

BROAD-SPECTRUM THERAPEUTICS FOR VIRAL DISEASES: A MEDICAL COUNTERMEASURE PLATFORM FOR EMERGING THREATS

Small Interfering Rna Inhibit The Severe Acute Respiratory Syndrome Coronavirus 2 Infection

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Background and Aims: RNA interference (RNAi) has a specific mechanism to silence gene expression by degrading messenger RNA (mRNA) targeted by small RNA molecules, such as microRNAs (miRNAs) and small interfering RNAs (siRNAs), which are complementary to mRNA. siRNA inhibitor has demonstrated the novel modality for suppressing infectious diseases. Our goals in this study are to develop siRNAs to target and silence viral genes of SARS-CoV-2 for the inhibition of viral replication and treatment of coronavirus disease 2019 (COVID-19).

Methods: Sixty one siRNA molecules, predicted by the bioinformatics programs, were screened for the possibility of treating SARS-CoV-2 using in vitro and in vivo assay.

Results: Among them, several siRNAs showed strong inhibitory efficacy against SARS-CoV-2 infection and replication in Vero E6 cells. To assess the inhibition efficacy of several siRNAs for SARS-CoV-2 in animals, we used Syrian hamsters. Our data showed a reduction in SARS-CoV-2 titer in the Golden Syrian hamster.

Conclusion: This study indicates that siRNAs are a rapid and effective treatment for newly emerging pathogens such as SARS-CoV-2, which may be able to diminish the impact of possible future pandemics by developing treatments promptly.