COVID-19 Vaccines

Basic Knowledge Series

Vaccination

Vaccination is a simple, safe, and effective way of preventing disease.

Vaccines train the body's immune system to produce antibodies, providing protection against pathogen.

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How does vaccine work in general

Vaccination allows the body's immune system to recognize the targeted pathogen (such as virus or bacteria), produce antibodies and develop immunological memory. In future, if the body is exposed to the same pathogen, our immune system will respond quickly to destroy it, preventing the disease.

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Vaccine components

All vaccine components play an important role to ensure that the vaccine is safe and effective.

The vaccine itself (including all its components) has been fully inspected and monitored to ensure its safety.

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Vaccine development

Vaccine development includes pre-clinical testing on animals and three stages of human clinical trials to ensure the vaccine is safe and effective.

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Legal framework for use of COVID-19 vaccines

Prevention and Control of Disease (Use of Vaccines) Regulation (Cap. 599K)

Bring in COVID-19 vaccines for emergency use

Satisfy the criteria of safety, efficacy and quality

Allowing members of the public to be administered with safe and effective COVID-19 vaccines and resume normal ways of life!

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Vaccine authorization

Safety

Efficacy

Quality

+

Approved by regulatory authority outside Hong Kong

or

In WHO's Emergency Use Listing/list of prequalified vaccines

Revocation of authorization

Risks of authorized vaccine outweigh its benefits

or **Condition attached to the authorization not complied with**

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Safety monitoring of COVID-19 vaccines

- Pharmacovigilance system to receive reports of adverse events following immunization of COVID-19 vaccines from healthcare professionals and the pharmaceutical industry
- Causality assessment
- Partnered with the University of Hong Kong to conduct active surveillance
- Keep in view the safety and efficacy assessment of the vaccines promulgated by the drug regulatory authorities of various countries and regions and the World Health Organization

Follow up actions include issuing safety alerts on the concerned vaccine to healthcare professionals, updating product label and product information, instructing the vaccine supplier to conduct recall, considering recommendation to revoke the authorization of the concerned vaccine.

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COVID-19: Vaccine and Testing

It is very unlikely that COVID-19 vaccination will affect the results of viral tests (nucleic acid or antigen tests).

Laboratory testing (virus and antibody testing) is not routinely required before or after COVID-19 vaccination.

If you experience COVID-19 symptoms, consult a doctor and get tested as advised.

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How to interpret vaccine efficacy (1)

Vaccine efficacy is estimated from clinical trials. In general, the higher the vaccine efficacy, the better the protection it offers.

However, vaccine efficacy differs if the clinical trial is conducted at different times, in different places or with different participants, using non-identical study protocols or disease definitions. Vaccine efficacy for various disease endpoints (e.g. death, severe symptoms, mild symptoms) will also vary.

As such, vaccine efficacy of different vaccines cannot be compared directly.

