(SD2021-433) Neutralize RNA viral infection by disrupting host RNA-viral protein interactions

Tech ID: 33285 / UC Case 2021-Z08-1

BACKGROUND

Presently, antiviral strategies are mostly focused on targeting viral proteins. However, the high mutation rates of RNA viruses, such as SARS-CoV-2, make the development of effective antiviral drugs very challenging. Disrupting viral-host interactions such as by targeting pro-viral, non-essential human genes will more likely prove effective against new variants or future coronavirus outbreaks.

TECHNOLOGY DESCRIPTION

Researchers from UC San Diego have found that by manipulating the expression of human cellular RNAs that interact with SARS-CoV-2 viral proteins, they can reduce the infection rate of SARS-CoV-2. They identified SARS-CoV-2 proteins that activate the expression of these host genes. Knockdown of these host genes using siRNAs, or disrupting the protein-RNA interactions such as using antisense oligonucleotides designed to target the loci of interactions can reduce SARS-CoV-2 infection.

UC San Diego scientists have recently performed the first large, systematic interrogation of all the host RNAs that interact with SARS-CoV-2 proteins in a human lung epithelial cell line, and they show for the first time that many of these interactions are essential for SARS-CoV-2 proliferation. The limitation of targeting host proteins is the limited number of druggable proteins, whereas siRNAs can target all genes in the human transcriptome. This powerful strategy will expand the set of druggable targets substantially.

INTELLECTUAL PROPERTY INFO

Patent Application: **https://patents.google.com/patent/WO2022256409A2**

Provided are compositions and methods of treating Coronavirus disease 2019 (COVID- 19) in a subject, the method including administering to the subject a therapeutically effective amount of a composition comprising an exogenous nucleic acid and delivering the exogenous nucleic acid into a cell, wherein the exogenous nucleic acid comprises an antisense oligonucleotide, a small interfering RNA (siRNA), or locked nucleic acid, and wherein the exogenous nucleic acid binds to a target RNA and modulates gene expression of the target RNA, thereby treating Coronavirus disease 2019 (COVID- 19) in the subject.

RELATED MATERIALS

- Joy S. Xiang, Jasmine R. Mueller, En-Ching Luo, Brian A. Yee, Danielle Schafer, Jonathan C. Schmok, Frederick E. Tan, Katherine Rothamel, Rachael N. McVicar, Elizabeth M. Kwong, Krysten L. Jones, Hsuan-Lin Her, Chun-Yuan Chen, Anthony Q. Vu, Wenhao Jin,

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OTHER INFORMATION

CATEGORIZED AS

- **Medical**
  - Disease: Infectious Diseases
- **Research Tools**
  - Nucleic Acids/DNA/RNA

RELATED CASES

2021-Z08-1

Samuel S. Park, Phuong Le, Kristopher W. Brannan, Eric R. Kofman, Yanhua Li, Alexandra T. Tankka, Kevin D. Dong, Yan Song, Aaron F. Carlin, Eric L. Van Nostrand, Sandra L. Leibel, Gene W. Yeo. Discovery and functional interrogation of SARS-CoV-2 protein-RNA interactions. bioRxiv 2022.02.21.481223.

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