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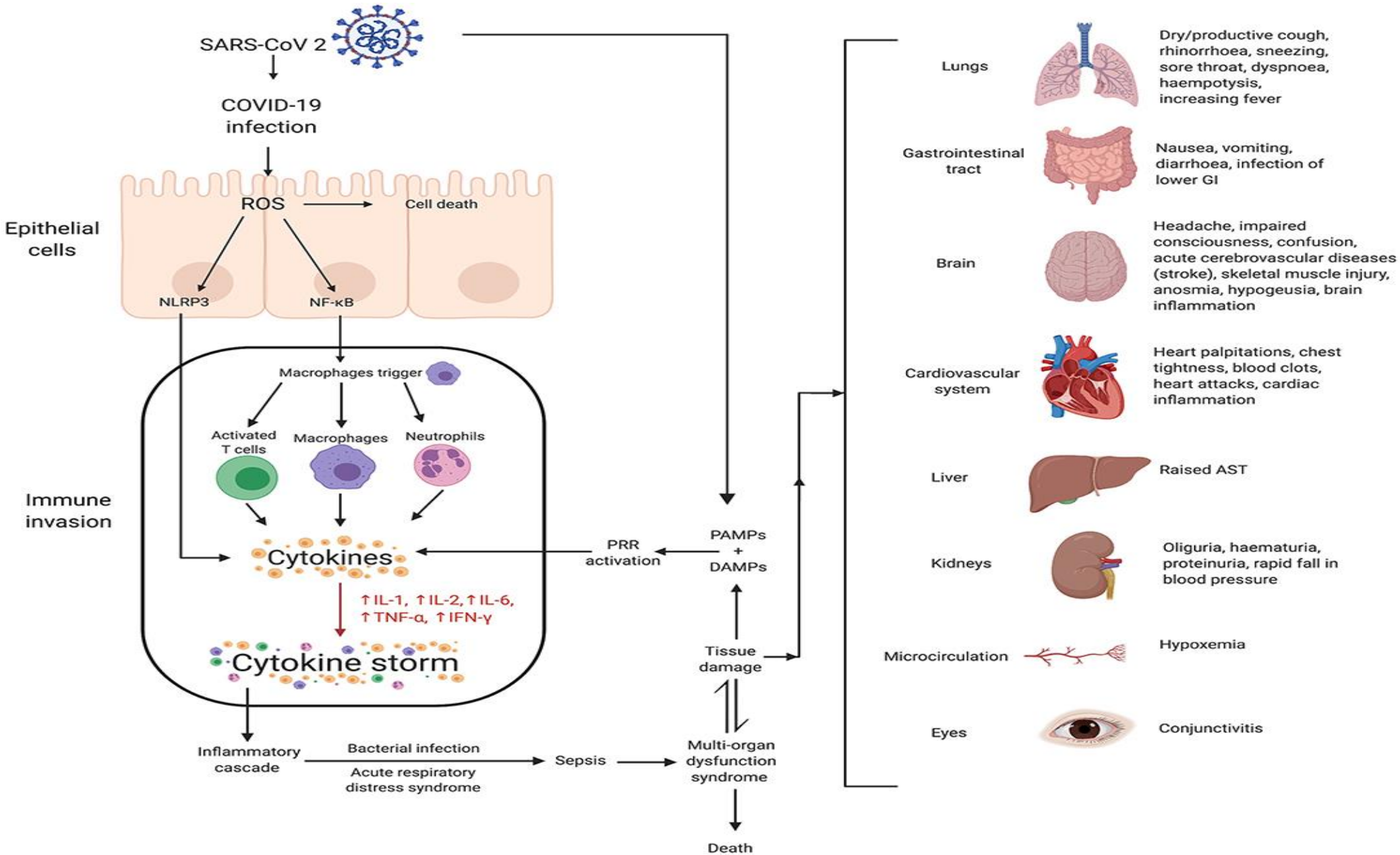

SARS-CoV 2
COVID-19 infection
Epithelial cells
ROS
Cell death
NLRP3
NF-κB
Immune invasion
Macrophages trigger
Activated T cells
Macrophages
Neutrophils
Cytokines
↑IL-1, ↑IL-2, ↑IL-6, ↑TNF-α, ↑IFN-γ
Cytokine storm
PRR activation
PAMPs + DAMPs
Tissue damage
Inflammatory cascade
Bacterial infection
Acute respiratory distress syndrome
Sepsis
Multi-organ dysfunction syndrome
Death
Lungs
Dry/productive cough, rhinorrhoea, sneezing, sore throat, dyspnoea, haempotysis, increasing fever
Gastrointestinal tract
Nausea, vomiting, diarrhoea, infection of lower GI
Brain
Headache, impaired consciousness, confusion, acute cerebrovascular diseases (stroke), skeletal muscle injury, anosmia, hypogeusia, brain inflammation
Cardiovascular system
Heart palpitations, chest tightness, blood clots, heart attacks, cardiac inflammation
Liver
Raised AST
Kidneys
Oliguria, haematuria, proteinuria, rapid fall in blood pressure
Microcirculation
Hypoxemia
Eyes
Conjunctivitis

Vaccine Platform

DNA-based vaccines work by inserting synthetic DNA of viral gene(s) into small DNA molecules (called plasmids). Cells take in the DNA plasmids and follow their instructions to build viral proteins, which are recognized by the immune system, and prepare it to respond to disease exposure

SANOFI INOVIO POWERING DNA MEDICINES

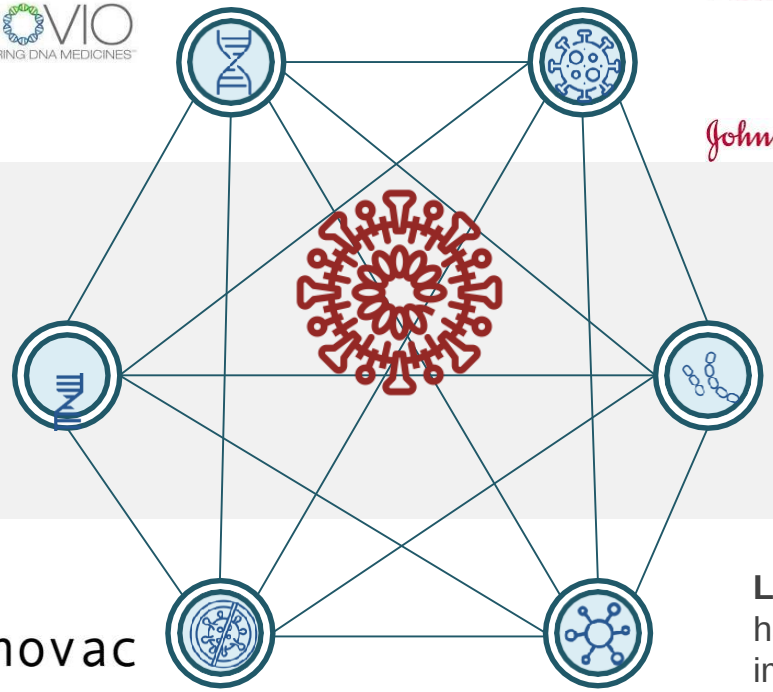
RNA vaccines introduce an mRNA sequence coded for a disease-specific antigen. Once this antigen is reproduced within the body, it is recognized and triggers an immune response

Pfizer moderna CUREVAC the RNA people®

Inactivated vaccines consist of the whole virus, which has been killed with heat or chemicals so it can't cause illness.