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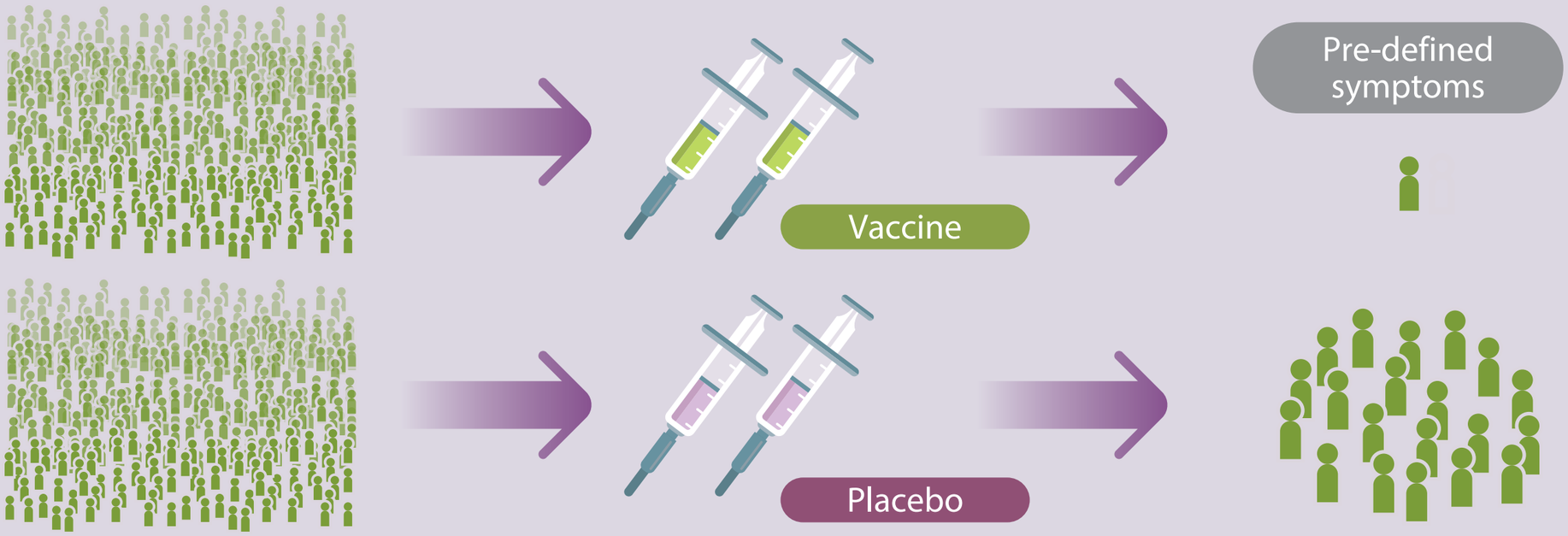
Calculation of vaccine efficacy:

$$\text{Vaccine efficacy} = \frac{\text{Attack rate in placebo group} - \text{Attack rate in vaccine group}}{\text{Attack rate in placebo group}}$$



- If the infection status of the two groups are the same, the vaccine efficacy is zero.
- If in vaccine group, 1 out of 100 persons has the condition under study (e.g. develop certain pre-defined symptoms) while 10 out of 100 persons in the placebo group have the same condition, the vaccine efficacy for this specified condition is 90%.
- If in vaccine group, 5 out of 100 persons have the condition while 10 out of 100 persons in the placebo group have the same condition, the vaccine efficacy for this specified condition is 50%.

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COVID-19 Vaccines Basic Knowledge Series

Example 1

Vaccine Efficacy of BioNTech vaccine Comirnaty*

Participants of the Phase 3 clinical trial are those from 16 years of age who had no evidence of past COVID-19 infection.

8 cases out of 18 198 in the vaccine group got COVID-19 symptoms while 162 cases out of 18 325 in placebo group got the symptoms. Vaccine efficacy was thus estimated to be 95%.

Vaccine Efficacy:

$$95\% = \frac{162/18325 - 8/18198}{162/18325}$$

*Source of information: Advisory Panel on COVID-19 Vaccines report (Jan 2021)

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Example 2

Vaccine Efficacy of Sinovac vaccine CoronaVac*

In a Phase 3 clinical trial conducted in Brazil (2 doses 14 days apart), about 12000 healthcare professionals participated.

The study estimated vaccine efficacy for prevention of different disease endpoints:

Hospitalization, severe illness and death:	Symptoms requiring medical attention:	Mild symptoms without need for medical attention:
100%	**84%**	**51%**

*Source of information: Advisory Panel on COVID-19 Vaccines report (Feb 2021)

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How to interpret vaccine efficacy (2)

