

Healthality Check: Covid-19 Vaccines

What Are They, How Do They Work, and Common Questions Answered

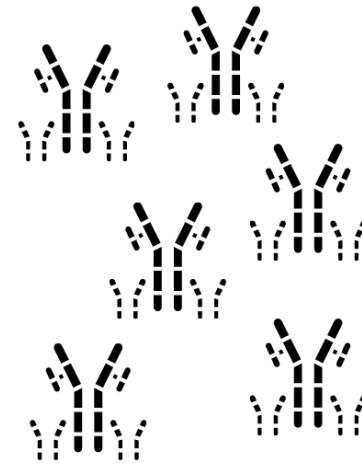
How do vaccines work?

Vaccines work by stimulating the body to produce antibodies against a particular organism, such as the coronavirus that causes Covid-19.

These antibodies then remain as part of the person's immune memory and are activated when the person is exposed to the actual virus in the future.



Vaccine contains the substance required to trigger immune response to a particular organism



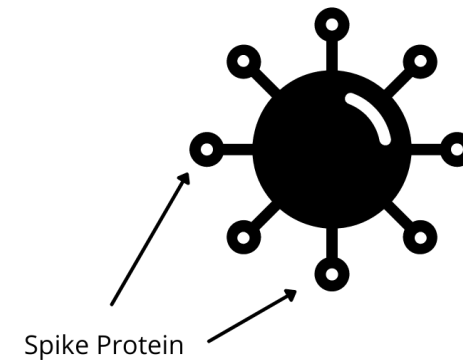
Vaccine triggers body's immune response to produce antibodies to the specific organism



When organism enters the body, immune system identifies it and antibodies attach on thereby stopping the organism infecting the person

How do the Oxford/AstraZeneca and Pfizer Vaccines work?

- ▶ Both vaccines focus on stimulating the immune system to create antibodies against the spike protein on the coronavirus.
- ▶ This is the protein that gives the coronavirus its name: corona = crown.
- ▶ In order to stimulate an immune response, the spike protein needs to be recreated inside a human cell.
- ▶ The way they do this is where the vaccines differ.



The Oxford/AstraZeneca Vaccine

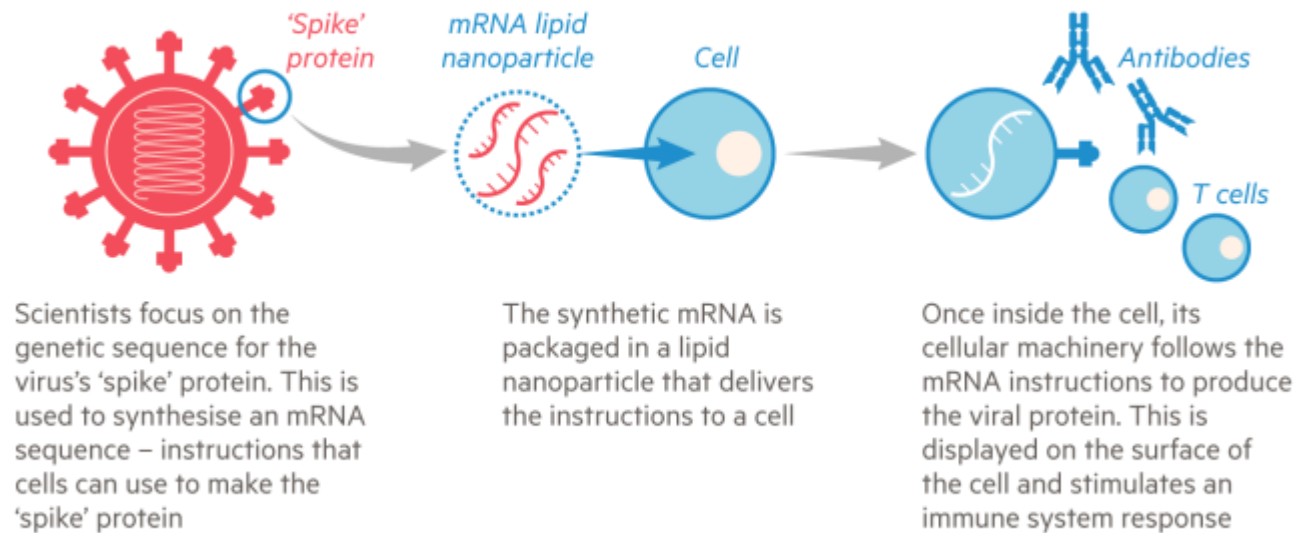
- ▶ Uses an inactivated virus that causes the common cold in chimpanzees as a vector – the vehicle that contains the DNA to make the spike protein
- ▶ When injected, attaches to a cell and the DNA enters the cell and the nucleus
- ▶ DNA then encoded in to mRNA
- ▶ mRNA acts as instructions for making the spike protein
- ▶ This then triggers the immune system to produce antibodies against the spike protein, and subsequently those antibodies would attack against the actual coronavirus should the person be exposed to it in the future