武汉生物制品研究所有限责任公司 WUHAN INSTITUTE OF BIOLOGICAL PRODUCTS CO.,LTD. SINOPHARM

sinovac



Viral vector vaccines insert a gene for a viral protein into another, harmless virus (replicating or non-replicating), which delivers the viral protein to the vaccine recipient, triggering an immune response.

AstraZeneca MERCK CanSinoBIO

МИНИСТЕРСТВО ЗДРАВООХРАНЕНИЯ РОССИЙСКОЙ ФЕДЕРАЦИИ

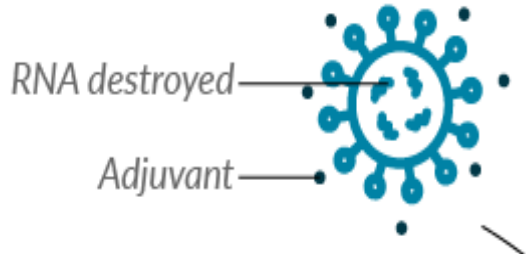
Johnson&Johnson

Subunit vaccines introduce a fragment of the virus into the body. This fragment is enough to be recognized by the immune response and stimulate immunity.

NOVAVAX Creating Tomorrow's Vaccines Today Clover Biopharmaceuticals

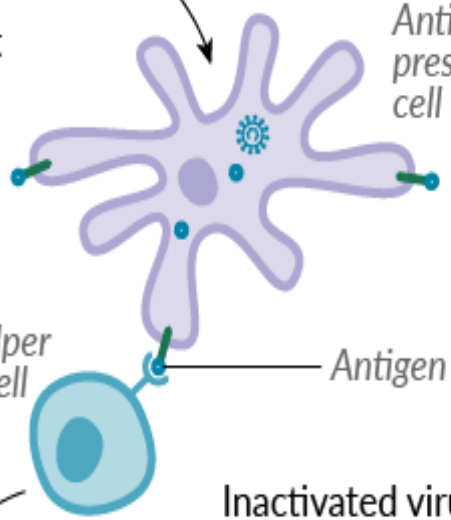
Live attenuated vaccines are made up of whole viruses that have weakened in a lab. They tend to elicit a stronger immune response than inactivated vaccines.

Inactivated virus vaccines



In inactivated virus vaccines, the genetic material of the virus has been **destroyed**.

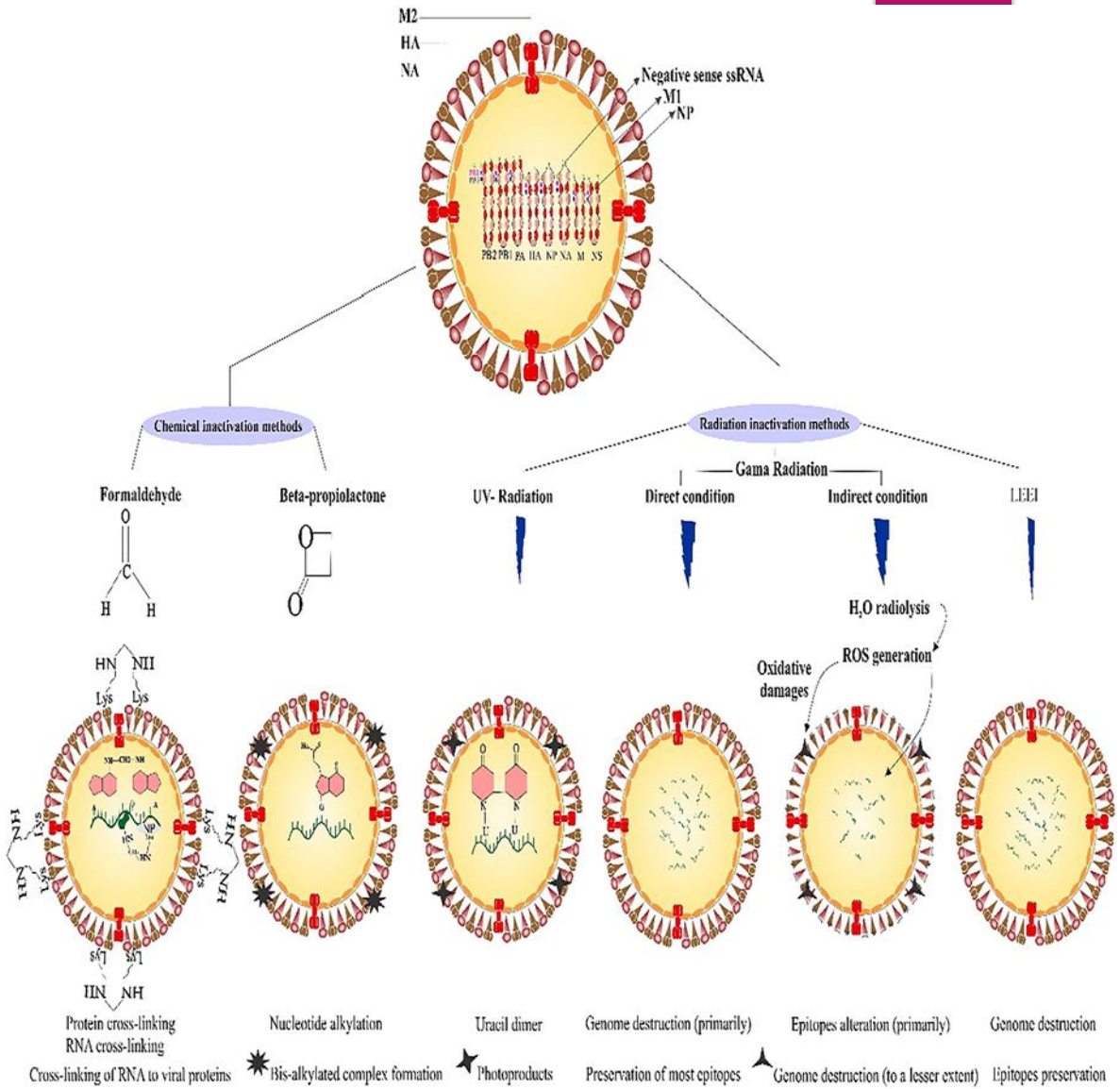
The inactivated virus cannot replicate inside the body, so higher doses are needed, typically alongside an **adjuvant** to strengthen the immune response.



