Stable Non-infectious Cell Clones that Produce Functional Sars-COV-2 RNA for Nonstructural Proteins and Accessory Proteins

Technology Summary

The invention includes stable non-infectious cell clones that produce autonomously replicating severe acute respiratory syndrome coronavirus 2 (SARS-coV-2) RNAs except the Spike (S), Matrix (M), and Envelope (E) genes. These cell clones are useful for screening candidate direct-acting antiviral drugs (DAAs) and studying the genetic and function aspects of SARS-coV-2 replication. These cell clones are derived from baby hamster kidney cells (BHK-21 cells). A pair of mutations have been introduced into non-structural protein 1 gene (NSP-1) to ameliorate cellular toxicity associated with viral replication. These clones can be used to screen antivirals and study coronavirus replication in a biosafety level 2 (BSL-2) laboratory.

The SARS-CoV-2 virus causes COVID-19 and is responsible for the recent pandemic. Vaccines have been approved to prevent COVID-19, but there remains a need for effective antivirals to treat COVID-19. This cell-based system is an improvement over currently known cell-based systems that replicate Sars-coV-2 RNA because it is self-replicating and viral RNA replication is not toxic to the host-cell. This cell clone can be maintained in culture and does not need to be produced prior to experiments. Additionally, the stability of this clone permits screening over longer time periods.

Potential Commercial Applications

- Screening compounds to identify candidate antivirals for treating COVID-19
- Studying Sars-coV-2 replication

Competitive Advantages

- Does not produce infectious virus
- Can be used in BSL-2 laboratory
- Cell clone is stable
- Useful for high-throughput screening

Development Stage: Proof-of-concept for screening compounds, Research Tool

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Publications: Shufeng Liu, et. al., *Stable Cell Clones Harboring Self-Replicating SARS-CoV-2 RNAs for Drug Screen*, 2021 Nov. 8; Preprint; **doi:** https://doi.org/10.1101/2021.11.04.467291 (viewed at https://www.biorxiv.org/content/10.1101/2021.11.04.467291v1.full on Nov. 23, 2021).

Intellectual Property: A U.S. provisional application has been filed

Product Area: COVID-19, Sars-CoV-2, Antiviral Drugs, Screening

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