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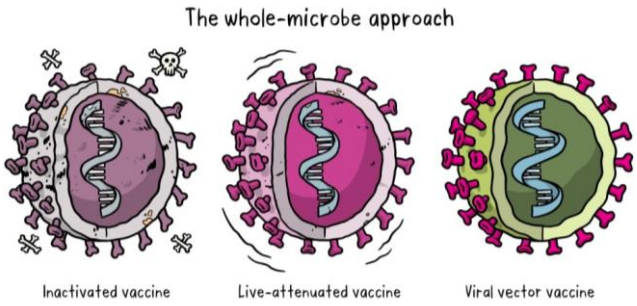
This Bulletin is a free quarterly periodical issued by the Drug Information Center (DIC) located at Faculty of Pharmacy, Assiut University

Vaccines

In this issue, we are going to talk about vaccines including COVID-19 vaccines that are currently available. First, we need to understand how different types of vaccines are made. There are three main approaches to desig a vaccine. Their differences lie in whether they use a whole virus or bacterium.



1- The whole-microbe approach

- Inactivated vaccine

The first way to make a vaccine is to take the disease-carrying virus or bacterium, or one very similar to it, and inactivate or kill it using chemicals, heat or radiation (e.g., flu and polio vaccines). This approach uses technology that's been proven to work in people and vaccines can be manufactured on a reasonable scale .
However, it requires special laboratory facilities to grow the virus or bacterium safely, can have a relatively long production time, and will likely require two or three doses to be administered.

-Live-attenuated vaccine

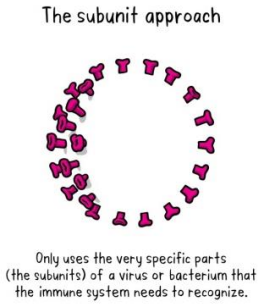
A live-attenuated vaccine uses a living but weakened version of the virus or one that's very similar. The measles, mumps and rubella (MMR) vaccines and the chickenpox and shingles vaccines are examples of this type of vaccine. This approach uses similar technology to the inactivated vaccine and can be manufactured at a large scale. However, vaccines like this may not be suitable for people with compromised immune systems.

-Viral vector vaccine

This type of vaccine uses a safe virus to deliver specific sub-parts – called proteins – of the germ of interest so that it can trigger an immune response without causing disease. To do this, the instructions for making particular parts of the pathogen of interest are inserted into a safe virus. The safe virus then serves as a platform or vector to deliver the protein into the body. The protein triggers the immune response. The Ebola vaccine is a viral vector vaccine and this type can be developed rapidly.

2- The subunit approach

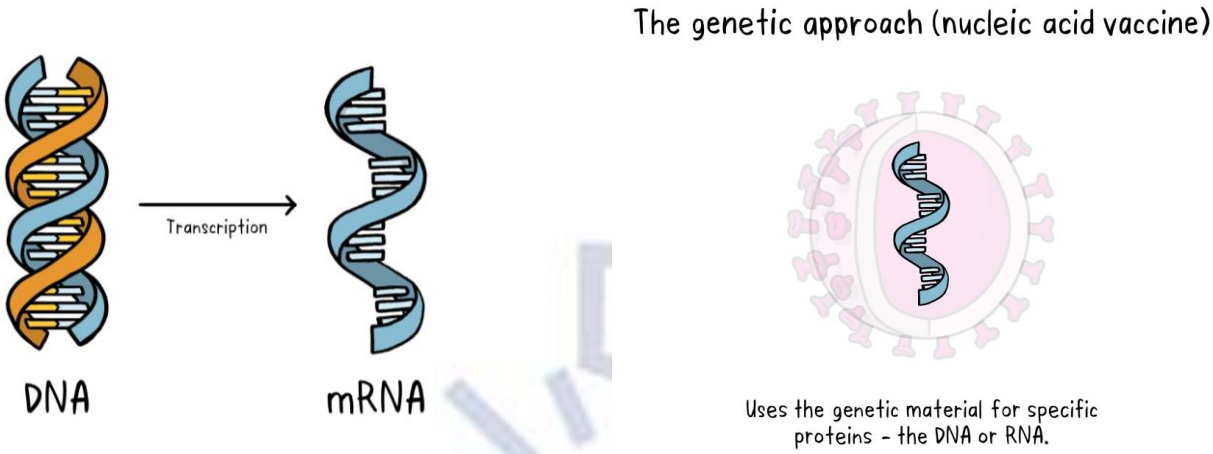
A subunit vaccine only uses the very specific parts (the subunits) of a virus or bacterium that the immune system needs to recognize. It doesn't contain the whole microbe or use a safe virus as a vector. The subunits may be proteins or sugars. Most of the vaccines on the childhood schedule are subunit vaccines, protecting people from diseases such as whooping cough, tetanus, diphtheria and meningococcal meningitis.