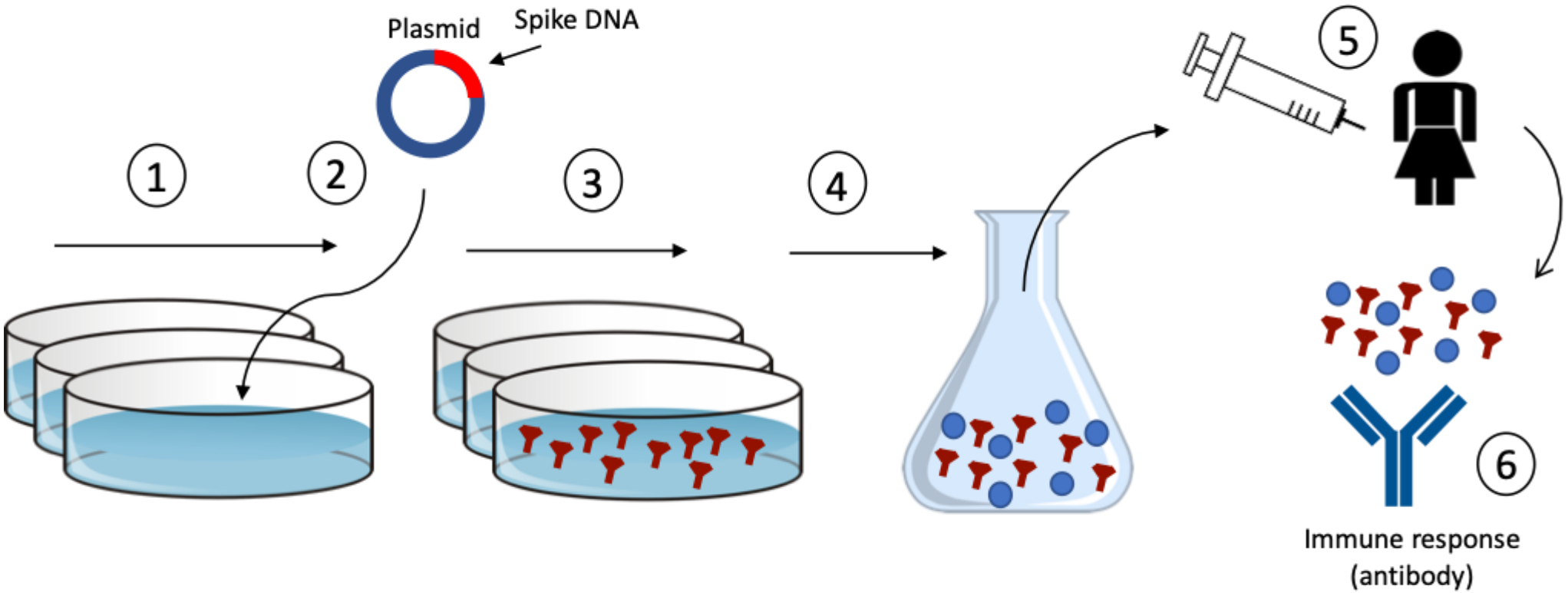
Inactivated virus vaccines generally only induce **antibody-mediated immunity** (not cell-mediated).