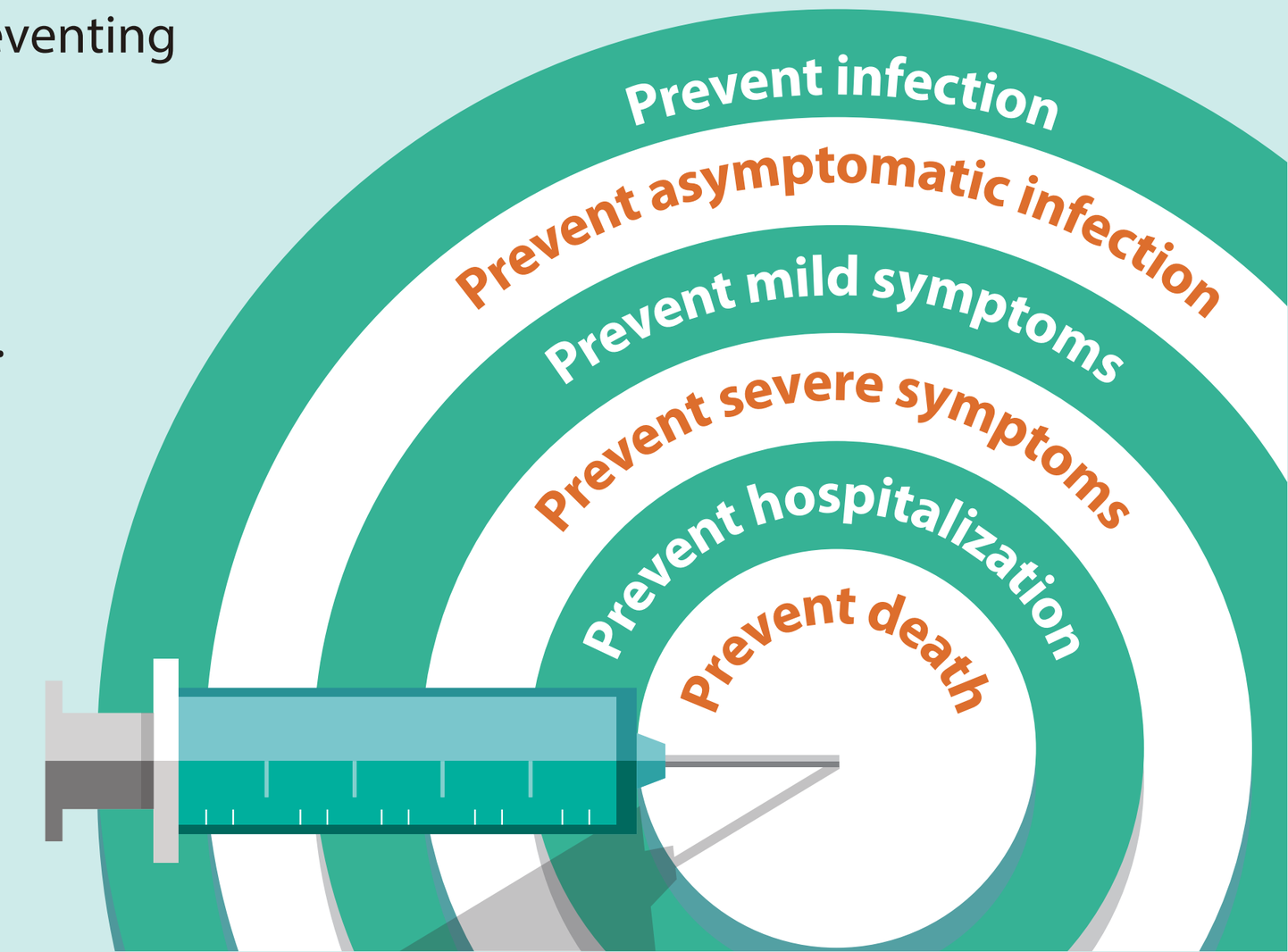
From the perspective of protection of personal health, one of the main purposes of vaccination is to prevent severe illness and death.

The two types of COVID-19 vaccines provided by the Government currently

(Sinovac vaccine CoronaVac and BioNTech vaccine Comirnaty)

are both **very effective** in preventing

severe illness and **death**
caused by the SARS-CoV-2 virus,
with vaccine efficacy or
vaccine effectiveness above 90%.



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Advice for COVID-19 Vaccine Recipients

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Before vaccination

- Understand the vaccines
- Understand own health conditions
- Consult family doctors or healthcare professionals if in doubt
- Postpone vaccination if having acute illness or fever

