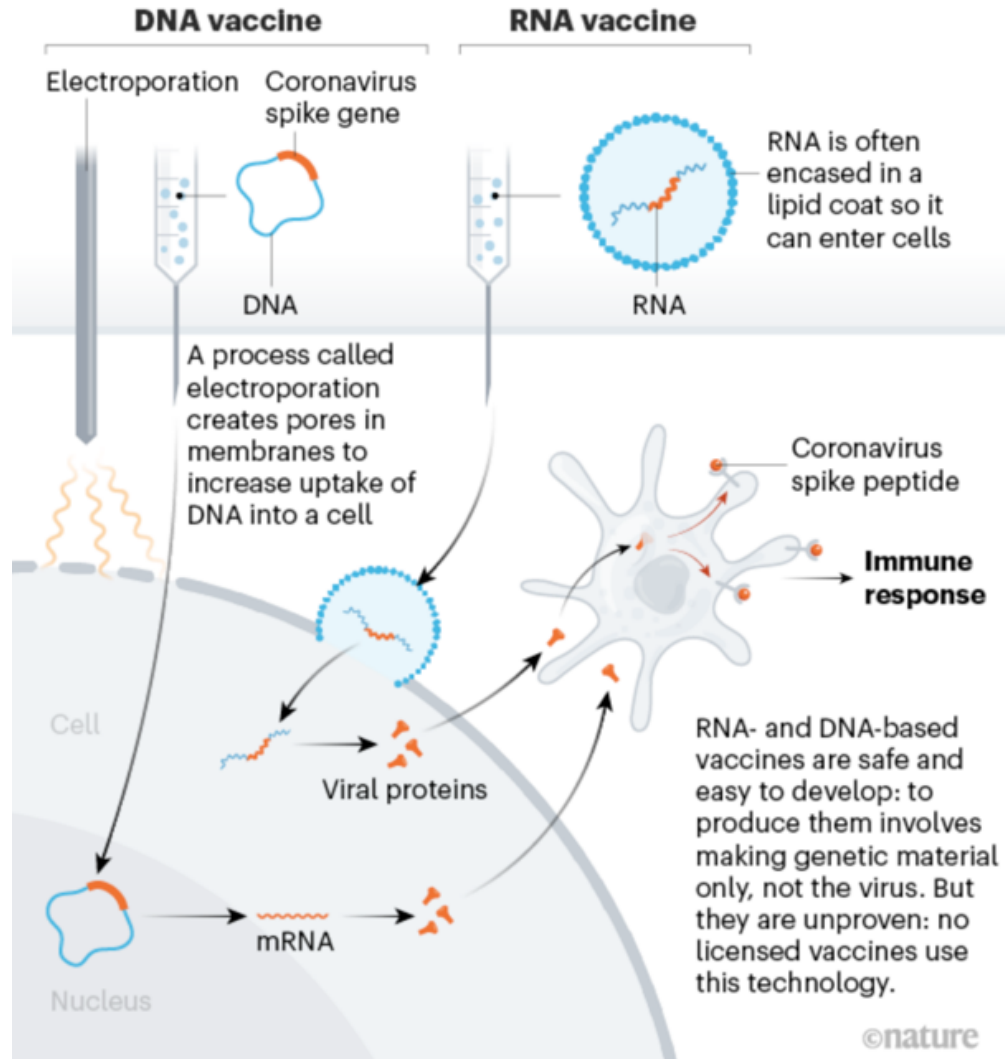
SARS-CoV1, 2003



MERS-CoV, 2013

Advances in Vaccine Technology

NUCLEIC-ACID VACCINES



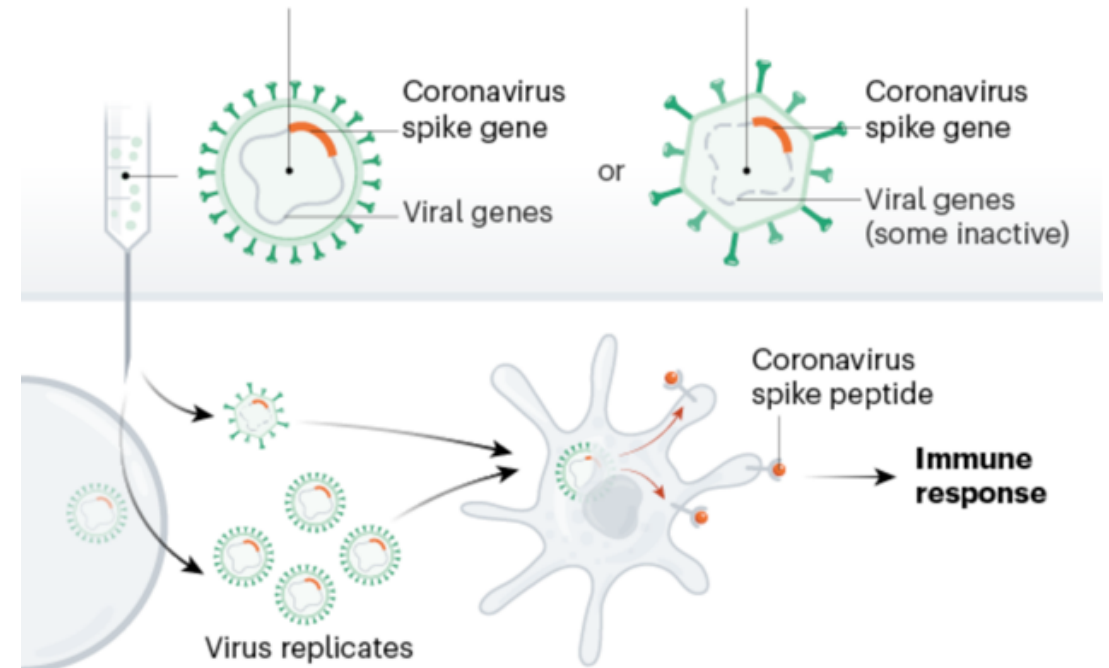
VIRAL-VECTOR VACCINES

Replicating viral vector (such as weakened measles)

The newly approved Ebola vaccine is an example of a viral-vector vaccine that replicates within cells. Such vaccines tend to be safe and provoke a strong immune response. Existing immunity to the vector could blunt the vaccine's effectiveness, however.

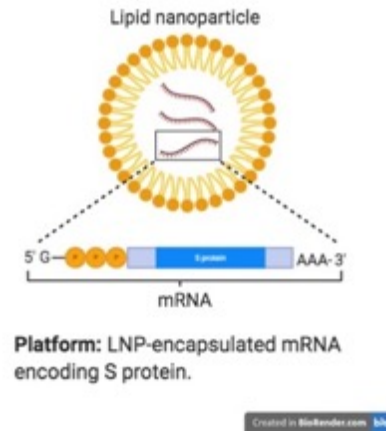
Non-replicating viral vector (such as adenovirus)

No licensed vaccines use this method, but they have a long history in gene therapy. Booster shots can be needed to induce long-lasting immunity. US-based drug giant Johnson & Johnson is working on this approach.