Antibody-mediated immune response and memory

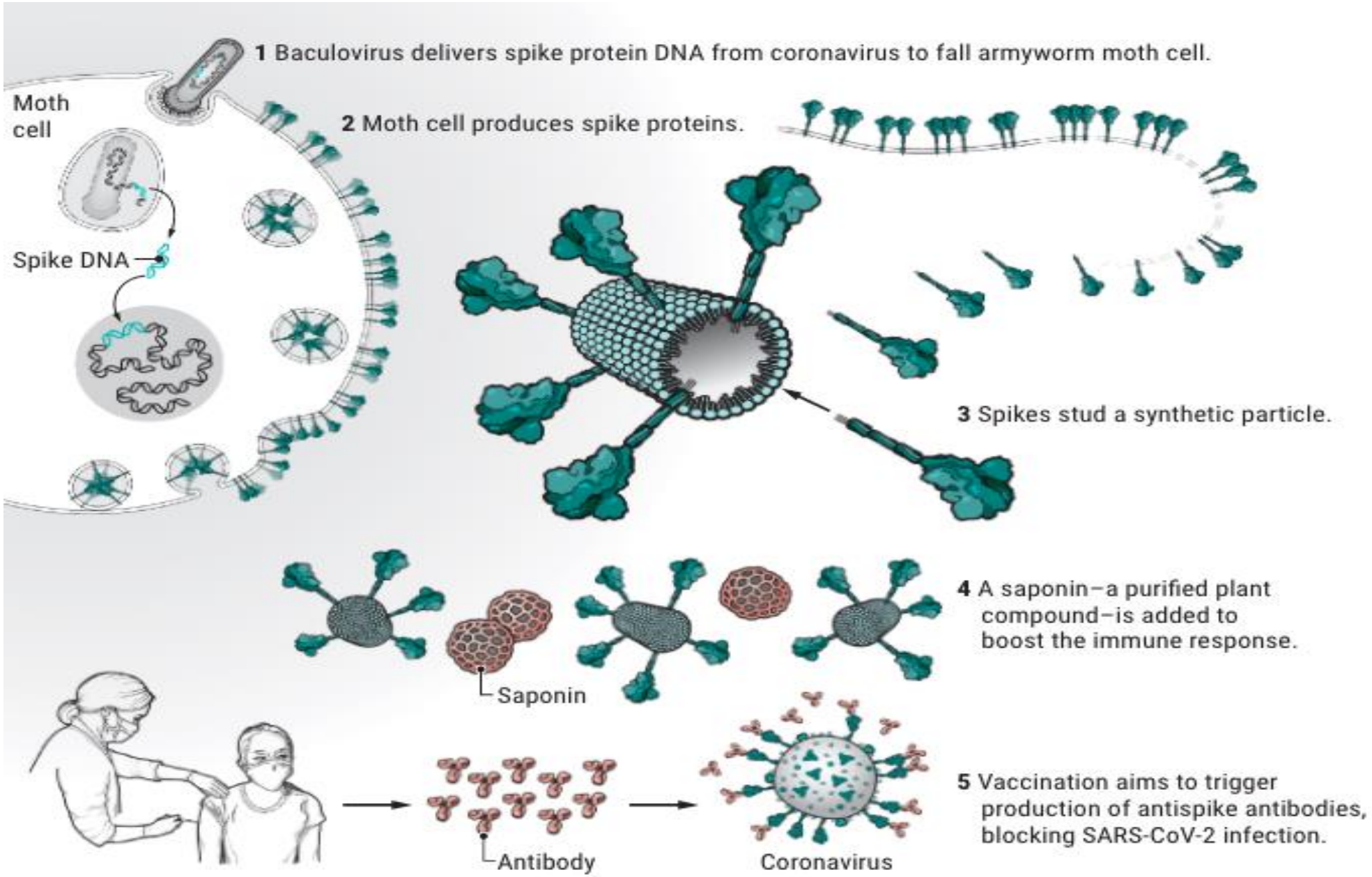
IVVN



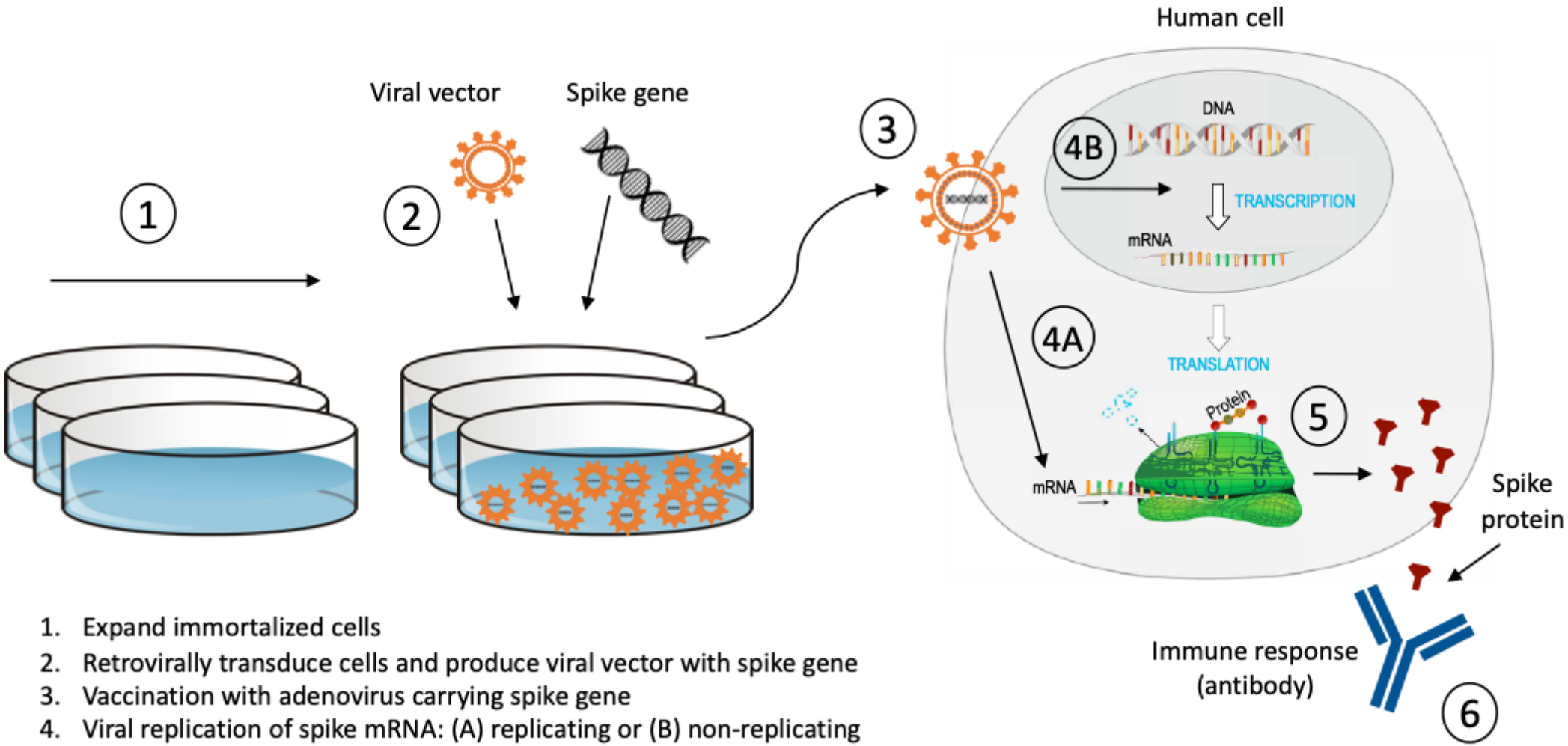
Protein-based Vaccine



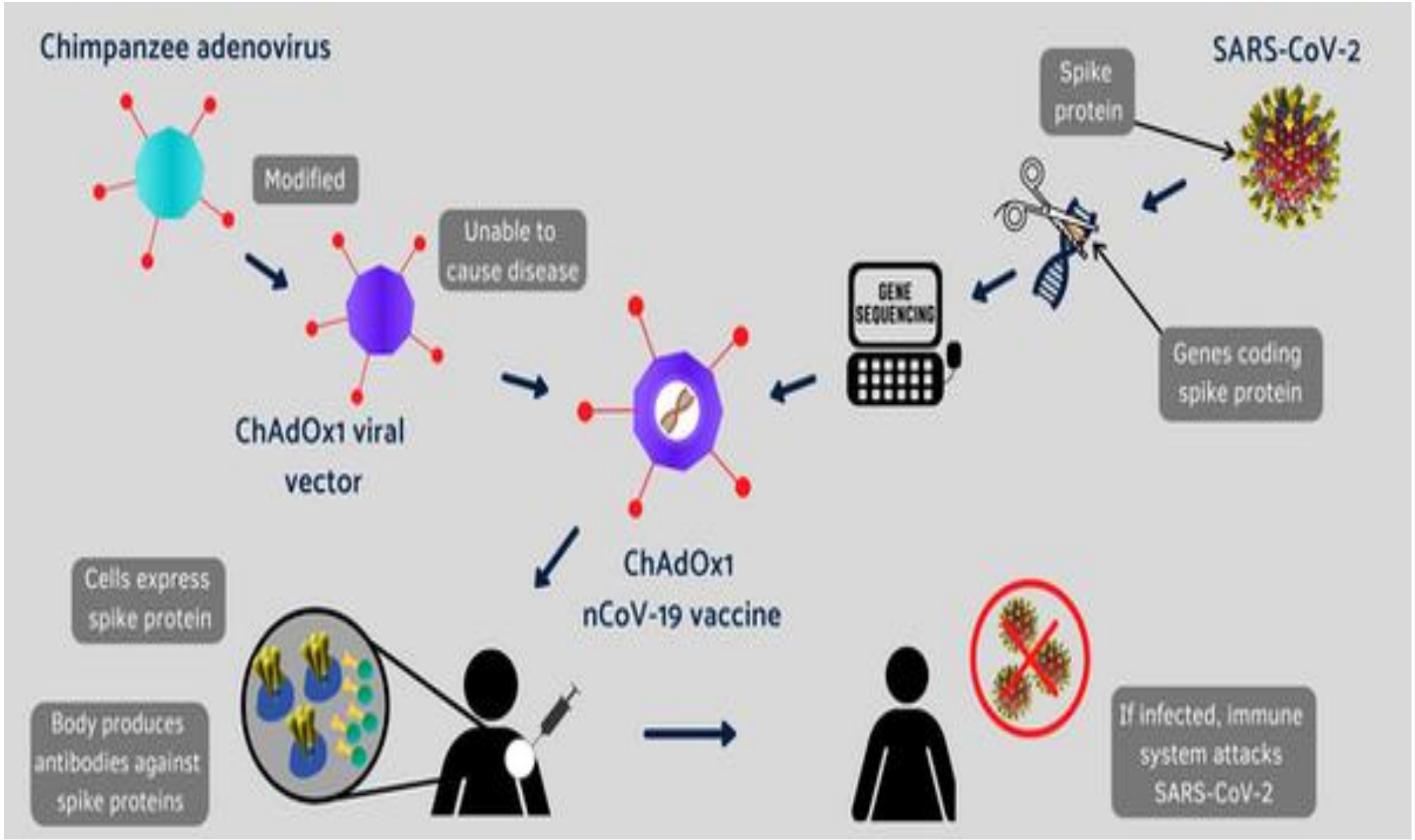
1. Expand immortalized cells
2. Retrovirally transduce cells with plasmid carrying spike DNA
3. Grow large amounts of spike protein in cells
4. Purify spike protein and add adjuvent
5. Vaccination with spike protein
6. Induction of immune response


