ISSN: 0976-7126
Yousif *et al.*, 15(5):29-31, 2024

International Journal of Pharmacy & Life Sciences
Open Access to Researcher

SARS-CoV-2 Vaccines, Vaccine Development and Significant Efforts in Vaccine Development

Al Fateh Al Rufai Fadlalla Yousif [1*], Md. Zulphakar Ali[2], Himani Tiwari[3] and Kaushal Kishor Chandrul[4]

1, Student of B. Pharm. 4th Year; 2, Assistant Professor; 3, HOD; 4, Principal

Department of Pharmacy, Mewar University, Gangrar Chittorgarh, (R.J.) - India

Article info

Received: 27/03/2024

Revised: 23/04/2024

Accepted: 29/05/2024

www.ijplsjournal.com

Abstract

COVID-19, caused by the SARS-CoV-2 virus, has had a significant global impact. To combat the pandemic, scientists have been working tirelessly to develop vaccines. These vaccines aim to stimulate the immune system to recognize and fight the virus, providing protection against COVID-19. Various types of vaccines, such as mRNA, viral vector, protein subunit, and inactivated vaccines, have been developed and authorized for emergency use. Vaccine development involves rigorous testing for safety, efficacy, and immunogenicity in clinical trials. The successful development and distribution of effective vaccines are crucial in controlling the spread of COVID-19 and protecting public health worldwide.

Key words: COVID, Vaccine, Development

Introduction

The COVID-19 pandemic has been a really tough and difficult time for all of us. It's quite shocking to think about everything that has happened. COVID-19 actually started back in December 2019 when the first case was detected in Wuhan, China. The World Health Organization (WHO) declared a Public Health Emergency of International Concern (PHEIC) on 30 January 2020 because the virus was spreading rapidly outside of China. And then, on 11 March 2020, the WHO declared it a pandemic. It's been a challenging journey, but we're all in this together!

Role of animals in vaccine development

Animal experiments are indeed crucial in vaccine development. They help evaluate the safety and effectiveness of vaccines, determine the dosage and injection schedule, and provide valuable insights into the immune response. Small animals like rodents, mice, rats, guinea pigs, and rabbits are commonly used in these studies. While they serve as important models for studying immunogenicity, tolerance, and safety, it's important to acknowledge that there can be species differences between animals and humans. This means that the biological effects observed in animal studies may not always directly translate to humans. It's a complex process, but these experiments help pave the way for safer and more effective vaccines.

***Corresponding Author**

Limitations of COVID -19 vaccines

It's true that some people who got vaccinated still ended up getting seriously sick with COVID-19. That happened because of these sneaky SARS-CoV-2 variants that can escape the effects of the vaccines. These variants have some tricky mutations that make them harder for the vaccines to fight off. One of the latest ones, called the Omicron variant, is a real troublemaker when it comes to vaccine escape. But don't worry, scientists are on it! They're working hard to create new vaccines that can provide a broader range of protection. One cool example is this nanoparticle-dotted "mosaic" vaccine from Caltech. They're trying different approaches to tackle this problem, and we're hopeful that they'll find a solution soon. Hang in there!

Conclusion

Researchers have every reason to be proud of the incredible achievement of developing a COVID-19 vaccine in such a short time. Going from the lab to clinics within a year is a major milestone for pandemic vaccines. And guess what? The impact of this vaccine development process goes way beyond just COVID-19. The success of mRNA vaccines has sparked excitement in the pharmaceutical world, leading to investments in using this technology for other infectious diseases. It's like opening up a whole new world of possibilities to fight all sorts of diseases like metabolic diseases and cancers.

Now, it's time for scientists to join forces and collaborate on a whole new level. They need to focus on developing "broad-spectrum" COVID-19 vaccines that can protect us against those pesky variants like VUMs, VOIs, and VOCs. And it doesn't stop there! They should also work on creating vaccines for other infectious viruses that have the potential to cause pandemics. The lessons learned from COVID-19 vaccine development will be crucial in preparing us for future pandemics. It's all about staying one step ahead and being ready to take on whatever comes our way!

Reference

1. Lu R., Zhao X., Li J., Niu P., Yang B., Wu H., Wang W., Song H., Huang B., Zhu N., et al. Genomic characterisation and epidemiology of 2019 novel coronavirus: Implications for virus origins and receptor binding. *Lancet.* 2020;395:565–574. doi: 10.1016/S0140-6736(20)30251-8. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

2. da Silva S.J.R., do Nascimento J.C.F., Germano Mendes R.P., Guarines K.M., da Silva C.T.A., da Silva P.G., de Magalhaes J.J.F., Vigar J.R.J., Silva-Junior A., Kohl A., et al. Two Years into the COVID-19 Pandemic: Lessons Learned. *ACS Infect. Dis.* 2022;8:1758–1814. doi: 10.1021/acsinfecdis.2c00204. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

3. Estes, J. D., Wong, S. W. &Brenchley, J. M. Nonhuman primate models of human viral infections. *Nat. Rev. Immunol.* 18, 390–404 (2018).

