

Coronavirus Vaccine Development Overview

Two previous coronavirus outbreaks, SARS in 2002 and MERS in 2012, led global health organizations to recognize coronavirus as a significant pandemic threat. As a result, scientists produced research towards extensive coronavirus vaccines over the last 20 years; by the time COVID-19 first emerged, experts knew the weakness of a coronavirus was in the “spike protein.” Extensive research funding, recent vaccine technology breakthroughs, and the knowledge of the spike protein weakness led to the rapid production of the COVID-19 vaccine.

Vaccine Types and Research

Researchers found two vaccine types to be the most effective at creating immunity to the virus: Viral Vector and mRNA. Both vaccines have received growing research since the 2002 SARS outbreak. Funding and scientific resources resulted in the fast production of COVID-19 vaccines, but researchers were also lucky that the spike protein worked when scientists plugged it into both the viral vector and mRNA approaches.

Viral Vector Vaccines:

Viral Vector technology was first published in 1972; since then, scientific researchers have continuously put viral vector technology to the test for infectious virus vaccines. Viral Vector vaccines have been researched for over a half-century since its discovery.

Johnson & Johnson’s Viral Vector vaccine is used in the United States. While AstraZeneca’s Viral Vector vaccine is used throughout the rest of the world.

mRNA – Messenger RNA Vaccines:

In 2005 a research team at the University of Pennsylvania published their discovery of messenger RNA delivery technology. Extensive safety and effectiveness testing followed the discovery of this technology, well before COVID-19. This technology was made publicly available. Moderna and Pfizer produced almost identical vaccines that met vigorous safety standards with exceptional effectiveness. With a backbone of successful mRNA technology, scientists simply needed to plug the makeup of a viruses’ spike protein into the vaccine allowing for speedy reliability testing.

mRNA vaccines from Moderna and Pfizer are currently in use in the United States.

Financial Funding:

Funding has historically been the reason for slow vaccine production. However, since COVID-19 was rapidly spreading in 2020, emergency federal funding was made available for COVID-19 vaccines through Operation Warp Speed to speed up the three trial phases. The trials were also done concurrently to speed up the testing



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Coronavirus Vaccine Development Timeline

1972

Viral Vector technology was first introduced to researchers

2002

SARS-CoV Coronavirus epidemic began

2003

University of Pittsburgh - First coronavirus Viral Vector Vaccine with successful antibodies in animal trial

2005

University of Pennsylvania successfully developed mRNA technology

2010

Moderna began research on mRNA technology for vaccinations

2012

MERS Coronavirus epidemic began

2017

CEPI (Coalition for Epidemic Preparedness Innovations) founded

2018

- Pfizer and BioNTech establish a partnership to develop mRNA vaccines
- Oxford produced successful MERS Coronavirus vaccine ready for human trial

2019

December - Coronavirus COVID-19 began spreading in Wuhan, China

2020

January

- Chinese scientists released the genetic coding for the COVID-19 virus
- Moderna and NIH finalize their vaccine sequence

March

- Moderna began phase 1 trial
- WHO declares COVID-19 a global pandemic

April - Pfizer began phase 1 trial

May - Operation Warp Speed was officially announced

June - Johnson & Johnson began phase 1 trial

December

- Pfizer Vaccine authorized by the FDA
- Moderna Vaccine authorized by the FDA

COVID-19
Global
Pandemic

2021

February - Johnson & Johnson vaccine authorized by the FDA

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