1 Baculovirus delivers spike protein DNA from coronavirus to fall armyworm moth cell.
Moth cell
2 Moth cell produces spike proteins.
Spike DNA
3 Spikes stud a synthetic particle.
4 A saponin–a purified plant compound–is added to boost the immune response.
Saponin
5 Vaccination aims to trigger production of antispike antibodies, blocking SARS-CoV-2 infection.
Antibody
Coronavirus

Viral Vector-based Vaccine



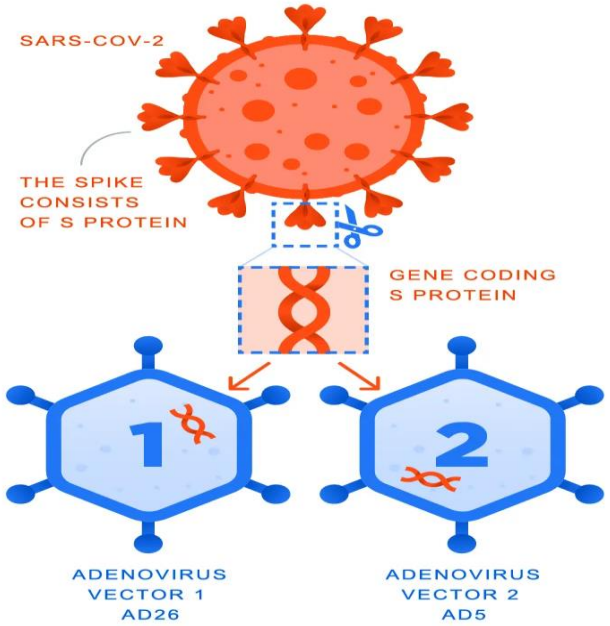
1. Expand immortalized cells
2. Retrovirally transduce cells and produce viral vector with spike gene
3. Vaccination with adenovirus carrying spike gene
4. Viral replication of spike mRNA: (A) replicating or (B) non-replicating
5. Production of spike protein
6. Induction of immune response


Chimpanzee adenovirus
Modified
Unable to cause disease
ChAdOx1 viral vector
SARS-CoV-2
Spike protein
GENE SEQUENCING
Genes coding spike protein
ChAdOx1 nCoV-19 vaccine
Cells express spike protein
Body produces antibodies against spike proteins
If infected, immune system attacks SARS-CoV-2

Two-vector vaccine against coronavirus

Vector creation

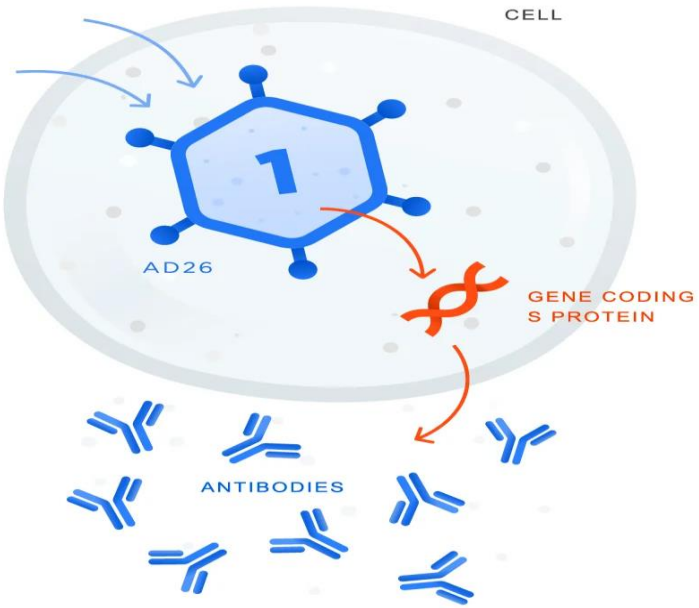
A vector is a virus that lacks a gene responsible for reproduction and is used to transport genetic material from another virus that is being vaccinated against into a cell.
The vector does not pose any hazard to the body. The vaccine is based on an adenoviral vector which normally causes acute respiratory viral infections



A gene coding S protein of SARS-COV-2 spikes is inserted into each vector.
The spikes form the "crown" from which the virus gets its name. The SARS-COV-2 virus uses spikes to get into a cell

First vaccination

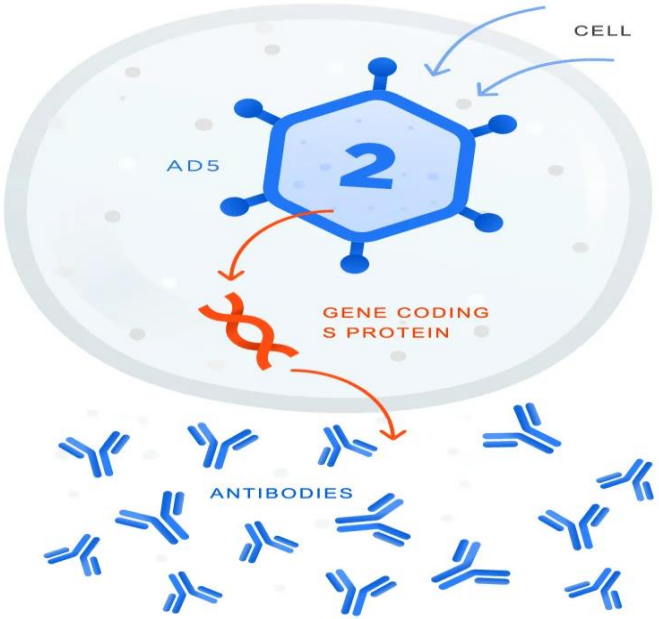
Vector with a gene coding S protein of coronavirus gets into a cell



