CHAPTER-29

AUTHORS' INFORMATION

Dr. Syed Baker is working as Research Scientist at Department of Microbiology, Prof. V.F. Voino-Yasenetsky Krasnoyarsk State Medical University, Krasnoyarsk, Russia. He has secured his PhD in Microbiology from University of Mysore.

Dr. Komal Kumar, is a young scientist working at Department of Health Science, University of Helsinki, He has completed his doctoral degree from University of Mysore.

Open Access Full Text Article
https://doi.org/10.26524/royal.37.29

CHAPTER-29

DEVELOPMENT OF VACCINATION DURING COVID-19

Syed Baker[1], Komal Kumar J[2]

[1]Department of Microbiology, Prof. V.F. Voino-Yasenetsky Krasnoyarsk State Medical University, Krasnoyarsk, Russia Partizana-Zheleznyaka street, 1, 660022 Siberia, Russian Federation

[2]Department of Health Science, University of Helsinki, 00100, Finland

Corresponding author:

Dr. Syed Baker

E-mail: syedbaker3@gmail.com

Keywords

COVID-19

PANDEMIC

VACCINE

DEVELOPMENT

ABSTRACT

The outbreak of COVID-19, has created huge impact. There has been different management strategies implemented by WHO as there is minimal drug choices and lack of vaccination process. In order to combat COVID-19, different scientific groups are associated and started clinical trials to come up with the first successful vaccine. The present chapter provides brief note on the different stages on the development of vaccination process. The information provided in the chapter is based on the information available across the media and WHO, the conclusive vaccination process can be only finalized with concrete clinical trials and sufficient scientific documentation in near future and we hope to see the first vaccination soon.

1. Introduction

The chapter starts with the natural process of vaccination in ecosystem for instance every springtime, thousands of crabs that are of the horseshoe type climb on to beaches in the mid-Atlantic portion of the U.S as they are being guided by that of the full moon. That is good news as far as sea-birds are concerned who feed on them and as for companies manufacturing drugs, it is a very critical resource for the creation of safe human medicines [1]. The secret is the creature's blood that is milky blue in colour and is known

to be the only natural source for that of limulus amebocyte lysate. This is the kind of substance which detects the contaminant known as endotoxin. Even in the tiniest of amounts, an endotoxin that is a kind of toxin that is bacterial making their ways into that of vaccines, other sterile pharmaceuticals like that of artificial hips and knees or injectable drugs can turn to be deadly. Many of the pharmaceutical companies have relied on these creatures around the world [2]. Each and every year as it passes by, drug manufacturing companies use about 0.5 million of the horseshoe crabs found in the Atlantic ocean. Their idea is to bleed them for a while and let them crawl back into the sea however many of the horseshoe crabs are found to be dying as a result of the same. The practice in combination with overharvesting of horseshoe crabs to be used as bait for fishes is causing a decline within that of the species pertaining to the U.S over the past years.

The beginning of July 2020 indicated that, an U.S based company Lonzais manufacturing vaccines for Coronavirus and send them for a human clinical trial. It is found that the lysate a very important component of the drug to be released and to be sold in the U.S markets. Lonza is giving a written statement stating that by testing the vaccine it will require about greater than a day's production of lysate from horseshoe crabs coming from 3 manufacturers in the U.S. The Charles River Laboratories have accepted the above to be true as John Dubczak, who is a representer of the company has explained via an email stating that in order to be able to make doses that are 5 billion in number a total of 600,000 tests shall have to be performed that can be using the same amount of lysate extracted in a day's time. As per Dubczak that will not threaten or endanger the population of horseshoe crabs or their supply chain. As the pandemic has put the world in a mode of panic news is that there are about 140 different vaccines that are being developed in order to combat Coronavirus. However, one does not know which will be effective or safe enough for people to take. As in a typical case of vaccines they can be taking years to be declared as safe and effective. However, this could be developed and considered in order to combat the pandemic with short time. There is at least a single candidate like that of Moderna which is a Biotech company is heading into the third phase of trials in the month of July [3]. As of in May 2020, The Government of

America launched its Operation Warp Seed that is out there to put dollars by the billion for the acceleration, tests and designing of virus vaccines that could be potentially effective. The scientists are however not so sure that they should be happy with the outcome of the first vaccine that passes its trial. It is turning out to be a balancing act for that of the officials of public health who have to be deciding as to when it is ready for being rolled out to the masses or the public. As an example, it can be taken into consideration that the production can be scaled up for the vaccines having limited effectiveness by promoting it heavily. However this might discourage the developers of vaccines from striving for making progress to cater the needs of the market.