3- The genetic approach (nucleic acid vaccine)

Unlike vaccine approaches that use either a weakened or dead whole microbe or parts of one, a nucleic acid vaccine just uses a section of genetic material that provides the instructions for specific proteins, not the whole microbe. DNA and RNA are the instructions our cells use to make proteins. In our cells, DNA is first turned into messenger RNA, which is then used as the blueprint to make specific proteins.

A nucleic acid vaccine delivers a specific set of instructions to our cells, either as DNA or mRNA, for them to make the specific protein that we want our immune system to recognize and respond to.
The nucleic acid approach is a new way of developing vaccines. Before the COVID-19 pandemic, none had yet been through the full approvals process for use in humans, though some DNA vaccines, including for particular cancers, were undergoing human trials. Because of the pandemic, research in this area has progressed very fast and some mRNA vaccines for COVID-19 are getting emergency use authorization, which means they can now be given to people beyond using them only in clinical trials (e.g., Pfizer/BioNTech Comirnaty vaccine).



Sources:*https://www.who.int/news-room/feature-stories/detail/the-race-for-a-covid-19-vaccine-explained*
https://www.who.int/news-room/questions-and-answers/item/coronavirus-disease-(covid-19)-vaccines؟
Garbuglia AR, Minosse C, Del Porto P. mRNA-and Adenovirus-Based Vaccines against SARS-CoV-2 in HIV-Positive People. Viruses. 2022 Apr 1;14(4):748.

Common Q & A

1- What vaccines are there against COVID-19?

There are several COVID-19 vaccines validated for use by WHO (given Emergency Use Listing,EUL).
The WHO Emergency Use Listing process determines whether a product can be recommended for use based on all the available data on safety and efficacy and on its suitability in low- and middle-income countries. Vaccines are assessed to ensure they meet acceptable standards of quality, safety and efficacy using clinical trial data, manufacturing and quality control processes. The assessment weighs the threat posed by the emergency as well as the benefit that would accrue from the use of the product against any potential risks.
As of 12 January 2022, the following vaccines have obtained EUL:

- The Pfizer/BioNTech Comirnaty vaccine, 31 December 2020.
- The SII/COVISHIELD and AstraZeneca/AZD1222 vaccines, 16 February 2021.
- The Janssen/Ad26.COV 2.S vaccine developed by J&J, 12 March 2021.
- The Moderna COVID-19 vaccine (mRNA 1273), 30 April 2021.
- The Sinopharm COVID-19 vaccine, 7 May 2021.
- The Sinovac-CoronaVac vaccine, 1 June 2021.

- The Bharat Biotech BBV152 COVAXIN vaccine, 3 November 2021 .
- The Covovax (NVX-CoV2373) vaccine, 17 December 2021.
- The Nuvaxovid (NVX-CoV2373) vaccine, 20 December 2021

2- What are the benefits of getting vaccinated?

Getting vaccinated could save your life. COVID-19 vaccines provide strong protection against serious illness, hospitalization and death. There is also some evidence that being vaccinated will make it less likely that you will pass the virus on to others, which means your decision to get the vaccine also protects those around you.

3- Can I experience Covid-19 symptoms after being vaccinated?

Even after getting vaccinated, keep taking precautions to protect yourself, family, friends and anyone else you may come into contact with. COVID-19 vaccines are highly effective, but some people will still get ill from COVID-19 after vaccination.

