

Different Techniques Used in the COVID-19 Vaccines Development in all Over the World - An Overview

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ABSTRACT

Corona virus is a pneumonia like disease which spreads through RNA virus. In the world, there is an epidemic condition due to spread of this devastating virus. Globally, it has destroyed the world by human deaths. Due to its pandemic conditions, World Health Organization and other collaborative institutes have been focusing on the development of the vaccine against this novel COVID-19 disease. All countries are doing trials for the vaccine development. Different biopharmaceutical and biotechnological companies are using the viral genome and its structural parts as a research agents. World Health Organization has funded billions of dollars to the different companies to develop vaccines. Some companies are using this viral spike proteins as inactivated parts to enter into the host cell to induce the immunity. In some cases, adenovirus is used as a carrier to induce the immunity. This adenovirus normally causes the common cold but it was used as carrier. Other method is the usage of nanoparticles at the spikes of virus which makes the weakened form of RNA replication inside the cell but some are single dose but some are dose interval. Many companies are working on this but still only trials are going. Very soon, a proper vaccine will come in the market and will be served for human populations cure.

Keywords: Virus, Corona Virus, Vaccine, Companies, Viral parts, Injection.

INTRODUCTION

Corona Virus is a type of virus which causes COVID-19 disease in the humans. It is highly contagious. It spreads very rapidly from the infected person to the healthy person. By spreading this virus, the condition in the world became epidemic (Woo et al., 2010). All

countries started to declare special precautions in their communities. Many countries started to work on development of vaccines for this novel corona virus (COVID-19) disease. In the world, more than 150 coronavirus vaccines are under the process of development.

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There is a great expectation that these will ease the world from globally held crisis. There are many efforts done by United States of America like Operative Warp Speed program which costs \$10 billion which aims to make vaccines till January 2021. The World Health Organization is also contributing well to synthesize vaccine against this novel virus. It may take about 12-15 years to commercialize a vaccine in market (Anonymous, 2019). But there are also roadblocks even if vaccine is present in the market that which population should have it first and on the how much price. Many vaccines remain staying in the phase-4 called perpetual phase which comes under regular research (Drexler et al., 2010).

Different companies, agencies and universities are trying to develop the vaccine against this novel virus. Some of them are given below:

1. University of Oxford Research

Classification: ChAdOx1 nCoV-19

Who is working and what is working: The United Kingdom University is working in association with company AstraZeneca. Oxford university team has transmitted the SARS-CoV-2 named spike protein, which aids the virus to get entrance into the cells, in the debilitated adenovirus. Adenovirus causes common cold. When this adenovirus was transferred to humans, the expectation is that the spike protein will activate the immunity response as well. AstraZeneca and the Oxford University team has planned to sell these vaccines at a cost. The working on trials is going on (Yin et al., 2018).

2. Pfizer Research

Classification: BNT162b2

Who is working and what is working: In this group, world famous company Pfizer is working in association with German Biotech Company BioNTech. The candidates rely on by injecting virus genetic mass into humans, this depends on mRNA. It produces the limbs by making of viral proteins which imitator the coronavirus. The immune system recognizes it. If, there will be success, then it will be first mRNA vaccine for human use. This vaccine needs 2 doses injected at 21 days interval (Peiris et al., 2003).

3. Sinovac Research

Classification: CoronaVac

Who is working and what is working: A Chinese Company is working along with Brazilian research center named Butantan. CoronaVac is the inactivated form which uses non-infectious form of the coronavirus to induce immunity in the cell of the humans (Zaki et al., 2012).

4. Moderna Therapeutics Research

Classification: mRNA-1273

Who is working and what is working: A biotech company is working in association with National Institutes of Health. This system also depends on by injecting mRNA snippets in to the human cells to activate the immune responding strategy (Chen et al., 2020).

5. Bharat Biotech Research

Classification: COVAXIN

Who is working and what is working: The Indian Biotechnology Company along with the Indian Council of Medical Research and National Institute of Virology is working on the development of vaccine. This COVAXIN practices inactivated form of corona virus which cannot cause disorder but it is still able to induce immunity response. Normally, two doses are given at 14 days interval (Zhao et al., 2012).

6. Novavax Research

Classification: NVX-CoV2373

Who is working and what is working: The Biotechnology Company in the Gaithersburg, Maryland is working on this project. It is bioengineered corona virus spike proteins which parts enter in cell but cannot cause disease by replicating. Nanoparticles with spikes are injected into human cells to induce immunity. The two doses at the interval of 21 days are highly administrated (Berceena et al., 2009).

7. Vector Institute Research

Classification: EpiVacCorona

Who is working and what is working: The Russian Biotechnology Institute is working on that project. In this, candidate relies on peptide vaccine by using tiny parts of the viral antigens to induce the immunity inside the human cells.

8. CanSino Biologics Research

Classification: Ad5-nCoV

Who is working and what is working: It is viral vector vaccine which uses a weakened form of adenovirus as a carrier for injection of SARS-CoV-2 spike protein into the cell. In this method, no adverse reactions were recorded (Neuman et al., 2020).

CONCLUSION

By the discussion of different techniques used and adapted in developing Corona Vaccines trials, we found that mostly rely on introduction of spike proteins into the cell to induce cell immunity. In some cases, inactivated versions of the spike proteins are injected into the cells to induce immunity by triggering the body immune system. There are also other ways as by using nanoparticles into spike proteins. Other methods are the using of adenovirus which causes common cold and is introduced into cell to induce immunity against corona virus. But there was one thing that every vaccine was under a specific dosage interval. Different countries are working strongly on this corona virus vaccine project to synthesize a complete vaccine. But all the vaccines procedures are still under trials.

Future Aspects

Hopefully in the near future, vaccine trials will be completed and a vaccine will be developed to cure COVID-19 disease. It should surely fulfill the economic losses to the countries.

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