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“Our Harrington team has been essential in helping us advance from successful experiments to the steps necessary for making our discoveries a reality.”

THINKING OUTSIDE THE ENVELOPE TO PREVENT COVID INFECTIONS

FOCUS: Intranasal agent to block COVID-19 infection.

Long before the pandemic hit, Dr. Moscona had made many discoveries about the mechanisms of action of the proteins in the viral envelope, which in many viruses is the outermost layer of the viral particle. These envelope proteins are responsible for the entry of viruses into the target cell and delivery of viral genes into the cell during infection.

Eventually this research fueled her design, together with her co-investigator Dr. Matteo Porotto, of specific lipopeptides (lipids connected to peptides, short strings of amino acids, the building blocks of proteins)

that prevent viruses including Nipah, measles, and influenza from fusing with a target cell membrane. This membrane fusion is a necessary step for many enveloped viruses, including SARS-CoV-2, to infect cells.

“The process of the viral envelope fusing with the lung cell membrane is mediated by the virus’ spike glycoprotein,” Dr. Moscona says. “For COVID-19, we are developing peptides that will be able to recognize the spike and prevent its protein from adopting the shape necessary for fusion. What makes this antiviral strategy

different from other approaches is that it directly attacks the virus at the earliest stage of getting into a person and starting an infection. Imagine a nasal spray taken once a day, protecting you from COVID.”

Further, Dr. Moscona and Dr. Porotto have tested the efficacy of their lipopeptides against a range of COVID variants, and found that the compound prevented the spike protein of all variants from fusing with the cell membrane—heartening news as variants of COVID continue to be documented.

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