The above situation has already been warned against by Roland Sutter who has been acting as the coordinator for that of containment of polio, product development, policies and research as a part of WHO or World Health Organisation located within Geneva in Switzerland. He is however slated to be retired in December of 2020. The scientists and pharmaceutical companies cannot afford to make the same mistake they made in the year 1976 lest the public withdraw their confidence in them. It may be demanded fast as of now but the development of the vaccine has to be taking place in stages. It starts with the trials of phase one. The clinical trials are aimed at assessment of the primary safety of drugs amongst a small and definite number of the population. About 50 or more people are recruited for the trial though numbers can vary pertaining to the case. The trials of phase two leave a clue in relation to the efficiency of the virus vaccine. This is being gauged by the analysis of the blood samples of people to be able to see as immunity sentinels like antibodies or anything else are present which can cause the pathogen that is targeted to be neutralised. The trials of phase 3 make an attempt to measure in a better way if the vaccine is able to protect people intended for by the scaling up and including thousands of people. They also typically compare protection that has been conferred to the ones who underwent an immunisation against the ones receiving just a placebo. The test becomes more sensible and real as the drugs are rolled out for mass usage as per scientists. The vaccine for Coronavirus is undergoing a clinical trial under the most controlled of environments as per Charlie Weller for the program of

vaccines at London based funding body Wellcome of biomedical research. People who participate or advert themselves to the vaccine test are more conscientious in regards to their actions by taking fewer risks which may be exposing them to the virus as they are kept a watch on and followed by medical practitioners such as doctors [4-6].

Even though, the vaccine has been through all necessary steps, the chances are there that it may not be as effective as expected and also the reasons behind the same may not be clear as well. This may be due the intrinsic factors with regard to the targeted virus and its propensity for mutating and propagating within bodies along with the ways in which our system of immunity interacts with it naturally. There are vaccines that are said to be extremely effective like the polio vaccine that is inactivated and is one of the successes of the scientific world. Three doses as a course being administered of the same are almost a hundred per cent effective in case somebody contracts polio. It has also been known that the vaccine for measles is almost as effective as 96 per cent post taking a single dose of the same. There are more such immunisations which are administered though they have lower chances of success in protection against diseases. The strains of the virus for flu changes from one year to another and that is the reason as to why they are administered every year with an improvement that guarantees that patients are protected by 40-60 per cent. The vaccine that came up against malaria being known to be as RTS, brings down the probability of the disease by only 33.33 per cent although it is still explored to be a fruitful option for the underdeveloped areas worldwide. In case of the development of the vaccine against COVID-19, finding an ideal candidate is necessary to establish immunity within at least a majority of the population (atleast up to 70 per cent) which will include the elderly going by the outline made in April under WHO. Anthony Fauci is a current director of the U.S National Institute of Allergy has stated that people will settle for vaccine that is about 70-75 per cent effective as of June 28 2020. WHO has also said that they will be accepting a vaccine that is at least 50 per cent successful or effective. Subsequently, the Food and Drug Administration of the U.S has mirrored the aforementioned guidance by releasing documents setting the same target at their baseline of 30th June 2020 [7-9].

Researchers are mainly not convinced and they have already spoken against the 50 per cent success rate is being terrible for the mass. One of the speaker Byram Bridle working as viral immunologist at University of Guelph's Ontario Veterinary College has stated against the 50 per cent success rate as being acceptable. It has been also said that for the pandemic to come to an end, herd immunity is necessary so that a vaccine is only 50 per cent successful falls short of achieving goals. A vaccine is after all just a multifaceted approach for the reduction in the spreading of the dreaded COVID-19 virus. This is reduced to being just a precautionary measure like wearing of masks along with that of social distancing. Scientists have further said that one has to look at the entire value of public health with regard to vaccine. The immunologists are forever vigilant about administering of vaccines since there have been some medically unpleasant surprises in past times. As of now, since the clinical trial is being conducted within a small group of people and the reactions or responses noticed have not found to be that adverse or extreme. This has been stated official by Wayne Koff,CEO and the president of the Human Vaccines Project. Human vaccine Project is a partnership and a public-private, Which seeks to act as a catalyst in the development of an effective vaccine for COVID-19. A case has been reported that, a man on whom the vaccine made by Moderna against COVID-19 had been tested, seemed to have a running fever after it followed by fainting. Similarly amongst 45 people, three other people who received the vaccination had a medically significant reaction which was negative. The researchers had already come to an agreement about the fact that the vaccine mRNA had over stimulated immune systems of patients as 3 out of 45 people had a side effect after being on the highest dosage all within the course of a single trial [10-12]. The world is waiting for technological oriented process as well to come up in management of COVID-19 situation [13].