The Pfizer/BioNTech Vaccine

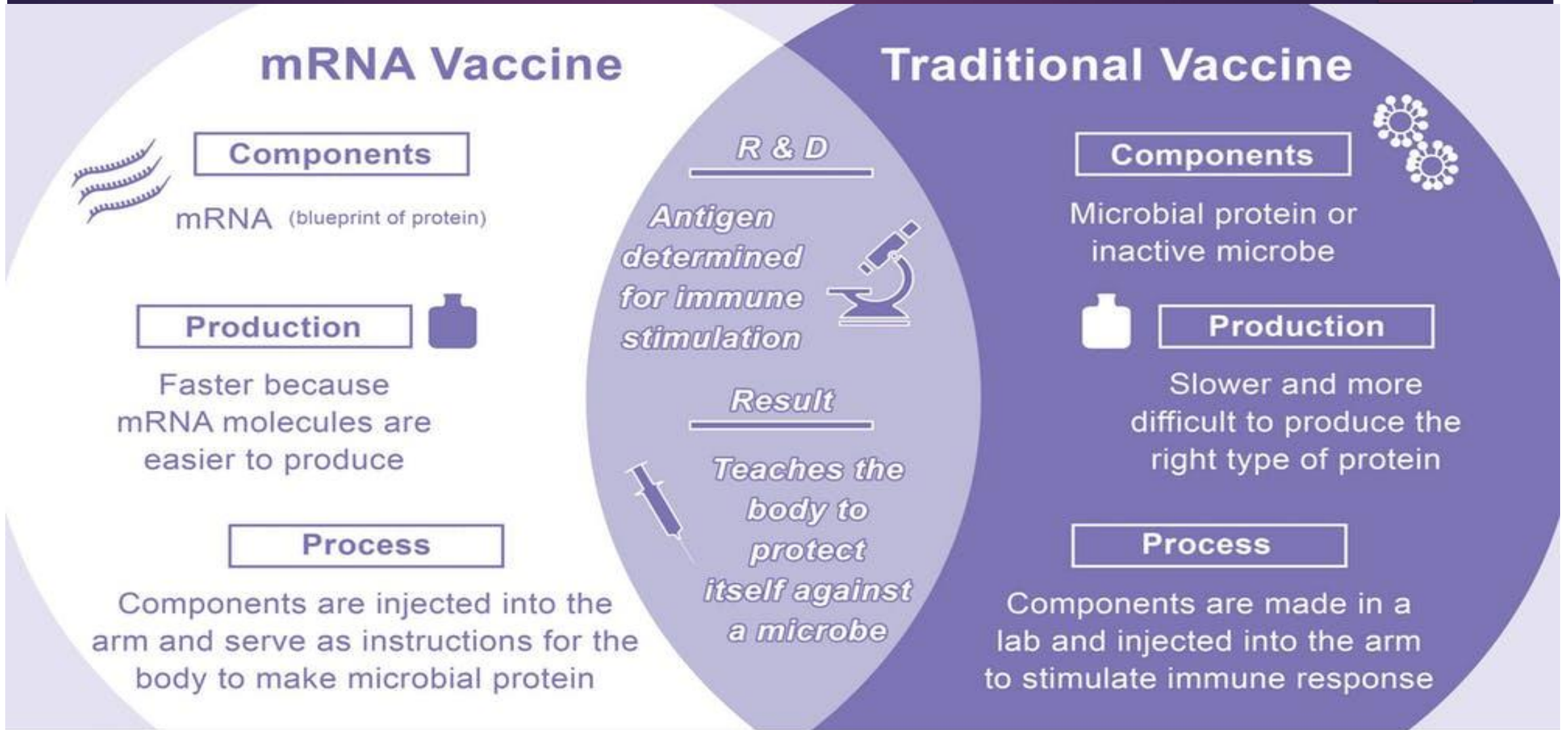
- ▶ Synthetic vaccine manufactured using plant based cells
- ▶ Similar method of action to the Oxford Vaccine however this is an mRNA vaccine eliminating the DNA step
- ▶ mRNA carries instructions for the spike protein
- ▶ Spike protein triggers immune response and antibody production

