
**ISSUES RELATED TO VACCINE OF THE COVID-19 ASTRA ZENECA USED IN VIETNAM:
MINI-REVIEW**

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ABSTRACT

In the war against the COVID-19 pandemic, the vaccine is an important goal to prevent the pandemic. From classic technology to the next-generation technology in vaccine production that brought back the results of the clinical trials were all good and hopefully. Unfortunately, new mutant variants of SARS-CoV-2 start to appear and spread across the world. Obstructing each country's epidemic prevention and control. A safe and effective vaccine against new strains of SARS-CoV-2 is of interest to researchers. In this study, the review COVID-19 vaccine Astra Zeneca is being used in Vietnam by viral vectors technology. The development of new vaccinations employing advance-technology is critical to overcoming the challenges of combating the COVID-19 pandemic around the world.

Keywords: Astra Zeneca, Vaccine, SARS-Cov-2, COVID-19, Vietnam.

I. INTRODUCTION

At the end of 2019, a novel coronavirus designated as 2019-nCoV emerged from the Huanan Seafood Market in Wuhan City of Hubei Province, China, and began spreading rapidly afterward. The clinical characteristics of patients include respiratory symptoms, fever, cough, dyspnea, and pneumonia [1], [2]. On 11 March 2020, the World Health Organization (WHO - <https://www.who.int/>) officially announced an acute respiratory infection (COVID-19) caused by a new strain of the coronavirus (SARS-CoV-2) caused as a "global pandemic", in the context of the disease has spread to over 220 countries and territories and confirmed more than 6 million deaths.

At present, with increasing morbidity and mortality, no specific antiviral drugs have been developed and approved to treat infections with human coronaviruses. Scientists are trying to find drugs to treat and prevent this disease. Several recent randomized trials have found some positive clinical effects and reduced mortality in the treatment with Chloroquine, Hydroxychloroquine [3], Remdesivir [4], Favipiravir [5], [6], Lopinavir, and Ritonavir [7].

Since the first case of COVID-19 was announced. Vietnam had detected seven virus variants: D614G (resulting in an outbreak in Da Nang city); B.1.1.7 (Alpha - resulting in an outbreak in Hai Duong province) - known as the UK variant; B.1.351 (Beta - patient 1422 South African citizen, entering Vietnam through Noi Bai airport); A.23.1 (recorded at Tan Son Nhat airport); B.1.617.2 (Delta - resulting in outbreaks in many provinces and cities); B.1.222 (found in a specimen of patient 2701, a Ukrainian expert); B.1.619 (found in a specimen of patient 2902, an Indian expert).

A new coronavirus variant, which is a hybrid between the (B.1.6172) and the UK variant (B.1.1.7), was confirmed by the Ministry of Health Nguyen Thanh Long at an online national conference on May 29th, 2021. This variant is not a new hybrid but part of the existing Indian strain. Viruses often develop small genetic

changes as they reproduce, and new variants of the coronavirus have been seen almost since it was first detected in December 2019. At this moment, there is no new hybrid variant in Vietnam.

A total of 86 vaccines [8] are under development in clinical phase trials. Protein subunits, inactivated viruses, DNA-based vaccines, RNA-based vaccines, viral vectors, and live-attenuated viruses are some of the techniques used to create them (see Table 1) [9], [10]. However, only a few COVID-19 vaccines, including those made by Oxford-AstraZeneca, Pfizer/BioNTech, and Moderna have made it through the stringent censoring process used by many state agencies across the world. Other vaccinations are still being tested.

Table 1: COVID-19 vaccines and technologies are developed and/or manufactured.

| No. | Vaccine Platform | Type of vaccine | Developer | Country | Ref. |
|----------------------------|-------------------------|--------------------------|---|---------------------|------------|
| Classical technology | | | | | |
| 1 | Inactivated virus | Sinopharm | Sinopharm/China National Pharmaceutical Group | China | [11] |
| 2 | Live-attenuated viruses | COVI-VAC | Codagenix/Serum Institute of India | India | [12] |
| 3 | Protein subunit | NVX-CoV2373 | Novavax/ Serum Institute Of India | India | [12], [13] |
| 4 | Virus-like particle | RBD SARS-CoV-2 HBsAg VLP | Serum Institute of India + Accelagen Pty + SpyBiotech | Australia | [8] |
| Next-generation technology | | | | | |
| 5 | Viral vector | AZD1222 | University Of Oxford, And Astrazeneca | UK | [13], [14] |
| 6 | | Sputnik V | Gamaleya Research Institute | Russia | [15] |
| 7 | DNA | INO-4800-phase 1 | Inovio Pharmaceuticals Inc., | USA | [16], [17] |
| 8 | Messenge RNA (mRNA) | mRNA1273 | Moderna/Niaid/Lonza/Catalent/Rovi/Medidata/Bioqual | USA | [13], [18] |
| 9 | | BNT162 | Biontech/Pfizer/Fosun Pharma/Rentschler Biopharma | Germany, China, USA | |
| 10 | Antigen-presenting cell | Developing | | | |

This study reviews the Astra Zeneca COVID-19 vaccine of a total of five that have been conditionally approved by Vietnam for the COVID-19 disease prevention emergency, with the goal of achieving community immunity during the fourth outbreak. After the first epidemic in March-April 2020, the Indian strain is spreading throughout the Southern provinces and cities.