The body synthesizes S protein, in response, the production of immunity begins

Second vaccination

Repeated vaccination takes place in 21 days

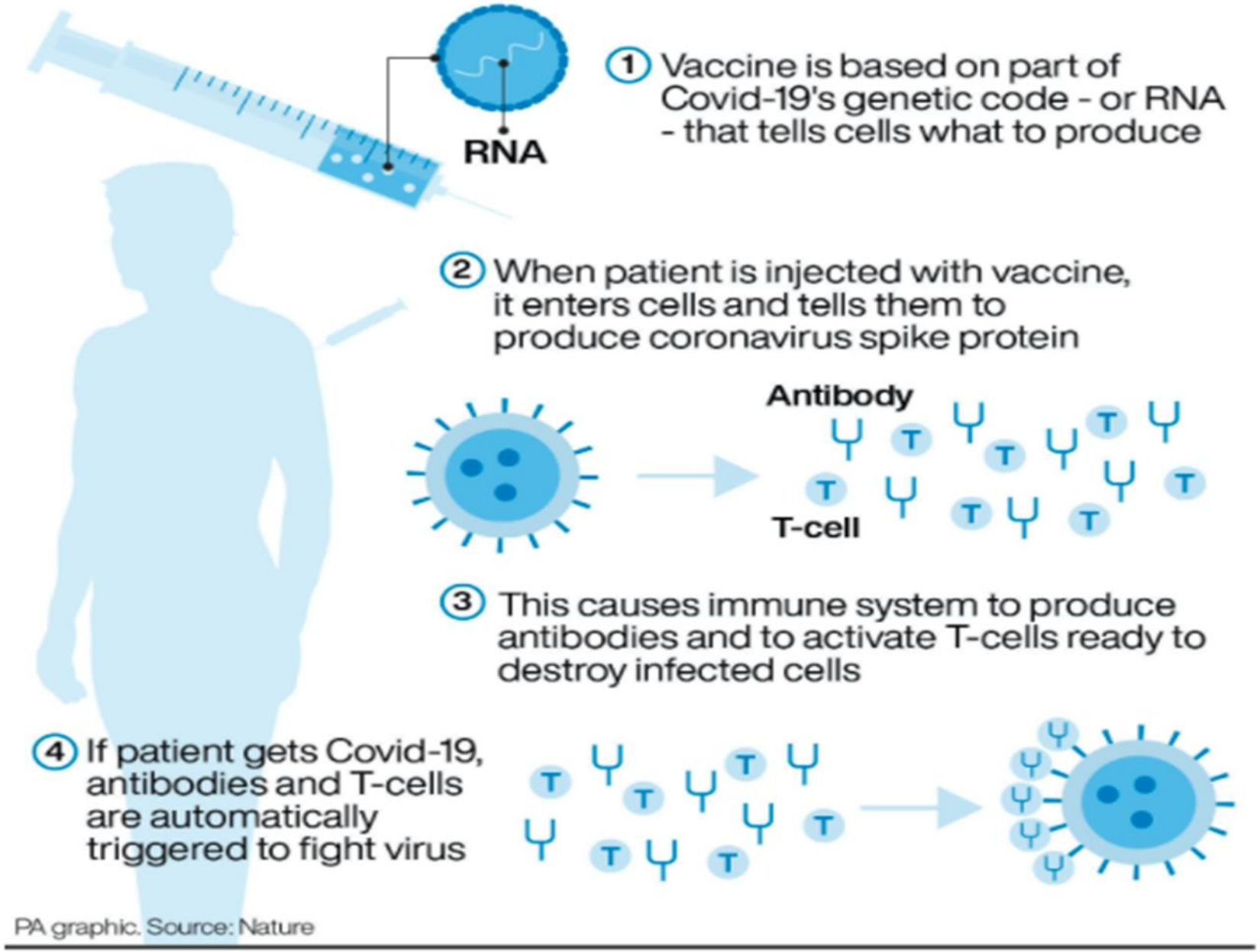


The vaccine based on another adenovirus vector unknown to the body boosts the immune response and provides for long-lasting immunity

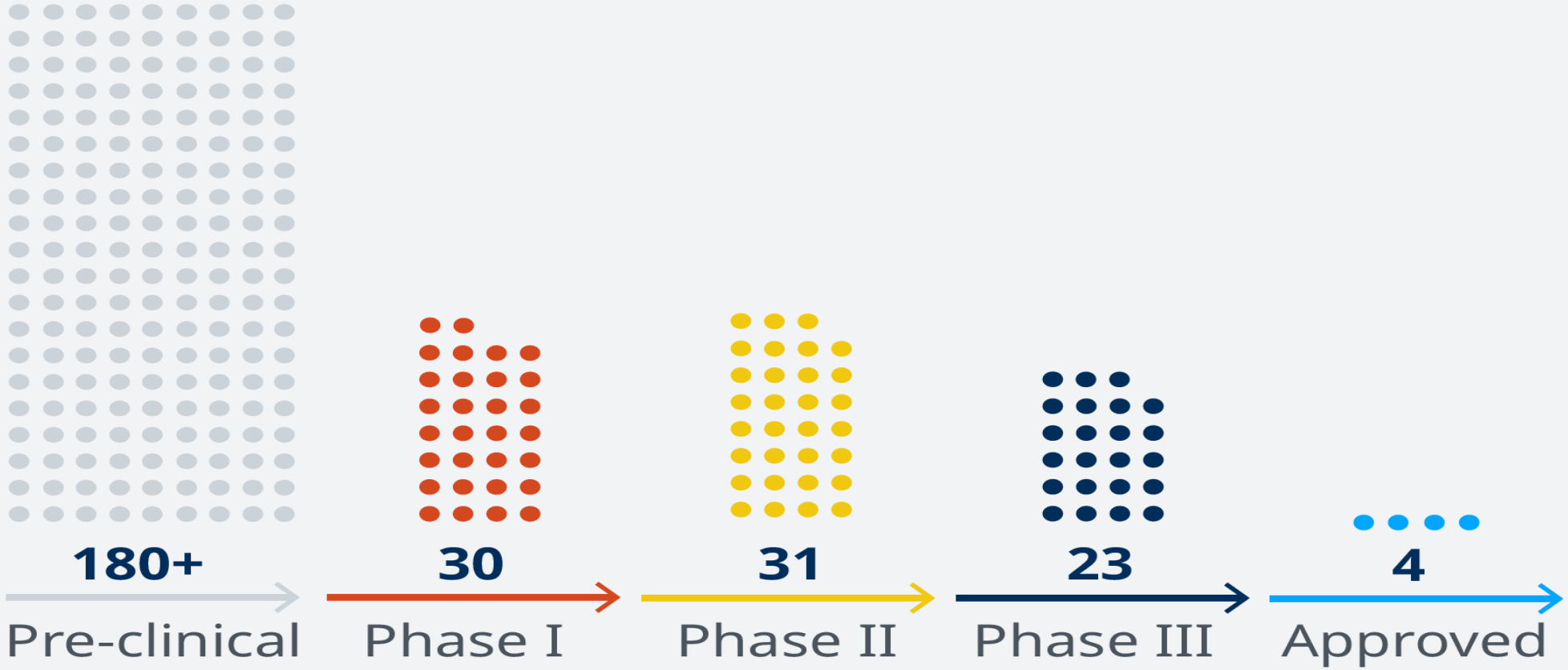
The use of two vectors is a unique technology of the Gamaleya Center making the Russian vaccine different from other adenovirus vector-based vaccines being developed globally

Source: Gamaleya Center, RDIF, 2020

How the Pfizer/BioNTech vaccine works



COVID-19 vaccine candidates in their various development stages



Source: WHO (as at 16.04.2021) | If a vaccine candidate is tested in two phases in parallel, it is assigned to the higher phase in this chart

Parkinson Secrets.com

COVID-19 Vaccine Comparisons

Vaccine Brand	Delivery Method	How many doses? Time between	Effectiveness	Storage	Estimated Cost per dose
Oxford-AstraZeneca	Adenovirus transports genetic material (DNA)	2 (28 days)	62% (2 full doses) 90% (1/2 first dose, full 2nd)	Standard refrigeration	~$4 USD
Moderna	mRNA	2 (28 days)	95%	-20C special refrigeration	~$25-37 USD
Pfizer-BioNTech	mRNA	2 (21 days)	94%	-70C Special refrigeration	~$20 USD
Gamaleya-Sputnick V (Russia)	Adenovirus transports genetic material (DNA)	2 (28 days)	~91% Limited data	Dry form can be stored at 2-8C	~$10 USD
Sinovac (China) Sinopharm (China)	Inactivated viral particles (similar to a classical flu shot)	2 (3-4 weeks)	~65-91% Limited data ~79-86% Limited data	Standard refrigeration	~$30-60 USD
Johnson & Johnson (Janssen)	Adenovirus transports genetic material (DNA)	1	~57-72% in moderate/severe disease	Standard refrigeration	~$10 USD