Please visit the thematic website to obtain more information and book vaccination:

www.covidvaccine.gov.hk

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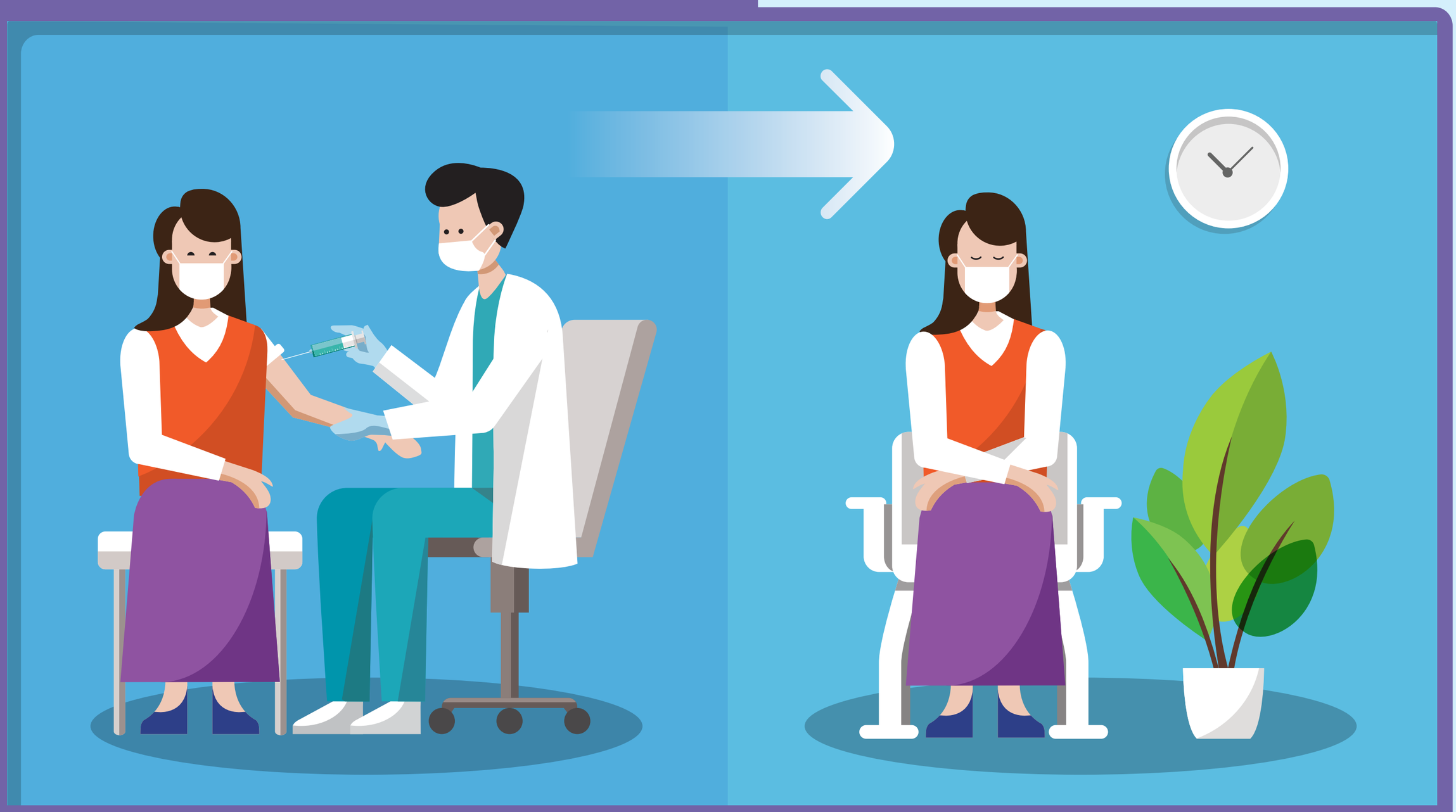
On the day of vaccination



- Wear loose-fitting clothes to facilitate vaccination
- Relax yourself
- Stay in resting area after vaccination
- Inform on-site healthcare professionals immediately if encountering acute allergic reactions (such as difficulty in breathing, swelling of the face and mouth, skin rash)

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After vaccination

- Continue to observe other preventive measures (such as wearing masks, good hand hygiene and maintaining social distance)
- Receive second shot according to schedule
- Seek advice from your doctor if necessary (e.g. the pain or redness at the injection site increases after 24 hours from injection; or your side effects do not seem to be going away in a few days; or your side effects or symptoms are worrying you)

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Different mechanisms of inactivated vaccine and mRNA vaccine

Different COVID-19 vaccines provide antigens via different mechanisms for our body to recognise the virus and build up immunity against it.