4- Can I infect others if I am fully vaccinated?

There is also still a chance that you could also pass the virus on to others who are not vaccinated. Stay at least 1 meter away from other people, wear a properly fitted mask over your nose and mouth when you can't keep this distance, avoid poorly ventilated places and settings, clean your hands frequently, stay home if unwell and get tested, and stay informed about how much virus is circulating in the areas where you travel, live and work.

5- Which COVID-19 vaccine should I get?

All vaccines with WHO Emergency Use Listing are highly effective at preventing serious illness, hospitalization and death due to COVID-19. You should accept the vaccine you are offered first and get vaccinated as soon as it is your turn to reduce your risk.

Do not delay getting vaccinated, unless advised to by your health care provider, as this could put you at risk of COVID-19. Getting vaccinated could save your life.

THE BEST COVID-19 VACCINE IS THE ONE AVAILABLE TO YOU SOONEST

6- Who should not be vaccinated against COVID-19?

There are very few conditions that would exclude someone from being vaccinated, but you should **NOT** be vaccinated if:

• You have a history of severe allergic reactions/anaphylaxis to any of the ingredients of the COVID-19 vaccine, in order to avoid possible adverse effects.

• You have a fever over 38.5ºC on the day of your vaccine appointment. Postpone until you have recovered.

• You currently have confirmed or suspected COVID-19. Wait until you have completed the mandated isolation period and your acute symptoms have passed to get vaccinated.

COVID-19 vaccines are safe for people taking blood thinners, but you should let the person giving you the vaccine know about any medication you are taking BEFORE you are given the vaccine.

In addition to the general recommendations above, each vaccine may have specific considerations for specific populations and health conditions. Talk to your doctor for advice about your specific situation.

7- Can I get vaccinated against COVID-19 if I am pregnant؟

Yes, you can get vaccinated if you are pregnant. During pregnancy, you are at higher risk of serious illness caused by COVID-19. You are also at higher risk of delivering your baby

prematurely if you contract COVID-19 .
While there is less data available on vaccination of pregnant people, evidence on the safety of COVID-19 vaccines during pregnancy has been growing, and no safety concerns have been identified. Especially in countries with high transmission, or if you have an occupation where you are at more risk of being exposed to COVID-19, the benefits of getting the vaccine outweigh potential risks. There is no risk of getting COVID-19 from the vaccine. Talk to your healthcare provider to make an informed decision about vaccination.

8- Should I get vaccinated against COVID-19 if I am breastfeeding؟
If you are breastfeeding, you should get vaccinated against COVID-19 as soon as it is your turn. None of the current COVID-19 vaccines have live virus in them. This means there is no risk of you transmitting COVID-19 to your baby through your breast milk from the vaccine. In fact, the antibodies you get after vaccination may go through your breast milk and help to protect your baby .

9- Can children and adolescents get vaccinated against COVID-19؟
The Pfizer vaccine can be safely administered to children from 5 years of age. Both Moderna and Pfizer vaccines are licensed for use in children from 12 years of age .
WHO recommends that children aged 5 and above with comorbidities that put them at significant risk of severe COVID-19 should be offered vaccination, at a reduced dosage, alongside other high-risk groups.
Most children are at low risk of serious disease and vaccinating them would be primarily about reducing transmission. There is emerging evidence that vaccines may be less effective at reducing transmission of Omicron. This means that the most impactful thing that can be done to protect children while vaccines are still being prioritised for those most at risk is to continue to practice the protective behaviours.

10- Is it safe for me to take antibiotics after the vaccine؟
There is no known influence or interaction between antibiotics and COVID-19 vaccines. If you are prescribed antibiotics by a health professional before or after your vaccination, you should go ahead and take the full course. However, if you have a temperature over 38.5 ºC at the time of your vaccination appointment, you should reschedule for when you feel better.