How the Pfizer-BioNTech vaccine works

mRNA vaccines give the immune system genetic instructions to recognise the virus



How were they developed so quickly?



What are the side effects?

Oxford Vaccine	Pfizer Vaccine
Very Common (may affect more than 1 in 10 people)	Very Common (may affect more than 1 in 10 people)
tenderness, pain, warmth, redness, itching, swelling or bruising where the injection is given	pain at injection site
generally feeling unwell	Tiredness
feeling tired (fatigue)	Headache
chills or feeling feverish	muscle pain
headache	chills
feeling sick (nausea)	joint pain
joint pain or muscle ache	fever
Common (may affect up to 1 in 10 people)	Common: may affect up to 1 in 10 people
a lump at the injection site	injection site swelling
fever	redness at injection site
being sick (vomiting)	nausea
flu-like symptoms, such as high temperature, sore throat, runny nose, cough and chills	Uncommon: may affect up to 1 in 100 people
Uncommon (may affect up to 1 in 100 people)	enlarged lymph nodes
feeling dizzy	feeling unwell
decreased appetite	Rare side effects: may affect up to 1 in 1,000 people
abdominal pain	temporary one sided facial drooping
enlarged lymph nodes	Not known (cannot be estimated from the available data)
excessive sweating, itchy skin or rash	severe allergic reaction

What do they contain?

Astrazeneca/Oxford Vaccine	Pfizer Vaccine
<ul style="list-style-type: none"> COVID 19 Vaccine (ChAdOx1-S recombinant) 5×10^{10} viral particles 	<ul style="list-style-type: none"> ALC-0315 = (4-hydroxybutyl) azanediyl)bis (hexane-6,1-diyl)bis(2-hexyldecanoate)
<ul style="list-style-type: none"> L-histidine 	<ul style="list-style-type: none"> ALC-0159 = 2-[(polyethylene glycol)-2000]-N,N-ditetradecylacetamide
<ul style="list-style-type: none"> L-histidine hydrochloride monohydrate 	<ul style="list-style-type: none"> 1,2-Distearoyl-sn-glycero-3-phosphocholine
<ul style="list-style-type: none"> magnesium chloride hexahydrate 	<ul style="list-style-type: none"> cholesterol
<ul style="list-style-type: none"> polysorbate 80 	<ul style="list-style-type: none"> potassium chloride
<ul style="list-style-type: none"> ethanol 	<ul style="list-style-type: none"> potassium dihydrogen phosphate
<ul style="list-style-type: none"> sucrose 	<ul style="list-style-type: none"> sodium chloride
<ul style="list-style-type: none"> sodium chloride 	<ul style="list-style-type: none"> disodium hydrogen phosphate dihydrate
<ul style="list-style-type: none"> disodium edetate dihydrate 	<ul style="list-style-type: none"> sucrose
<ul style="list-style-type: none"> water for injections 	<ul style="list-style-type: none"> water for injections

What are lipids?

- ▶ The Pfizer vaccine contains
 - ▶ ALC-0315 = (4-hydroxybutyl) azanediyl)bis (hexane-6,1-diyl)bis(2-hexyldecanoate)
 - ▶ ALC-0159 = 2-[(polyethylene glycol)-2000]-N,N-ditetradecylacetamide
 - ▶ 1,2-Distearoyl-sn-glycero-3-phosphocholine
 - ▶ cholesterol
- ▶ These are lipids
- ▶ They form a protective ring around the mRNA to prevent it from being damaged and destroyed
- ▶ Once the mRNA enters the host cell, these lipids dissolve and are excreted by the body

What about the rest of the ingredients?

