

- Vaccination / Virus

CAN NASAL VACCINES SHUT DOOR ON COVID?

Researchers are making a strong case for human trials as the nose is a entry point for the coronavirus and the easy-to-administer vaccine promises mucosal immunity

Gulf News · 22 Sep 2021 · 1 · BY JAY HILOTIN Senior Assistant Editor SEYYED DE LLATA Senior Designer

The nose is the door through which Covid-19 infects humans. The nostrils are easy entry points for the coronavirus. Fact: If you got both jabs and didn't develop mucosal immunity, the virus can still get in. Experts call that a "breakthrough" infection.



A peer-reviewed research published in the journal Cell iScience shows the intranasal vaccine would "close the door" of Covid infection. How come there's no nasal vaccine against Covid-19 approved or widely distributed till now? There's no straight answer.

What experts say: ■ What do nasal vaccines do?

Nasal vaccines are designed to confer mucosal immunity in the nasal compartment. Most experts consider the nasal compartment as first point of entry of SARS-CoV-2 before it clobbers the lungs.

"The idea is to shut the door," researcher Nathalie Mielcarek working with the Lille Pasteur Institute to develop a nasal spray vaccine against whooping cough told AFP.

'MUCOSAL'

'Mucosal' refers to mucosa, tissue that lines your nose, mouth and lungs. It is the innermost layer, and functions in absorption and secretion. It is composed of epithelium cells and a thin connective tissue. The mucosa contains specialised goblet cells that secrete sticky mucus throughout the gastrointestinal tract.

We've successfully blocked serious and critical infections, but we don't have our lives back together, the economy is faltering."

Dr Daniel Teres and Martin A. Strosberg

■ What happens to the nasal compartments and lungs when a nasal vaccine is used? In animal models, researchers say it induces systemic neutralising antibodies (NAbs), immunoglobulin A (IgA) and T-cell responses in the lung.

Some good news:

■ Single-dose intranasal vaccination elicits systemic and mucosal immunity against SARS-CoV-2

■ Using genetic sequencing, it showed evidence of coordinated activation of T/B-cell responses within the nasal-associated lymphoid tissues.

This type of immunity is also seen as more “durable”. More importantly, it curbs infection in individuals and prevent disease transmission.

■ Can intranasal vaccines help stop Covid spread?

The experts say intranasal vaccines would significantly curb the pandemic when used alongside the already-approved intramuscular vaccines.

In March 2021, Daniel Oran and Eric Topol from the Scripps Institute published an opinion piece in Scientific American citing their reasons for pursuing intranasal vaccines, and providing financial incentives.

Their arguments are based on known benefits:

■ Ease of administration.

■ Eliminating the issue of “needle phobia.”

■ Direct mucosal immunity.

■ Nasal vaccines against Covid-19 can help reduce viral load and break the train of virus transmission.

One of the blind spots for systemic vaccines is the upper areas of the nostrils,”

Dr. Navin Varadarajan | M.D. Anderson Professor of Chemical and Biomolecular Engineering at UH

NEUTRALISING ANTIBODIES

The presence of neutralising antibodies (NAbs), measured in terms of “titres”, is a good evidence of protective immunity.

The higher the titre, the better the protection. An acceptable threshold antibody level for protection is 1:10 dilution of serum in a 50 per cent plaque reduction neutralisation (PRNT).

■ How many vaccines are approved?

There are currently 22 intramuscular (IM) Covid-19 vaccines authorised/approved by at least one state regulator. Dozens more are under way.

The end point for IM vaccines is to prevent hospitalisations, critical illnesses and death.

Evidence shows fully vaccinated individuals who contract the highly contagious Delta variant are still able to transmit live virus. And Covid-19 continues to mutate.

■ What’s the role of nasal mucosa in enabling — or breaking — the ‘chain of transmission’ of Covid?

The nasal cavity is the primary entry point of a Covid-19 infection, which activates nasal IgA. Infection usually starts in the nasopharynx. Nasal vaccine is now seen as a new way to reduce viral load at entry.

■ Is natural infection more effective than vaccination?

Yes and no. Evidence shows that natural infection elicits a broader immune response compared to the mRNA vaccines or other platforms — which present just a fragment of the S spike protein or a killed version of the whole virus.

In plain English, it means natural infection confers better protection than vaccination. At least one study, however, also shows “hybrid vaccination” — giving a booster shot to a person who had prior natural infection — confers up to a 100-fold protection than natural infection.

■ Is there an approved nasal vaccine?

Yes. The US FDA approved “FluMist”, a nasal spray flu vaccine, in 2003. It’s a culmination of 40 years of research by University of Michigan (UM) Prof. Hunein Maassab.

It uses the “live-attenuated” (virus is still alive, but weakened) trivalent influenza virus vaccine platform. It is the first flu shot delivered as a nasal mist made commercially available in the US. Other vaccine makers soon followed the nasal route.