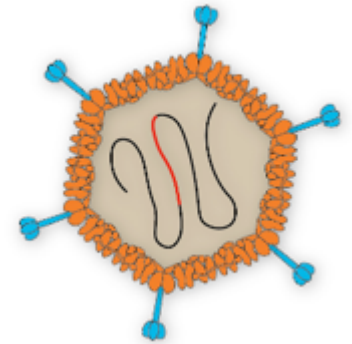


Leading SARS-CoV-2 Vaccines

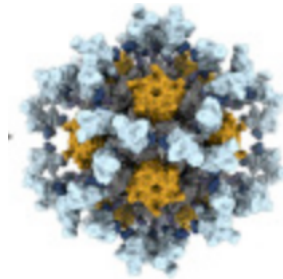
mRNA 1273 (Moderna)
BNT162b2 (Pfizer)
Authorized for use
90-95% Efficacy*
Two immunizations



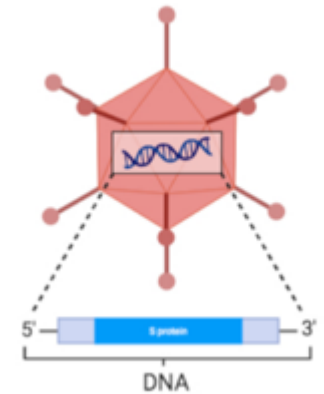
AZD1222 (ChAdOx1 nCoV-19)
(Oxford/AstraZeneca)
Phase 3 (March 2021?)
Two immunizations



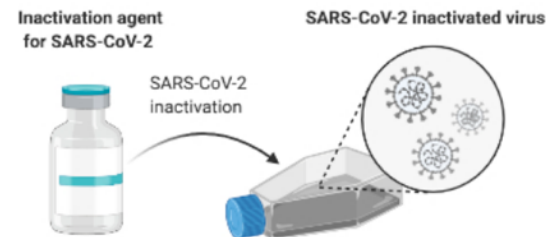
GBP510
(CEPI/SK Bioscience)
Phase 1



Ad26.COV2.S (Jansen/J&J)
Phase 3 (Feb. 26, 2021)
~70% Efficacy*
One immunization



CoronaVac (Sinovac)
Approved in China



SARS CoV-2 rS +
Matrix M (Novavax)
Phase 3



* Efficacy at preventing moderate to severe COVID