Astra Zeneca COVID-19 vaccine

Mechanism of action

The Astra Zeneca COVID-19 vaccine (previously known as ChadOx1 nCoV-19 or AZD1222) vaccine was developed at Oxford University and contains the full-length of the SARS-CoV-2 structural surface glycoprotein antigen (spike protein nCoV-19) gene in a replication-deficient chimpanzee adenovirus vector ChadOx1 (Adenovirus has been modified to be non-pathogenic which means it cannot multiply) [15]. After entering the body, the vaccine will carry the genetic code of the coronavirus (spike protein). Cell spike (S) protein of SARS-

CoV-2 increases on the surface of the cell. Immediately the body activates the immune system response. The immune system recognized spike protein as an “intruder”. The body begins to make antibodies and immune cells, called T cells receptors. T cell is antibodies against cells that have (S) protein of the virus. The immune cells produce more immune cells to help fight the “intruder”. Besides, in addition to producing antibodies, it also produces cellular immunity and creates immunity memory (Immunological memory can consist of memory B cells, antibodies, memory CD4+ T cells, and/or memory CD8+ T cells) [19], [20]. These memory cells can detect the future virus, by recognizing protein S on the surface of the coronavirus. The immune cells detect the coronavirus in the body, they will create antibodies and produce T cells. This prevents the coronavirus from multiplying in the body and reduces the harm caused by COVID-19.

Storage and Administration

Each vaccine has specific storage and administration requirements depending on the vaccine manufacturing technology. In Vietnam, the Astra Zeneca vaccine is indicated for vaccination to prevent COVID-19 caused by SARS-CoV-2, in individuals ≥ 18 years old. We have summarised key requirements in Table 2 for the COVID-19 Astra Zeneca vaccine. According to Table 2, preservation is particularly important in the production process, transportation, and storage of vaccines. The advantage of the COVID-19 Astra Zeneca vaccine is preservative temperatures like the usual vaccine (see Table 2 below). Improper storage process will affect the quality of the vaccine, the damage could reach billions of vaccines, seriously affect, and results in the fight against the COVID-19 pandemic.

Table 2: Storage and administration requirements for COVID-19 Astra Zeneca vaccine [15]

| Storage | Administration |
|--|---|
| <ul style="list-style-type: none"> • Store in the refrigerator between +2 to +8°C for up to 6 months <ul style="list-style-type: none"> • Do not freeze • Keep vials in the outer carton to protect from light | <ul style="list-style-type: none"> • After the first puncture cumulatively store up to 6 hours at room temperature or up to 48 hours at 2 to 8°C with total storage time not to exceed 48 hours. • The COVID-19 Astra Zeneca vaccine consists of two separate doses of 0.5 mL. Each vial contains 5mL of solution (clear type I glass) with a stopper (elastomeric with aluminum overseal). Care should be taken to ensure a full 0.5 mL dose is administered. Where a full 0.5 mL dose cannot be extracted, the remaining volume should be discarded. No dilution or pool excess vaccine from multiple vials. • The second dose should be administered between 4 and 12 weeks after the first dose. Individuals who have received the first dose of COVID-19 vaccine Astra Zeneca should receive the second dose of Astra Zeneca vaccine to complete the vaccination course. There are no reports on the interchangeability of the COVID-19 vaccine Astra Zeneca with another COVID-19 vaccine. |

Side effects, Precautions, and Contraindications

COVID-19 vaccine Astra Zeneca is more than 89% effective in protecting humans against the causative agent of COVID-19 based on clinical studies [15]. However, like any other vaccine, the COVID-19 vaccine Astra Zeneca also has a small scale of side effects. Reports of serious side effects are collected in Table 3. As of now, millions of people have been vaccinated in Astra Zeneca and the safety of the vaccines continues to be monitored. To minimize the risk of adverse reactions following injection, it is always recommended to:

- Following an injection at a medical facility, staying at the vaccination site for 30 minutes to one hour to be monitored by medical staff, early detection of post-vaccination reactions.
- Tracking the primary medical and longer than the time above the case of background disease, history of allergies.
- At home/work: Actively monitor personal health care for 48 hours, you need to stay with someone who can support you. Shouldn't be alone. Make sure that your nutrition, sleep well.
- In normal circumstances continue to monitor the health for 7 days after the injection.

Table 3: Overview of side effects after receiving a COVID-19 vaccine Astra Zeneca [21], [22].

| Common side effects | Less common side effects | Rare side effects |
|--|---|--|
| <ul style="list-style-type: none"> • pain, swelling, tenderness, redness or itching at the injection site • feeling unwell • headache • muscle, joint pain • nausea • fever and chills | <ul style="list-style-type: none"> • Chills • Vomiting • decreased appetite • stomach pain. | <ul style="list-style-type: none"> • Severe allergic reaction (anaphylaxis). • A very rare and unusual clotting condition. |

II. CONCLUSION

The current vaccine in Viet Nam includes the COVID-19 vaccine Astra Zeneca, which was urgently approved in the COVID-19 prevention campaign, and has not yet reported any serious side effects when injected. They create effective vaccine immunity in protecting the health of those vaccinated and successfully contribute to Vietnam's fight against and repel the COVID-19 epidemic. Besides the approved vaccine, domestically produced vaccines are being developed with positive signs. Vietnam will strive to achieve the goal of herd immunity by the end of 2021 or in mid-2022, through the largest vaccination campaign in history.

III. REFERENCES

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