

## What are vaccines and how do they work?

- Vaccines are a preventative measure against infectious disease.
- They stimulate our bodies to build immunity to a disease, without having to acquire the disease in the first place.<sup>1,2</sup> [Read more.](#)
- After a vaccine is administered it can take up to two weeks for the body to build immunity and often a second 'booster' shot is required to ensure the quality and quantity of this immunity.<sup>3,4</sup>

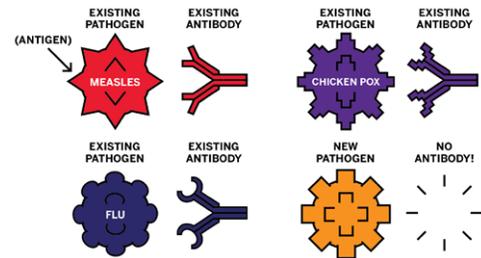
## OUR IMMUNE SYSTEM

When our immune system identifies disease-causing pathogens (e.g. bacteria or virus) it produces specific antibodies that bind to the pathogen and signal for it to be destroyed.

Memory cells are created which remain in your bloodstream and produce a quick response if the pathogen is encountered again (when you come in contact with the disease). [Read more.](#)

## Why are vaccines being developed for COVID-19?

- Because the COVID-19 virus is a new virus, the human body does not have specific antibodies ready to fight it.
- However, scientists have found a 'spike protein' that is unique to the COVID-19 virus and can be used in a vaccine to stimulate immunity. [Read more.](#)



## Why is this a smart vaccine approach?

- By focusing on the 'spike protein', the vaccine enables the body to fight the COVID-19 virus before it even enters the cells in our body – stopping it in its tracks and preventing disease.<sup>5,6</sup> [Read more.](#)
- Furthermore, scientists have used the latest vaccine science and technology to deliver the 'spike protein' into our bodies (which then stimulates the body to produce antibodies).

## DID YOU KNOW?

The COVID-19 virus is also known as coronavirus and SARS CoV-2.

There are several approaches to making the COVID-19 vaccine including:

	JUST THE GENETIC MATERIAL		GENETIC MATERIAL IN A VIRAL VECTOR		NON-INFECTIOUS VIRAL PROTEINS	WHOLE VIRUS	
How the vaccine is made	mRNA - Messenger RNA (mRNA) is a 'blueprint' that delivers instructions to the body to produce the 'spike protein'. <sup>7</sup> <a href="#">Read more.</a>		DNA in <b>viral vector</b> – The DNA of the 'spike protein' is inserted into a dead or genetically modified virus or 'viral vector'. The body then uses the DNA to create its own mRNA that delivers instructions to produce the 'spike protein'. <sup>8</sup> <a href="#">Read more.</a>		Protein vaccine - A non-infectious version of the 'spike protein' is injected into the body. <sup>9</sup>	Inactivated virus - The whole virus is weakened, inactivated or killed and introduced into the body. <sup>10</sup>	
Company	Pfizer BioNTech	Moderna	Oxford AstraZeneca	J&J (only single dose)	Novavax	Bharat Biotech, ICMR	Sinovac
Efficacy data (hyperlinked)	<a href="#">91% – 100%</a>	<a href="#">94% – 100%</a>	<a href="#">76%</a>	<a href="#">66% – 72%</a>	<a href="#">85% – 96%</a>	<a href="#">81%</a>	<a href="#">50% - 91%</a>

## What is the process of bringing vaccines to market?

- Traditionally it takes 5-10 years to bring a vaccine to market.
- The following steps are taken sequentially, often with many months between each stage to secure funding, recruitment or manage logistics and red tape.<sup>11,12</sup>

## The standard process for vaccines<sup>9</sup>:

<b>1. RESEARCH</b> Study the mechanism of disease-causing pathogen. Advance vaccine technology.	<b>2. PRE-CLINICAL</b> Assess efficiency, toxicity and drug-on-drug interactions in non-human cells.	<b>3. PHASE I</b> Assess safety of low dose in a small number of healthy people.	<b>4. PHASE II</b> Assess safety in low but ascending doses in bigger and more diverse group.	<b>5. PHASE III</b> Monitor safety and efficacy in normal dose in large number of people.	<b>6. GOVERNMENT APPROVAL</b> Independent expert committees review data and undergo quality control.	<b>7. MANUFACTURING AND DISTRIBUTION</b> Major pharmaceutical companies manufacture vaccines, network of distributors globally.
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## How did the process happen so quickly for the COVID-19 vaccines?