How some of the Covid-19 vaccines compare

Company	Type	Doses	Storage
Oxford Uni-AstraZeneca	Viral vector (genetically modified virus)	x2	2 to 8°C (6 months)
Moderna	RNA (part of virus genetic code)	x2	-25 to -15°C (7 months)
Pfizer-BioNTech	RNA	x2	-80 to -60°C (6 months)
Gamaleya (Sputnik V)	Viral vector	x2	-18.5°C (liquid form) 2 to 8°C (dry form)
Sinovac (CoronaVac)	Inactivated virus (weakened virus)	x2	2 to 8°C
Novavax	Protein-based	x2	2 to 8°C
Janssen	Viral vector	x1	2 to 8°C (3 months)

Source: UK government, Reuters

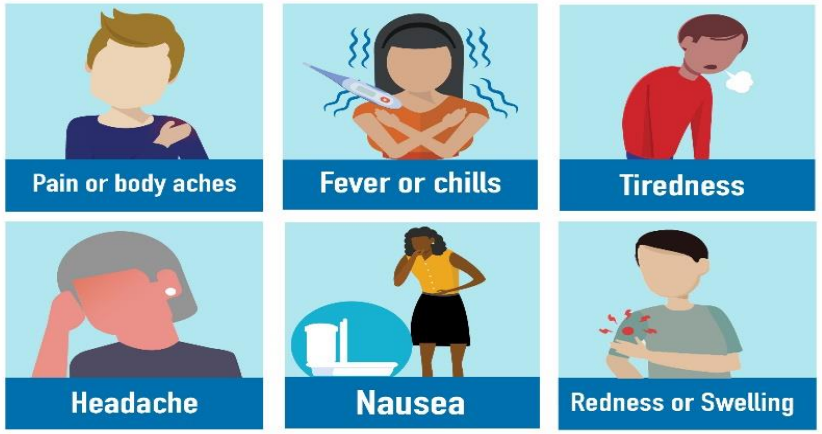
BBC

هند

مشخصات کلی واکسن Covaxin	
نام تجاری	Covaxin (also known as BBV152 A, B, C)
نوع واکسن	ویروس غیرفعال
شرکت تولیدکننده واکسن	Bharat Biotech
تعداد دوز	دو دوز
فاصله بین دو تزریق	۲۸ روز
نوع تزریق	عضلانی
دمای نگهداری	۲-۸ درجه سانتیگراد
فاز مطالعاتی	فاز ۳ در ۲۵،۸۰۰ شرکت‌کننده در حال انجام است و همه آنان اولین دوز را در تاریخ ۶ ژانویه ۲۰۲۱ دریافت کرده‌اند.
اثربخشی	هنوز گزارش نشده

Common COVID–19 Vaccine Side Effects

These side effects of the COVID-19 vaccine may affect your ability to do daily activities, but they should go away in a few days.



Side effects after your second shot may be more intense than the ones you experienced after your first shot. These side effects are normal signs that your body is building protection and should go away within a few days.

Contact your doctor or healthcare provider:

- If the redness or tenderness where you got the shot increases after 24 hours
- If your side effects are worrying you or do not seem to be going away after a few days

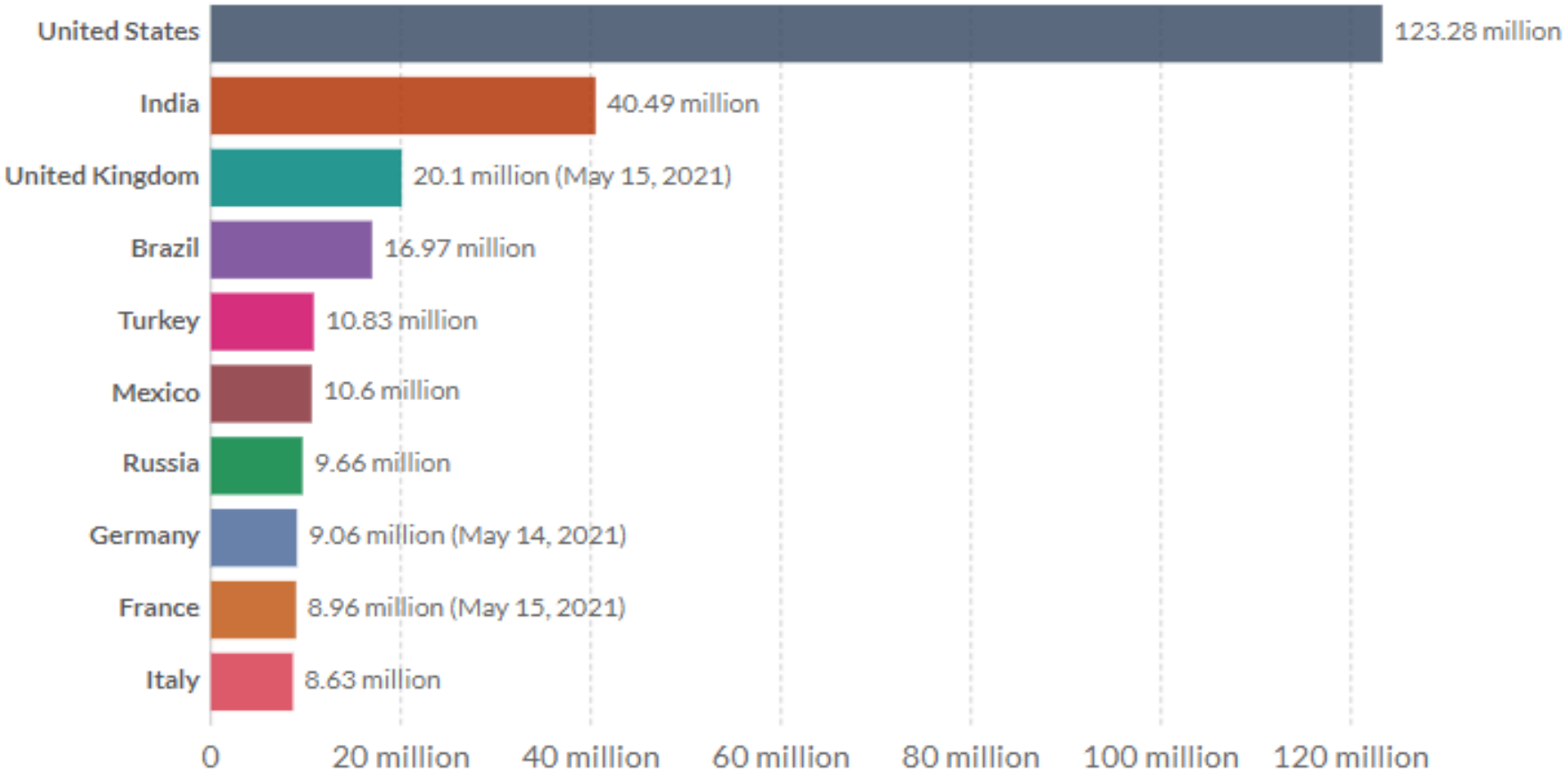
https://www.cdc.gov/coronavirus/2019-ncov/vaccines/expect/after.html

Number of people fully vaccinated against COVID-19, May 16, 2021

Total number of people who received all doses prescribed by the vaccination protocol. This data is only available for countries which report the breakdown of doses administered by first and second doses.