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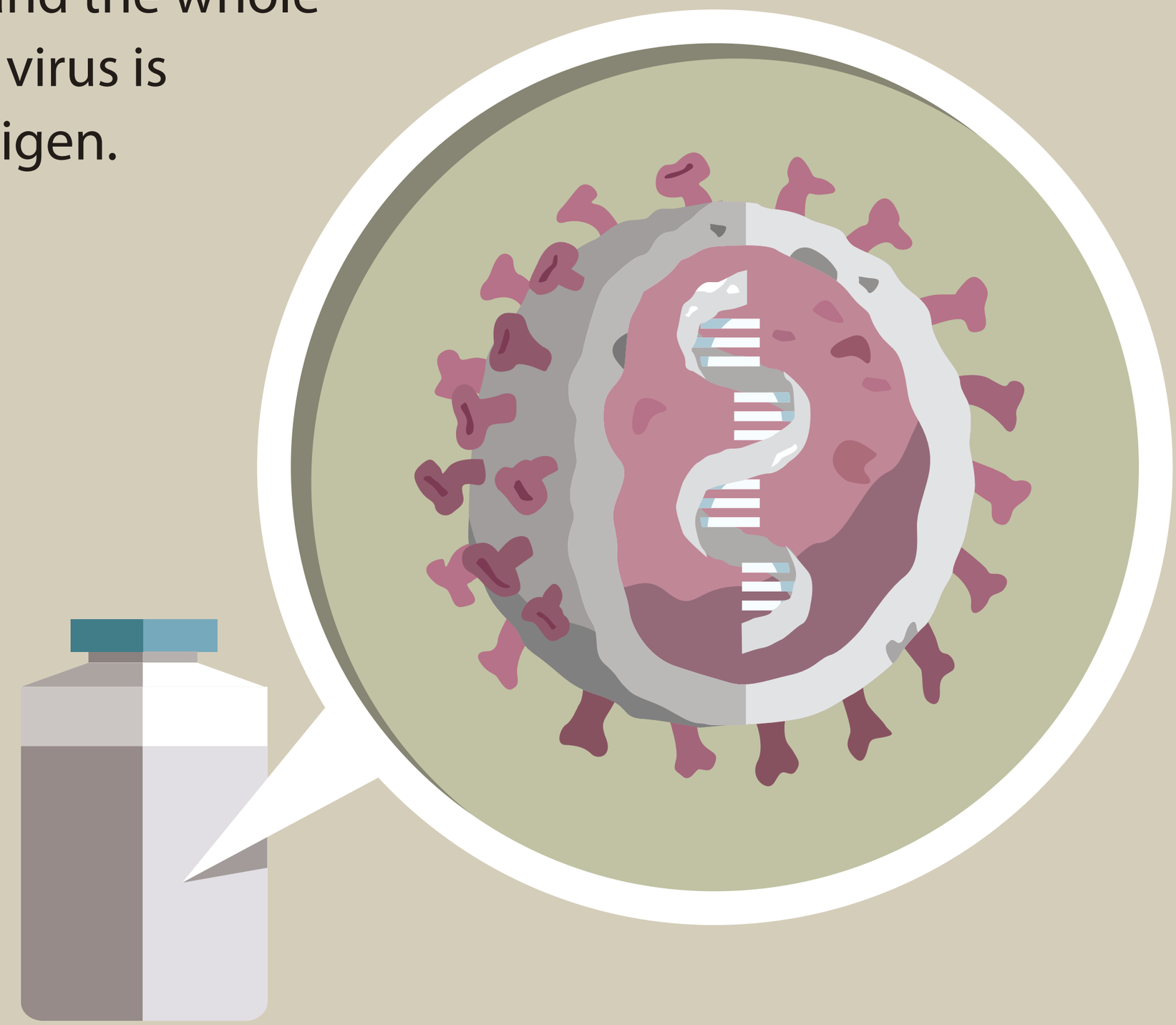
Sinovac vaccine CoronaVac :

Inactivated virus vaccine

The virus is killed and the whole inactivated (dead) virus is injected as the antigen.