Sources: *https://www.who.int/news-room/feature-stories/detail/the-race-for-a-covid-19-vaccine-explained*
https://www.who.int/news-room/questions-and-answers/item/coronavirus-disease-(covid-19)-vaccines؟
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Hay fever

Hay fever, or allergic rhinitis, is primarily characterised by a runny nose (rhinorrhoea); nasal congestion; sneezing ؛ itching of any of the nose, eyes, ears or throat; and watery, red, irritated eyes. Symptoms are typically triggered by environmental allergens such as pollen and are worse at times of high pollen count.

Symptoms:
Allergic rhinitis was previously classified as either seasonal or perennial. It is now defined as either intermittent (‘hay fever’) or persistent allergic rhinitis and is classified according to the

timing and duration of symptoms. Typically, it is classified as 'hay fever' when symptoms occur on less than four days a week and for less than four weeks at a time.
Symptoms can be further classified as either mild or moderate to severe, depending on the presence or absence of sleep disturbance, impairment in the performance of daily activities, leisure activities, sport, school or work, and troublesome symptoms. The condition is considered mild when these features are not present and moderate to severe when one or more of the features are present.

Medical and lifestyle history:

The presence of one or more of the following risk factors will make a diagnosis of hay fever more likely:

- A history of atopy (allergic disorders such as eczema ، asthma or food allergies) in one or both parents increases the risk of developing allergic rhinitis. Family history is the primary risk factor. If both parents have allergic rhinitis, there is a 75% chance of their offspring developing it. If only one parent has it, the risk decreases to 50%.

Exposure to the following allergens or pollutants can trigger hay fever symptoms:

- Environmental allergens—mould spores, pollens ،house dust mites, cockroaches, cigarette smoke and animal dander.
- Occupational allergens—wool and textile dust ، rubber latex, organic dusts (seed, wood dust) and various chemicals.
- pollutants—ozone and diesel exhaust particles.

Treatment options:

Allergen avoidance is an important aspect of preventing or controlling the symptoms of hay fever. Avoidance strategies will vary according to the allergen .
Treatment is individualised and symptom-specific as shown in table 1. Product selection depends on the severity and frequency of the symptoms, the aim being to reduce symptoms and improve the person's functional status.
In intermittent or mild-to-moderate allergic rhinitis, the different drug classes can be used in sequence or in combination from the start.

Treatment options include the following classes of medicines:

- **Antihistamines:** they provide rapid relief of symptoms such as sneezing and rhinorrhoea but can often fail to relieve nasal congestion. There is little difference in efficacy between antihistamines. If sedation is desirable, a sedating antihistamine can be used in the absence of any contraindications (e.g., closed-angle glaucoma, increased intra-ocular pressure ، pyloroduodenal obstruction, bladder neck obstruction or hyperthyroidism).

Some people report that antihistamines are less effective after prolonged use. Tolerance has not, however, been clinically demonstrated, and the decline in effectiveness is likely to be a result of factors such as increased allergen exposure, exacerbation of the condition, and the limited effectiveness of antihistamines in severe disease. It is reasonable to suggest switching to a different class of antihistamine, since there is some inter-patient variability in response.Topical antihistamine nasal sprays are an alternative to systemic antihistamines for adults and for children aged more than six years.

- **Intranasal corticosteroids** (INCS) offer both symptom relief and prevention and are the treatment of choice for moderate-to-severe symptoms. They are considered more effective than oral antihistamines for the treatment of allergic rhinitis. They are particularly effective for congestive symptoms, and can also alleviate ocular symptoms.

- Nasal decongestants: They can be used if intranasal corticosteroids and antihistamines have failed to relieve nasal congestion .

Oral decongestants can provide rapid relief, but care is needed in the presence of other co-morbidities ،particularly cardiovascular disease .
Topical decongestants **should not be** used for more than five days: prolonged use causes rebound congestion.

Other treatments
A number of other products are also used in the management of allergic rhinitis:
- Intranasal saline: this is used as a nasal wetting agent or for irrigation. It can relieve mucosal irritation and dryness, decreasing nasal stuffiness ،rhinorrhoea and sneezing, and can also help to counteract drying from INCS use.
- Antihistamine eye drops. These can be used if allergic conjunctivitis persists despite the use of INCS or oral antihistamines. Artificial tears can alleviate mild symptoms.
- Ipratropium bromide. A nasal spray formulation ،can be added to existing therapy in cases of intractable rhinorrhoea.
- Leukotriene receptor antagonist. This prescription-only medicine is used in children with asthma as well as allergic rhinitis. It is selected ahead of INCS to treat both disorders and is more convenient given the difficulty in administering INCS in children. For seasonal (intermittent) allergic rhinitis, is considered equivalent to oral antihistamines but inferior to INCS.