- ▶ These are commonly found in vaccines and are not new or unique
- ▶ They help balance the pH (acidity) of the vaccine and stabilise it

How are they stored and given?

	Astrazeneca/Oxford Vaccine	Pfizer Vaccine
How it's stored	2 to 8 degrees	Frozen at -70 degrees celcius Thawed and kept 2 to 8 degrees for maximum of 5 days
How it's given	COVID-19 Vaccine AstraZeneca is injected into a muscle (usually in the upper arm). The second injection can be given between 4 and 12 weeks after the first injection.	Intramuscularly in the deltoid muscle after dilution. The second after at least 21 days.

Are DNA/mRNA vaccines new?

The Oxford/AstraZeneca and Pfizer/BioNTech, and now the Moderna, vaccines are the first DNA/mRNA vaccines approved for use in humans.

However, the technology is not completely new – it is 30 years in the making with research in to the use of DNA/mRNA vaccines looking at:

- ▶ 1. Gene sequencing of viruses
- ▶ 2. Identifying proteins on the virus that can be targeted
- ▶ 3. Writing the correct mRNA code
- ▶ 4. Transporting the mRNA to the correct cells, in a way that a persons own blood cells will not destroy it
- ▶ 5. Ensuring an immune response
- ▶ 6. Global IT infrastructure to allow sharing of data

Do they contain any animal products?

- ▶ No
- ▶ Neither of the Oxford Vaccine or Pfizer Vaccine contain any animal products, such as gelatine

Do they contain human foetus tissue or cells?

- ▶ Neither the Oxford Vaccine or the Pfizer Vaccine contain any human cells.
- ▶ The Pfizer vaccine is produced using a synthetic process.
- ▶ The Oxford Vaccine does use cells derived from an aborted foetus in the manufacturing process.
- ▶ However, these cells are completely removed, using a purification process, from the actual injectable vaccine.

Do they contain a microchip?

No

Rumours have circulated on social media stating:

- ▶ The vaccines contain a radio frequency identification device (RFID)
 - ▶ Not possible to inject via a syringe needle
- ▶ Contain a GPS tracking device as part of Bill Gates wider strategy to control people
 - ▶ Needs a power supply thereby not possible to inject
- ▶ Contain a chip that is the mark of the Beast – changing people's faith and preventing entry to heaven
 - ▶ There is no microchip in the vaccine
 - ▶ Religious people should bear in mind that God enables science and medicine

Can they alter your own DNA?

- ▶ No
- ▶ It is impossible for mRNA vaccine to alter your own DNA as the mRNA does not enter the cell nucleus.
- ▶ DNA that enters the nucleus via the adenoviral vector, as used in the Oxford/AstraZeneca vaccine does not integrate with the cell's own DNA.
- ▶ It is episomal – ie remains separate to the cell's own genetic material.
- ▶ This DNA is therefore transient and lost when the cell divides, with a range of 7 to 42 days, thereby requiring a second dose for maximum immune response.

Can you get Covid-19 from the vaccine?

- ▶ No
- ▶ Unlike other traditional vaccines, these Covid-19 vaccines do not contain any of the coronavirus itself – only the genetic instructions for the spike protein.
- ▶ Therefore it is impossible to get Covid-19 from having the vaccine itself.

Are the vaccines halal?

- ▶ Many Muslim faith leaders have classed these vaccines as halal

About us

- ▶ Healthality is a Private GP Service set up to enable everybody to live well informed, healthier lives
- ▶ Part of our mission is to make it easier for people to understand health related information by presenting it in an understandable way, doing away with jargon.
- ▶ Dr Adnan Ali and Dr Rizvana Ali are both fully qualified and experienced clinicians and General Practitioners.
- ▶ This information has been written in good faith, if you have any questions, or corrections, please do contact us on feedback@healthality.co.uk

The information presented is accurate as of press time. However, as the situation surrounding COVID-19 continues to evolve, it's possible that some data have changed since publication. While Healthality is trying to keep as up-to-date as possible, we also encourage readers to stay informed by using credible resources such as .gov.uk and .nhs websites.

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