The Covid vaccine pill – A dream or reality

Introduction

Right now, protection against Covid-19 comes via an injection. But in future, those vaccines could come from inhalers or even pills.

In a white, airy laboratory in Medicon Village, one of southern Sweden's largest science parks, chemist Ingemo Andersson holds up a thin, plastic inhaler, half the size of a matchbox.

Her team is hoping this tiny product could play a big role in the global fight against coronavirus allowing people to take powdered versions of future vaccines at home

One has to remove a little plastic slip and then the vaccine inhaler is activated and you just put it in your mouth, take a deep breath and inhale.

The Pill vaccine

- The company, Iconovo, is collaborating with an immunology research start-up in Stockholm, ISR, which has developed a dry-powder vaccine against Covid-19.
- It uses manufactured Covid-19 virus proteins (unlike Pfizer, Moderna and Astra Zeneca which use RNA or DNA that code for these proteins), and can withstand temperatures of up to 40C –mean can be kept in homes with other regula medicines.
- That's a major contrast to the conditions needed to store the current commonly available coronavirus vaccines approved by the World Health Organization (WHO), which are all in liquid form.
- They have to be kept in tough glass vials in temperatures as low as -70C, before being transferred to fridges, or they lose effectiveness - known as the "cold chain".
- The game-changer is that the powder vaccine extremely easily can be used without the cold chain, and it can be administered without the need for healthcare providers.
- The company is currently testing its vaccines on the Beta (South African) and Alpha (UK) variants of Covid-19.

- It believes it could prove especially useful in speeding up vaccine rollouts in Africa where there are currently no home-grown vaccine manufacturers, and warmer climates and limited electricity supplies have led to major challenges when it comes to storing and delivering Covid-19 vaccines before they expire.
- There is still some way to go before trials indicate the full potential of ISR's air-dried vaccine, including whether it can offer the same level of protection as the current list of vaccines approved by the WHO.

  So far, it has only been tested on mice, although ISR and Iconovo have risen enough funding to begin studies on humans within the next two months.

Pitfalls

Despite the effectiveness of vaccines, we still need drugs to treat COVID. Even people who have been double vaccinated stand a small chance of getting COVID and ending up moderately or even severely ill. There are drugs to treat COVID, but they have to be given in hospital.

Future

One promising drug that could improve things is molnupiravir, an antiviral that's moving into the final stages of testing in humans.

Virus isolation was significantly lower in participants receiving 800 mg molnupiravir (1.9%) versus placebo (16.7%) at Day 3 ($p = 0.02$).

At Day 5, virus was not isolated from any participants receiving 400 or 800 mg molnupiravir, versus 11.1% of those receiving placebo ($p = 0.03$).

Time to viral RNA clearance was decreased and a greater proportion overall achieved clearance in participants administered 800 mg molnupiravir versus placebo ($p = 0.01$).

Molnupiravir was generally well tolerated, with similar numbers of adverse events across all groups.

Importantly, it can be taken as a pill - meaning people wouldn't need to be hospitalised to receive it.

Action of the drug

When the virus then reproduces, the molnupiravir causes mutations to accumulate in the virus's RNA, which increase every time it replicates. Eventually, this causes an "error catastrophe", where excessive mutations stop the virus from being able to reproduce altogether, and it dies off.

So far, a small trial has looked at the effects of molnupiravir in 202 COVID patients (not in hospital) who had started having symptoms.

Indian Scenario

Kolkata-based ICMR-NICED has submitted a proposal to the Department of Biotechnology under the Union Ministry of Science and Technology for research on an oral COVID vaccine, a senior official of the institute said on Monday.

The proposed research project will be done in collaboration with a German firm and it has been shortlisted for presentation. It will take around 5-6 years to develop the oral vaccine in a laboratory.

All stages of developing a vaccine and phases of clinical trials for safety and immunogenicity will be followed in this case too and the vaccine will be first tested on animals.

The entire process will take at least five to six years and we can expect the oral vaccine in the next few years as not just a vaccine but also as a new oral antiviral drug for Covid treatment at domiciliary basis.

Summary

- Covid has created a pandemic destroying lives, industries,child psychology and a host of trends in human life.
- Many trials are on not just for treatment but also as different types of vaccines.
- Routes of vaccination are also underway in different methods.
- Hope never ends. So is with an upcoming oral Covid vaccine.
- Molnupiravir is the first oral, direct-acting antiviral shown to be *highly effective at reducing nasopharyngeal SARS-CoV-2 infectious* virus and viral RNA and has a favorable safety and tolerability profile.
- *Researchers are hoping it can be used both to treat and prevent COVID.*