Article CAS PubMed *PubMed Central Google Scholar*

4.Muñoz-Fontela, C. et al. Animal models for COVID-19. Nature 586, 509–515 (2020).

***Article CAS PubMed PubMed Central* Google Scholar**

5. Chakraborty C., Sharma A.R., Bhattacharya M., Lee S.S. A Detailed Overview of Immune Escape, Antibody Escape, Partial Vaccine Escape of SARS-CoV-2 and Their Emerging Variants with Escape Mutations. *Front. Immunol.* 2022;13:801522. doi: 10.3389/fimmu.2022.801522. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

6. Cohen A.A., van Doremalen N., Greaney A.J., Andersen H., Sharma A., Starr T.N., Keeffe J.R., Fan C., Schulz J.E., Gnanapragasam P.N.P., et al. Mosaic RBD nanoparticles protect against challenge by diverse sarbecoviruses in animal models. *Science.* 2022;377:eabq0839. doi: 10.1126/science.abq0839. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

7. Chatterjee S., Bhattacharya M., Nag S., Dhama K., Chakraborty C. A Detailed Overview of SARS-CoV-2 Omicron: Its Sub-Variants, Mutations and Pathophysiology, Clinical Characteristics, Immunological Landscape, Immune Escape, and Therapies. *Viruses.* 2023;15:167. doi: 10.3390/v15010167. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

8. Chakraborty C., Bhattacharya M., Dhama K. Cases of BA. 2.75 and recent BA. 2.75. 2 subvariant of Omicron are increasing in India: Is it

alarming at the global level? *Ann. Med. Surg*. 2022;84:104963.
doi: 10.1016/j.amsu.2022.104963. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
9. Chakraborty C., Bhattacharya M., Sharma A.R., Dhama K., Lee S.S. The rapid emergence of multiple sublineages of Omicron (B. 1.1. 529) variant: Dynamic profiling via molecular phylogenetics and mutational landscape studies. *J. Infect. Public Health.* 2022;15:1234–1258. doi: 10.1016/j.jiph.2022.10.004. [PubMed] [CrossRef] [Google Scholar]
10. Chakraborty C., Bhattacharya M., Sharma A.R., Dhama K., Agoramoorthy G. A comprehensive analysis of the mutational landscape of the newly emerging Omicron (B. 1.1. 529) variant and comparison of mutations with VOCs and VOIs. *GeroScience.* 2022;44:2393–2425. doi: 10.1007/s11357-022-00631-2. [PMC free article] [PubMed] [CrossRef] [Google Scholar
11. Chakraborty C., Bhattacharya M., Sharma A.R., Mallik B. Omicron (B. 1.1. 529)-A new heavily mutated variant: Mapped location and probable properties of its mutations with an emphasis on S-glycoprotein. *Int. J. Biol. Macromol.* 2022;219:980–997.
doi: 10.1016/j.ijbiomac.2022.07.254. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
12. Mohapatra R.K., Kandi V., Sarangi A.K., Verma S., Tuli H.S., Chakraborty S., Chakraborty C., Dhama K. The recently emerged BA. 4 and BA. 5 lineages of Omicron and their global health concerns amid the ongoing wave of COVID-19 pandemic—Correspondence. *Int. J. Surg.* 2022;103:106698.
doi: 10.1016/j.ijsu.2022.106698. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
13. Bhattacharya M., Sharma A.R., Dhama K., Agoramoorthy G., Chakraborty C. Omicron variant (B. 1.1. 529) of SARS-CoV-2: Understanding mutations in the genome, S-glycoprotein, and antibody-binding regions. *GeroScience.* 2022;44:619–637.
doi: 10.1007/s11357-022-00532-4. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

Cite this article as:
Yousif Al F. Al. R. F, Ali Z. Md., Tiwari H. and Chandrul K. K. (2024). SARS-CoV-2 Vaccines, Vaccine Development and Significant Efforts in Vaccine Development. *Int. J. of Pharm. & Life Sci.,* 15(5): 29-31.

Source of Support: Nil
Conflict of Interest: Not declared
For reprints contact: ijplsjournal@gmail.com