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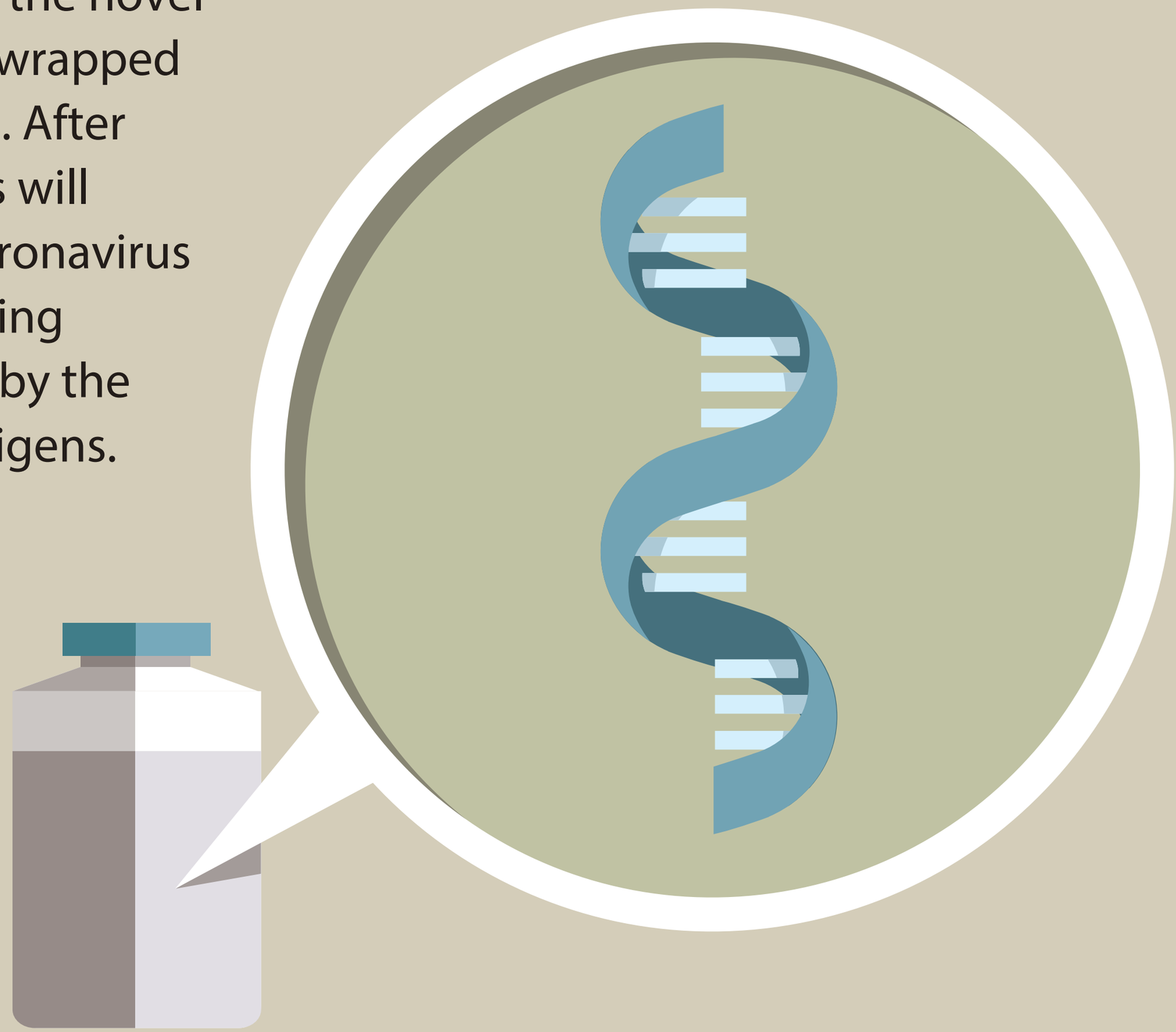
Different mechanisms of inactivated vaccine, mRNA vaccine and viral vector vaccine

BioNTech vaccine Comirnaty :

mRNA vaccine

A specific segment of the novel coronavirus mRNA is wrapped by lipid nanoparticles. After injection, human cells will produce the novel coronavirus spike proteins according to the coding carried by the mRNA to serve as antigens.



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