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Management and Development of Covid 19 Vaccine by Healthcare Experts

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ABSTRACT: Many potential vaccines for COVID-19 are being studied, and several large clinical trials may report results later this year. If a vaccine is proven safe and effective, it must be approved by national regulators, manufactured to exacting standards, and distributed. WHO is working with partners around the world to help coordinate key steps in this process. Once a safe and effective vaccine is available, WHO will work to facilitate equitable access for the billions of people who will need it. A series of independent reviews of the efficacy and safety evidence is required, including regulatory review and approval in the country where the vaccine is manufactured, before WHO considers a vaccine product for prequalification. Part of this process also involves the Global Advisory Committee on Vaccine Safety. An external panel of experts convened by WHO, called SAGE, will analyze the results from clinical trials and along with evidence on the disease, age groups affected, risk factors for disease, and other information, they will recommend whether and how the vaccines should be used. Officials in individual countries will decide whether to approve the vaccines for national use and develop policies for how to use the vaccines in their country based on the WHO recommendations. The vaccines must be manufactured in large quantities, which will be a major and unprecedented challenge – all the while continuing to produce all the other important life-saving vaccines already in use. As a final step, vaccines will be distributed through a complex logistical process, with rigorous stock management and temperature control.

I.INTRODUCTION

The impact of COVID-19 vaccines on the pandemic will depend on several factors. These include factors such as the effectiveness of the vaccines; how quickly they are approved, manufactured, and delivered; and how many people get vaccinated.[1]

Most scientists anticipate that, like most other vaccines, COVID-19 vaccines will not be 100% effective. WHO is working to help ensure that any approved vaccines are as effective as possible, so they can have the greatest impact on the pandemic. Several different types of potential vaccines for COVID-19 are in development, including:

- *Inactivated or weakened virus vaccines*, which use a form of the virus that has been inactivated or weakened so it doesn't cause disease, but still generates an immune response.[2]
- *Protein-based vaccines*, which use harmless fragments of proteins or protein shells that mimic the COVID-19 virus to safely generate an immune response.
- *Viral vector vaccines*, which use a virus that has been genetically engineered so that it can't cause disease, but produces coronavirus proteins to safely generate an immune response.
- *RNA and DNA vaccines*, a cutting-edge approach that uses genetically engineered RNA or DNA to generate a protein that itself safely prompts an immune response.
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Entos Pharmaceuticals is developing Fusogenix DNA vaccine developed using the Fusogenix drug delivery platform to prevent COVID-19 infections. Fusogenix drug delivery platform is a proteo-lipid vehicle that introduces genetic payload directly into the cells. Entos is working on developing an optimised payload containing multiple protein epitopes derived from SARS-COV-2 proteins, which will stimulate an immune response in the body to prevent COVID-19 infection.[3]

Medicago is developing drug candidates against COVID-19 after having produced Virus-Like Particles (VLP) of the coronavirus. The company has formed a collaboration with Laval University's Infectious Disease Research Centre to develop antibodies against SARS-CoV-2.

The company's research activities are being partly funded by the Canadian Institutes for Health Research (CIHR). An intranasal Covid-19 vaccine is being developed by US-based clinical-stage biopharmaceutical company, Altimmune.[4] Design and synthesis of the single-dose vaccine have been completed, while animal testing will follow. The coronavirus vaccine is being developed based on a vaccine technology platform that is similar to NasoVAX, an influenza vaccine developed by Altimmune. The MIGAL Research Institute in Israel announced that an Infectious Bronchitis Virus (IBV) vaccine developed to treat avian coronavirus has been modified to treat COVID-19. The vaccine has demonstrated efficacy in pre-clinical trials conducted by the Volcani Institute.

The IBV vaccine was developed after four years of research and has high genetic similarity to the human coronavirus. The institute has genetically modified the vaccine to treat COVID-19 and will be available in the oral form.[5] The institute is currently exploring potential partners for producing the vaccine in the next eight to ten weeks and obtaining the necessary safety approvals for in-vivo testing.

II.DISCUSSION

The point of a vaccine is to harmlessly expose parts of the virus to the immune system, which then recognises it as an invader and learns how to fight it.

There are many ways to do this and researchers are using different approaches.

Pfizer/BioNtech (and Moderna) have developed what's known as an RNA vaccine. This uses an experimental approach, which involves injecting part of the virus's genetic code into the body, in order to train the immune system.

Once inside the body, this starts making viral proteins to train the body. This is a completely new technique.

The Oxford and Russian vaccines take a harmless virus that infects chimpanzees, and genetically modify it to resemble coronavirus, in the hope of getting a response.

Two of the big China-made vaccines use the original virus but in a disabled form, so it cannot cause an infection.[6]

Understanding which method produces the best results will be vital. Challenge trials, in which people are deliberately infected, could help answer these questions.

- Trials need to show the vaccine is safe - it would not be useful if it caused more problems than the disease
- Clinical trials need to show vaccines either stop people getting sick or at least reduce the number who die
- A way of producing the vaccine on a huge scale must be developed for the billions of potential doses
- Regulators must approve the vaccine before it can be given

It is thought that 60-70% of the global population need to be immune to the virus in order to stop it spreading easily (known as herd immunity) - in other words, billions of people, even if the vaccine works perfectly.[7]

III.CONCLUSION

More than 150 coronavirus vaccines are in development across the world—and hopes are high to bring one to market in record time to ease the global crisis. Several efforts are underway to help make that possible, including the U.S. government's Operation Warp Speed initiative, which has pledged \$10 billion and aims to develop and deliver 300 million doses of a safe, effective coronavirus vaccine by January 2021. [8]

The World Health Organization is also coordinating global efforts to develop a vaccine, with an eye toward delivering two billion doses by the end of 2021. The COVID-19 candidates, like all vaccines, essentially aim to instruct the immune system to mount a defense, which is sometimes stronger than what would be provided through natural infection and comes with fewer health consequences. Wealthy countries have already grabbed a major chunk of the available supply. The United States, the United Kingdom, Japan and Canada have struck deals large enough to vaccinate their entire populations. By contrast, a pooled global effort to distribute vaccines equitably to more than 150 countries — including dozens of low-income nations — has secured only 700 million doses.[9]

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