Resource Summary Report

Generated by dkNET on Sep 13, 2026

Pseudotyping lentiviral particles with SARS-CoV-2 Spike protein for neutralization assays

DOI:10.17504/protocols.io.bfghjjt6
Type: Protocol

Proper Citation

Katharine H. D. Crawford, Rachel Eguia, Adam S. Dingens, Andrea N. Loes, Jesse D. Bloom 2020. Pseudotyping lentiviral particles with SARS-CoV-2 Spike protein for neutralization assays. protocols.io dx.doi.org/10.17504/protocols.io.bfghjjt6

Protocol Information

URL: https://dx.doi.org/10.17504/protocols.io.bfghjjt6

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Group: Coronavirus Method Development Community

Summary: SARS-CoV-2 enters cells using its Spike protein, which is also the main target of neutralizing antibodies. Therefore, assays to measure how antibodies and sera affect Spike-mediated viral infection are important for studying immunity. Because SARS-CoV-2 is a biosafety-level-3 virus, one way to simplify such assays is to pseudotype biosafety-level-2 viral particles with Spike. Such pseudotyping has now been described for single-cycle lentiviral, retroviral and VSV particles, but the reagents and protocols are not widely available. Here we detail how to effectively pseudotype lentiviral particles with SARS-CoV-2 Spike and infect 293T cells engineered to express the SARS-CoV-2 receptor, ACE2. We also make all the key experimental reagents available in the BEI Resources repository of ATCC and the NIH. Furthermore, we demonstrate how these pseudotyped lentiviral particles can be used to measure the neutralizing activity of human sera or plasma against SARS-CoV-2 in convenient luciferase-based assays, thereby providing a valuable complement to ELISA-based methods that measure antibody binding rather than neutralization.

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External URL: https://www.mdpi.com/1999-4915/12/5/513

Version: 1

Publication Date: 2020

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Record Creation Time: 20210329T220522+0000

Record Last Update: 20210329T220854+0000

Data and Source Information

Source: