

# COVID-19 Vaccine Developments

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## Availability:

Globally, the private sector has mobilized to develop vaccines:

- Over 40 possible vaccines have been identified
- One US vaccine entered a Phase 1 clinical trial on March 16, 2020
- Globally, the public-private partnership [CEPI](#) is coordinating vaccine efforts

Vaccines will likely not be available at scale for 12 to 18 months:

- Vaccines that make it through early clinical trials could be considered in high-risk front-line health care workers
  - This was done for Ebola vaccine trials
  - This would keep vaccine trial time short because front line workers are so frequently exposed to COVID-19

## Science behind COVID-19 vaccines:

- **Vaccines must be both safe and effective**; an effective vaccine safely helps a person generate an immune response against an infection without first being exposed to the pathogen (in this case, the COVID-19 virus).
  - This immune response must be big enough to effectively protect against future exposures to the COVID-19 virus but must not be so big as to cause harm.
  - As an example, this is why some people get mild flu-like symptoms after getting the flu vaccine.
- Coronaviruses get their name because they have a “crown” of spikes.
  - The virus uses these spikes to enter into human cells.
  - Proteins on the spikes induce the immune system to respond.
- **Most vaccines under development for COVID-19 vaccines are using technology to mimic or replicate a spike protein**; when the vaccine is injected into a person, the goal is for the immune system to respond mildly, to protect a person in the future.
- However, word of caution:
  - one reason COVID-19 infection is so harmful is because it generates such a huge response from the human immune system
  - Some vaccines could make future exposures to COVID-19 worse—not better; this is a phenomenon called “**disease enhancement**”
    - An experimental SARS vaccine caused disease enhancement in vaccinated ferrets

**Sources:**

[COVID-19 Vaccine Tracker](#)

[CEPI | New Vaccines For A Safer World](#)

[The outbreak of SARS-CoV-2 pneumonia calls for viral vaccines](#)

[Don't rush to deploy COVID-19 vaccines and drugs without sufficient safety guarantees](#)

[COVID-19, an emerging coronavirus infection: advances and prospects in designing and developing vaccines, immunotherapeutics, and therapeutics](#)

[Coronavirus vaccines: five key questions as trials begin](#)

[NIH clinical trial of investigational vaccine for COVID-19 begins](#)