Pregnancy: Pregnant women are treated using the step-by-step approach used for non-pregnant women, although some drugs should be avoided during the first trimester.
Children: Less sedating oral antihistamines are safe for children whose symptoms are mild or who require only intermittent treatment. The more sedating antihistamines should be avoided. Intranasal corticosteroids can be used in children needing long-term therapy. Nasal stinging, dryness and irritation as well as nose bleeding have been reported. They can also cause a sore throat, dry mouth and cough.

Prevention
Suggest avoidance strategies to minimise exposure to allergens. For example:
- Stay inside during the morning hours, when pollen counts are highest .
- Avoid outdoor activities when trees, flowers or moulds that trigger the allergy are present.
- After outdoor exposure take a shower to remove pollen that is adhering to the hair and skin.
- Keep house and car windows closed to exclude pollen .
- Prevent mould and mildew growth by using an air conditioner to reduce indoor humidity during the warmer months. Clean air conditioner filters regularly .
- Use vacuum cleaners and air conditioners with HEPA (high-efficiency particulate air) filters to trap allergens .
- Cover pillows and mattresses with impermeable covers to reduce exposure to house dust mites .
- Wash bedding weekly in hot water
- Limit the presence of dust-collecting furnishings such as curtains, bed skirts, carpeting and stuffed animals, especially in the bedroom .
- Vacuum frequently.
- Exposure to smoke, fumes and strong perfumes ،rapid changes in temperature, and outdoor pollution can be non-specific triggers in patients with allergic rhinitis and should, if possible, be avoided if they seem to aggravate symptoms.

Source: *Australian Pharmaceutical Formulary and Handbook 22, p 517-520*

Table 1: Treatment strategies of hay fever

Frequency of symptoms			
Intermittent		Persistent	
↓		↓	
Severity of symptoms			
↓		↓	
Mild	Moderate to severe	Mild	Moderate to severe
Oral or intranasal antihistamine and/or a decongestant (5 days or less for topical decongestants)	Intranasal corticosteroid and/or oral or intranasal antihistamine	Intranasal corticosteroid and/or oral or intranasal antihistamine	Intranasal corticosteroid plus oral or intranasal antihistamine • If rhinorrhea present, add ipratropium. • If congestion, add decongestant (5 days or less for topical decongestants)
		Review after 2–4 weeks' therapy	
		↓	↓
		• Improvement: continue for 1 month • No improvement: change to treatment for moderate-to-severe symptoms	• Improvement: change to treatment for mild symptoms and continue for 1 month • No improvement: refer for investigation or to review diagnosis

Test Your Knowledge

1- **An advantage of live virus vaccines over killed viral vaccines is**
(a) better stability (b) ease of titration
(c) longer immunity (d) faster action
2- **Active infection gives little or no immunity to**
(a) mumps (b) smallpox
(c) measles (d) gonorrhea
3- **Which of the following is considered a type IV or delayed hypersensitivity reaction?**
(a) eczema (b) food allergy
(c) drug hypersensitivity (d) Tuberculin skin reaction test
4- **Lyme disease is transmitted to humans via**
(a) cats (b) deer ticks
(c) spiders (d) guinea pigs

OTC Medicines Corner

Managing common side effects of COVID-19 vaccines

If you experience pain at the injection site, fever, headaches or body aches in the first 1 to 2 days after vaccination, you can take paracetamol to help reduce any of these symptoms. You don't need to take paracetamol or ibuprofen before vaccination. If there's swelling at the injection site, you can use a cold compress.

Source: **https://www.healthdirect.gov.au/covid-19/after-the-vaccination**

Answers:

1. (c) 2. (d) 3. (d) 4. (b)