Study: A nasal spray protects against coronavirus infection, including recent immune-evasive variants

March 24 2023

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Researchers have developed a molecule that is, when administered nasally, extremely effective in preventing the disease caused by all

known variants of the SARS-CoV-2 virus. The molecule can be a key tool in preparing for future pandemics, as it is aimed at preventing both the transmission and spread of the virus.

In laboratory animal studies, a molecule known as TriSb92, developed by researchers at the University of Helsinki, has been confirmed as affording effective protection against coronavirus infection. The molecule identifies a region in the spike protein of the coronavirus common to all current variants of the virus and inhibits its functioning.

"When administered nasally, the TriSb92 molecule is extremely effective in preventing infection, and experiments carried out in cell cultures indicate that it also encompasses the very latest variants, including XBB, BF7 and BQ.1.1," explains Postdoctoral Researcher Anna R. Mäkelä from Professor Kalle Saksela's research group.

Animal models have also demonstrated that, unlike face masks, the molecule can, when sprayed into the nose, prevent infection even after a few hours of exposure.

According to the researchers, the molecule remains fully functional at room temperature for at least 18 months, making it well suited for use as a nasal spray.

The results have been published in *Nature Communications*.

Anticipation of future viral variants

While the worst stage of the coronavirus pandemic is, at least for the time being, behind us, nasally administered protection can be a crucial help in preventing the spread of the virus in the future.

"The latest variants effectively avoid the immune protection provided by

both vaccines and the COVID-19 disease, and current vaccines are not effective in preventing transmission," Mäkelä says.

Moreover, the nasal spray can protect those people from serious disease who do not gain sufficient immunity from vaccines, such as immunocompromised individuals and elderly.

According to the researchers, the molecule could also work against future animal-borne close relatives of SARS-CoV-2, which are expected to be the cause of entirely new coronavirus pandemics.

"Since the region in the coronavirus's spike protein affected by the TriSb92 molecule has remained almost unchanged in all viral variants so far emerged, it can be assumed to be effective also against future SARS-CoV-2 variants," Mäkelä confirms.

"The easily and inexpensively produced TriSb92 could be a very important first line of defense in curbing such a new pandemic, pending the development, production and distribution of vaccines," she adds.

A copyable approach

According to the researchers, the sherpabody-technology used is also applicable to the prevention of many other viral diseases, particularly influenza and other respiratory viruses.

"The whole approach stems from a technical solution based on a binder protein platform developed in Finland, which was not originally intended for the development of an antiviral drug. It provides an opportunity for many other new initiatives based on the accurate identification of diseased cells or pathogens in patients," Mäkelä says.

In the next stage, the molecule must be tested in clinical trials, after

which it could be made commercially available.

More information: Anna R. Mäkelä et al, Intranasal trimeric sherpabody inhibits SARS-CoV-2 including recent immunoevasive Omicron subvariants, *Nature Communications* (2023). DOI: 10.1038/s41467-023-37290-6