Development and effectiveness of pseudotyped SARS-CoV-2 system

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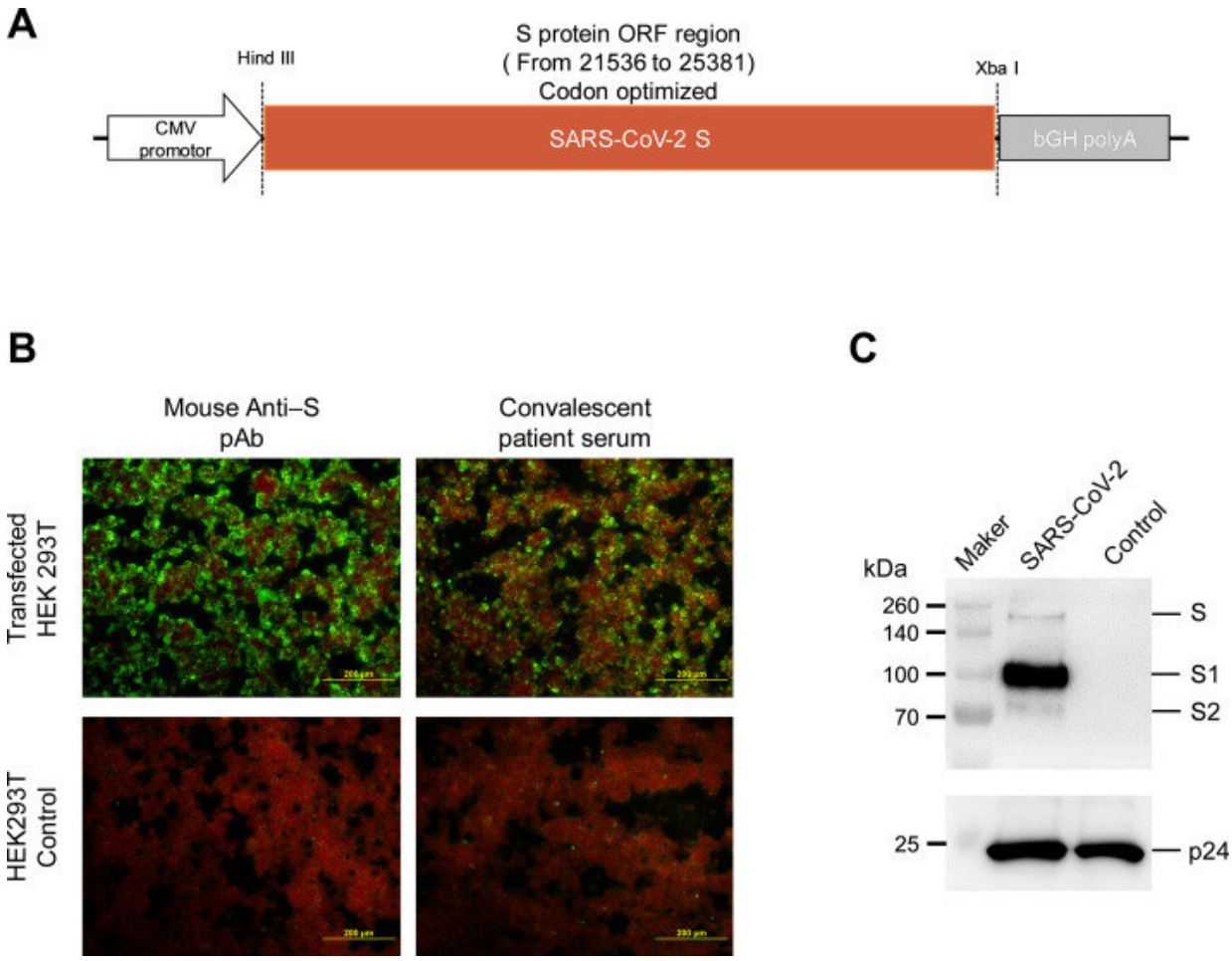

Fig. 1. Identification of SARS-CoV-2 S protein expression and SARS-CoV-2 pseudotyped virus.(A) Construction and identification of S expressing plasmid. SARS-CoV-2 S protein gene was inserted in the pCDNA3.1 vector. (B) Immunofluorescence assay for S protein expression in pcDNA3.1-SARS-CoV-2 S plasmid. The expression was determined using mouse pAb against SARS-

CoV-2 S protein and convalescent serum samples from COVID-19 patients. (C) Identification of S protein expression in SARS-CoV-2 pseudotyped virus by immunoblot assay. Bands corresponding to SARS-CoV-2 S and HIV-1 p24 proteins were detected at the same sample line in the gel. Credit: Compuscript Ltd

Coronavirus disease 2019 (COVID-19) has become a global pandemic. Currently, SARS-CoV-2 live virus-associated experiments need to be handled in biosafety level 3 (BSL-3) facilities. Previously, researchers had successfully established an HIV-based, pseudotyped virus system for studies on MERS-CoV and Ebola virus. Using the pseudotyped virus system, viral entry associated research, e.g., neutralization assays and in vitro pharmacodynamics, can thus be carried out in the BSL-2 facilities.

In this study, the authors have developed a pseudotyped SARS-CoV-2 system that efficiently operates in a BSL-2 facility. With transfection of two plasmids into HEK293T cells, the authors developed an HIV-1 core-based pseudotyped virus consisting of SARS-CoV-2 spike protein and found Huh7.5 cell line suitable for analysis of the pseudotyped SARS-CoV-2 system. The authors used the Convalescent serum from 11 COVID-19 patients to compare the results of SARS-CoV-2 live-virus microneutralization and the pseudotyped SARS-CoV-2 system and notice a significant correlation between the results obtained by the two methods.

The pseudotyped SARS-CoV-2 system, developed in this study, seems highly reliable for conducting the SARS-CoV-2 viral entry associated research in a BSL-2 facility. The system is suitable for high-throughput analysis and R&D of vaccines and drugs.

More information: Ren Yang et al, Development and effectiveness of

pseudotyped SARS-CoV-2 system as determined by neutralizing efficiency and entry inhibition test in vitro, *Biosafety and Health* (2020). DOI: 10.1016/j.bsheal.2020.08.004