Our World in Data

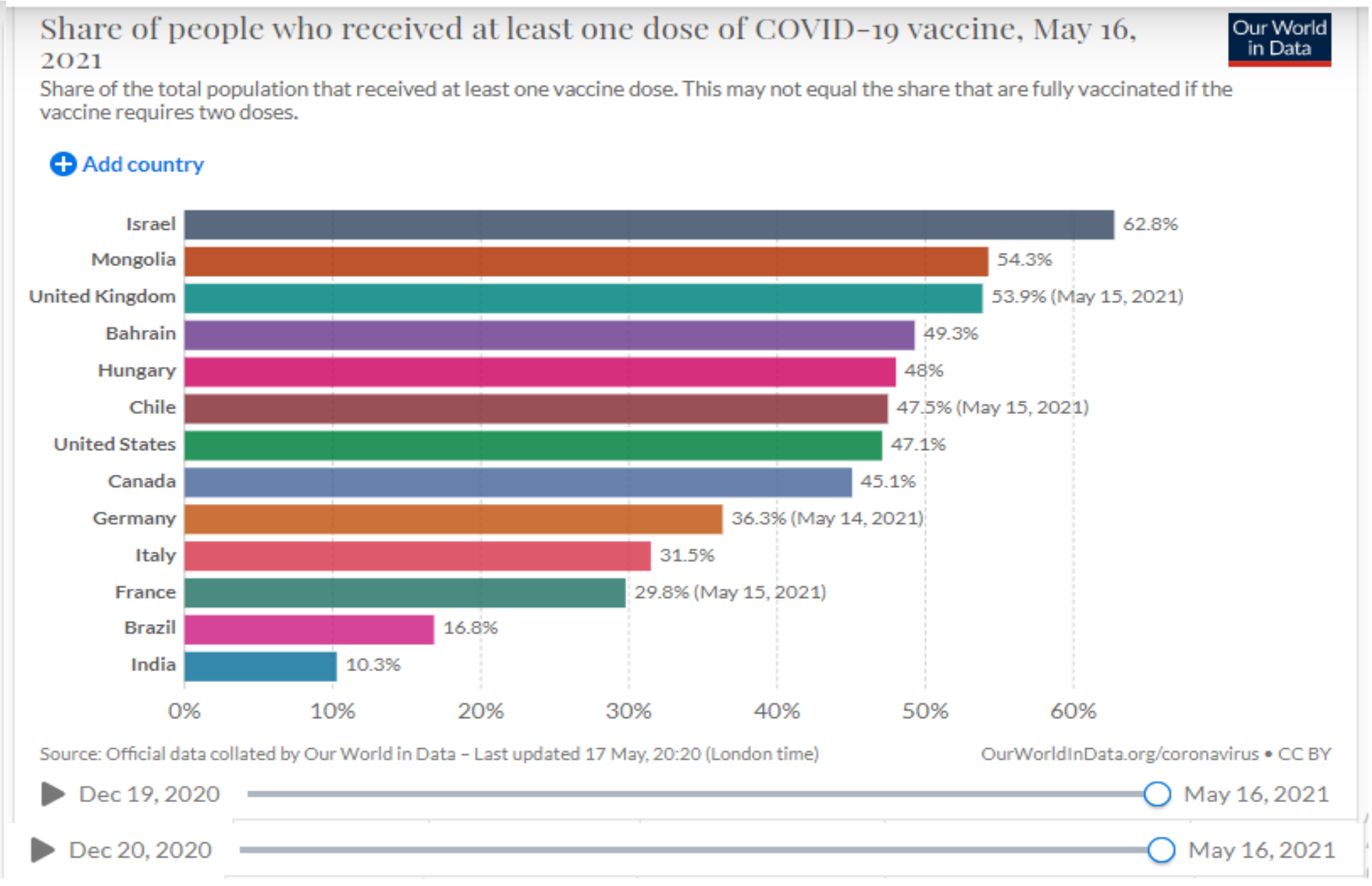
Add country



Source: Official data collated by Our World in Data – Last updated 17 May, 20:20 (London time)

OurWorldInData.org/coronavirus • CC BY

Dec 27, 2020 — May 16, 2021


Share of people who received at least one dose of COVID-19 vaccine, May 16, 2021
Our World in Data
Share of the total population that received at least one vaccine dose. This may not equal the share that are fully vaccinated if the vaccine requires two doses.
Add country
Israel 62.8%
Mongolia 54.3%
United Kingdom 53.9% (May 15, 2021)
Bahrain 49.3%
Hungary 48%
Chile 47.5% (May 15, 2021)
United States 47.1%
Canada 45.1%
Germany 36.3% (May 14, 2021)
Italy 31.5%
France 29.8% (May 15, 2021)
Brazil 16.8%
India 10.3%
0% 10% 20% 30% 40% 50% 60%
Source: Official data collated by Our World in Data – Last updated 17 May, 20:20 (London time)
OurWorldInData.org/coronavirus • CC BY
Dec 19, 2020
May 16, 2021
Dec 20, 2020
May 16, 2021


جمهوری اسلامی ایران
وزارت بهداشت، درمان و آموزش پزشکی
بکزین سلامت
پویش#زه سلامت
سه شنبه
۲۸ اردیبهشت ۱۴۰۰
۶ شوال ۱۴۴۲/ ۱۸ می ۲۰۲۱
تست های آزمایشگاهی انجام شده
۱۸۲۸۵۳۹۳
بیماران شناسایی شده جدید
۱۳۹۳۰
موارد بستری جدید
۲۱۰۲
بیماران بستری در بخش مراقبت های ویژه
۵۱۷۳
موارد جدید فوت شده
۳۱۰
مجموع جان باختگان
۷۷۵۳۲
واکسن تزریق شده دُز اول
۲۱۶۳۶۴۱
STEP 1
واکسن تزریق شده دُز دوم
۴۰۷۵۱۹
STEP 2
مجموع واکسن تزریق شده
۲۵۷۱۱۶۰

واکسن‌های ایرانی کرونا به کجا رسیدند؟

	پیشا بالینی	فاز یک	فاز دو	فاز سه	استفاده محدود	تأیید شده
	آزمایش حیوانی	آزمایش انسانی محدود	آزمایش انسانی چندصد نفری	آزمایش انسانی چند هزار نفری	اجازه استفاده محدود یا زودهنگام	تأیید برای استفاده کامل
واکسن پاستور با همکاری کوبا	✓	✓	✓	✓	✓	✓
واکسن کوو ایران برکت	✓	✓	✓	✓	✓	✓
واکسن کوو پارس رازی	✓	✓	✓	✓	✓	✓
واکسن وزارت دفاع میلاد نور	✓	✓	✓	✓	✓	✓
واکسن سیناژن	✓	✓	✓	✓	✓	✓

منبع : ستاد ملی مقابله با کرونا، ۱۴۰۰/۰۱/۲۸

Thank you for your attention