- Decades of research into coronaviruses (e.g. SARS and MERS) and vaccine technology:
  - There has been over 25 years of research into DNA vaccines and 10–15 years into the new RNA vaccine technology. [Read more.](#)
- Super funding from pharmaceutical companies, scientific institutions, and philanthropic organizations:
  - Billions of dollars were quickly invested, and the cost of trials shared - making it possible to speed up the process.<sup>13</sup>
- Trials were run in parallel, not sequentially:
  - The COVID-19 vaccines went through the same trial process but undertaken at the same time.
- Regulatory authorities pooled knowledge and prioritized approvals:
  - The International Coalition of Medicines Regulatory Authorities and local emergency regulations enabled countries to expedite and streamline approval process. [Read more.](#)

## Timeline of the COVID-19 vaccines development process, run in parallel not sequentially ([read more](#)):



## Are these vaccines safe?

- All vaccines are thoroughly tested for safety (including side effects) before they are approved for use. [Read more.](#)
- So far, most side effects of the COVID-19 vaccines have been found to be mild to moderate.
- Speak to your doctor to understand if the vaccine is recommended for people with your medical history.

## Why is there confusion around the COVID-19 vaccines and pregnant or breastfeeding women?

- Vaccine trials are typically conducted in healthy adults before they explore use in specific populations like pregnant women. As such, there is not yet data and information for pregnant women.<sup>14,15</sup> [Read more.](#)
- Vaccines are, in general, safe and well tolerated during pregnancy and the expectation is that these vaccines should be safe in these populations.<sup>16</sup>
- Vaccination is a personal decision and women who are pregnant should consult their healthcare professional to discuss their options.

## What impact do the new variants of the COVID-19 virus have on vaccines?

- The COVID-19 vaccines that are currently in development or have been approved are expected to provide at least some protection against new virus variants because they elicit a broad response.<sup>16</sup>
- Therefore, changes or mutations in the virus should not make vaccines completely ineffective. [Read more.](#)
- Speak to your doctor to understand how the different variants in your area impact the efficacy of the vaccines approved locally.

## WHAT'S NEXT?

Now that we have vaccines that have shown to be safe and effective, we need to produce enough for 70% of the global population and break transmission of the disease – that's a total of 5 - 10 billion doses!<sup>10</sup>

To date, over 689 million vaccine doses have been administered worldwide – see [latest figures here](#)

There is 50+ vaccines currently going through clinical trials and regulatory approvals. [Read more.](#)<sup>17</sup>

*Brought to you by the WE specialist health teams.*

*An important part of our purpose is to ensure that people have factual, unbiased information they need to make informed decisions about their health. We understand vaccination is a personal decision and this is not meant to persuade or tell you what to do – only provide information for you make the right decision for yourself and your family.*

## Endnotes

<sup>1</sup> [CDC.gov | Vaccines](#)

<sup>2</sup> [Better Health Channel | Vaccines](#)

<sup>3</sup> [The Conversation | Why do you need a second dose?](#)

<sup>4</sup> [CDC | COVID-19 Vaccines that Require 2 Shots](#)

<sup>5</sup> [Johns Hopkins Medicine | COVID-19 Vaccine: What You Need to Know](#)

<sup>6</sup> [The Conversation | COVID vaccines focus on the spike protein – but here's another target](#)

<sup>7</sup> [New York Times | How the Pfizer Covid-19 Vaccines Work](#)

<sup>8</sup> [New York Times | How the Oxford-AstraZeneca Covid-19 Vaccine Works](#)

<sup>9</sup> [Health.gov.au | How COVID 19 vaccines work](#)

<sup>10</sup> [WHO | The race for a COVID-19 vaccine explained](#)

<sup>11</sup> [Bill Gates | What you need to know about the COVID-19 vaccine](#)

<sup>12</sup> [The Conversation | Coronavirus vaccine: understanding trial results, roll-out and what happens next](#)

<sup>13</sup> [Bill Gates | These breakthroughs will make 2021 better than 2020](#)

<sup>14</sup> [The Conversation | Should pregnant women get the COVID-19 vaccine? Will it protect against asymptomatic infections and mutated viruses? An immunologist answers 3 questions](#)

<sup>15</sup> [ABC | Coronavirus COVID 19 Vaccines who will be immunized](#)

<sup>16</sup> [WHO | The effects of virus variants on COVID-19 vaccines](#)

<sup>17</sup> [RAPS | COVID-19 vaccine tracker](#)