Conclusion

The truth remains a bitter pill since one might assume that the vaccine against that of COVID-19 will be meeting the benchmarks of WHO by the outweighing of safety risks over benefits and yet the public may not be 100 per cent sure about the fact that it will be working on them. They might still need a lot of convincing for taking a shot of the vaccine

that has been come up with. It has already been made public that 50 per cent of the population will be taking the vaccine as it becomes available by The Associated Press-NORC Center for Public Affairs Research. This indicates matching of data percentage with that of the Pew Research Center Poll in regards to the taking of the vaccine against flu. Both were interestingly conducted at a similar time. There had been a larger chunk of the population which will not be settling for that of immunisation that fights against Coronavirus or COVID-19 as compared to the population that refused the flu vaccine which is also a seminal aspect of research.

REFERENCES

1. In India, black markets for tocilizumab spring up as demand for the COVID-19 drug surges", Scroll.in, 2020. [Online]. Available: https://scroll.in/article/966644/in-india-black-markets-for-tocilizumab-spring-up-as-demand-for-the-COVID-19-drug-surges. [Accessed: 08- Jul- 2020].
2. Draft landscape of COVID-19 candidate vaccines", Who.int, 2020. [Online]. Available: https://www.who.int/publications/m/item/draft-landscape-of-COVID-19-candidate-vaccines. [Accessed: 08- Jul- 2020].
3. COVID-19 vaccine tracker", Raps.org, 2020. [Online]. Available: https://www.raps.org/news-and-articles/news-articles/2020/3/COVID-19-vaccine-tracker. [Accessed: 08- Jul- 2020].
4. L. Williams, A.J. Gallant, S. Rasmussen, L.A. Nicholls,, N. Cogan, K. Deakin, D. Young, & P. Flowers, "Towards intervention development to increase the uptake of COVID-19 vaccination among those at high risk: outlining evidence-based and theoretically informed future intervention content," medRxiv,2020
5. S. Shivendu, S. Chakraborty, A. Onuchowska, A. Srivastava, & Patidar, A. Patidar, "Is there evidence that BCG vaccination has non-specific protective effects for COVID 19 infections or is it an illusion created by lack of testing?" medRxiv,2020
6. N. Cimolai, "Defining Protective Epitopes for COVID-19 Vaccination Models," Journal of Medical Virology, 2020

7. S. Graham, R.K. McLean, A. Spencer, S. Belij-Rammerstorfer, D. Wright, M. Ulaszewska, J. Edwards, al. et, "Evaluation of the immunogenicity of prime-boost vaccination with the replication-deficient viral vectored COVID-19 vaccine candidate ChAdOx1 nCoV-19," bioRxiv,2020

8. R. Acharya, "Prospective vaccination of COVID-19 using shRNA-plasmid-LDH nanoconjugate," Medical Hypotheses, 143, 110084 – 110084,2020

9. U.W. Chohan, "After the Coronavirus Vaccine's Discovery: Concerns Regarding a COVID-19 Vaccination's Distribution," Political Economy - Development: Public Service Delivery eJournal,2020

10. X. Liu, C. Liu, G. Liu, W .Luo, & N. Xia, "COVID-19: Progress in diagnostics, therapy and vaccination," Theranostics, 10, 7821 – 7835,2020

11. C.H. Basch, G.C. Hillyer, E.A. Zagnit & C.E. Basch, "YouTube coverage of COVID-19 vaccine development: implications for awareness and uptake," Human vaccines & immunotherapeutics, 1-4, 2020

12. M. Wehling, "Calling for an exponential escalation scheme in vaccine development for COVID-19," European Journal of Clinical Pharmacology, 1 – 2, 2020.

13. RR Nadikattu, and S.M. Mohammad, and P. Whig, "Novel Economical Social Distancing Smart Device for COVID-19 (July 1, 2020)," International Journal of Electrical Engineering and Technology (IJEET), 11 (4),204-217, 2020.