

# Supplementary Information for

SARS-CoV-2 Spike impairs DNA damage repair and inhibits V(D)J recombination in vitro

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## **Affiliations:**

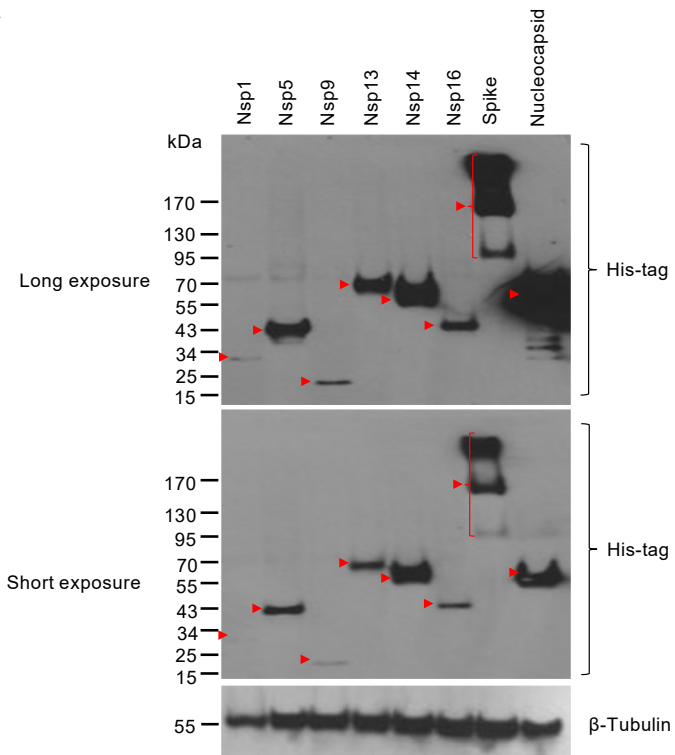
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## **This PDF file includes:**

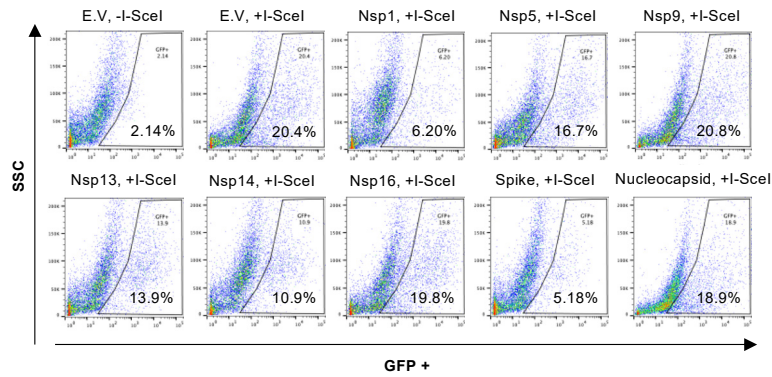
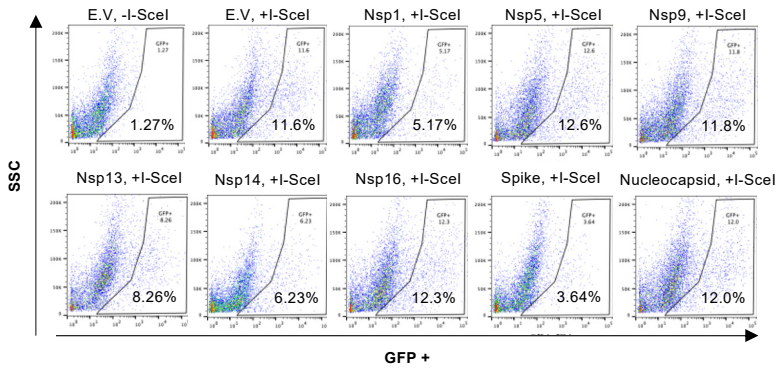
Figures S1 to S5

## **Supplementary Figures**

**A**

**Figure S1. Expression of nuclear localized SARS-CoV-2 proteins in human cells.**

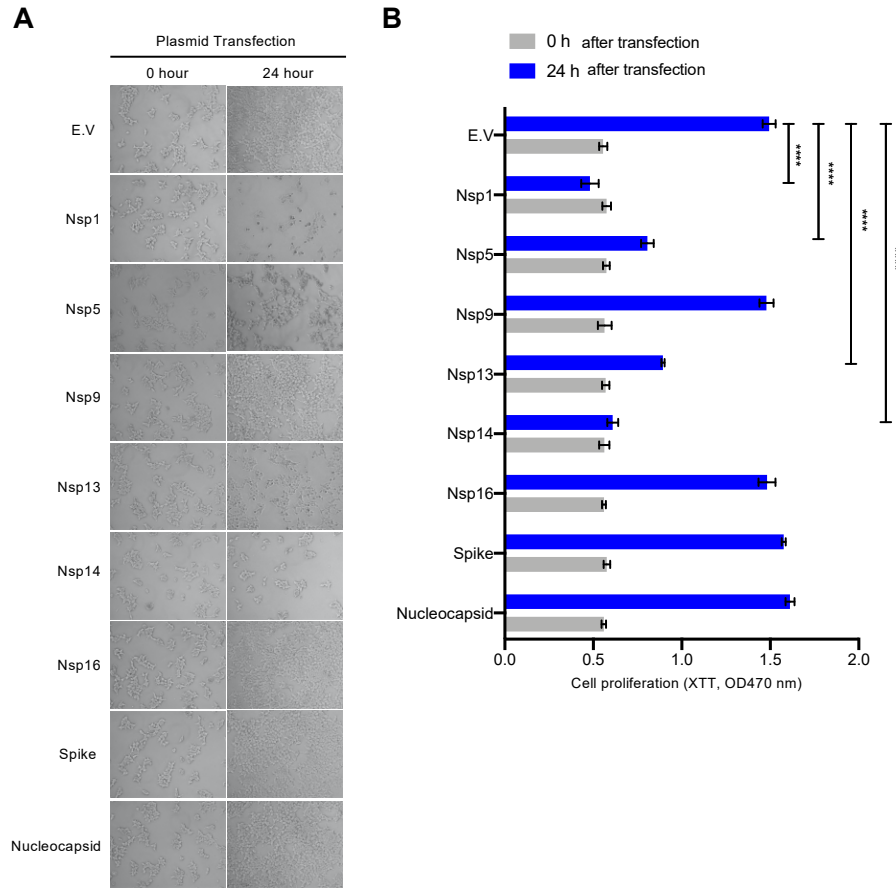
(A). Overexpression of individual SARS-CoV-2 protein with His-tagged in HEK293T cells. Cells were lysed for western blotting 24hr post-transfection using anti-His tag antibodies. Red arrows indicate the individual protein.

**A****B****Figure S2. Effect of nuclear SARS-CoV-2 proteins on NHEJ- and HR- DNA repair pathway**

(A) EJ5-GFP-HEK293T cells with or without pCBASceI expression were transfected with empty vector (E.V) or individual SARS-CoV-2 protein expression vectors. After 48 h, the cells were analyzed for GFP-positive cells by flow cytometry to demonstrate the repair efficiency of NHEJ.

(B) DR-GFP-HEK293T cells with or without pCBASceI expression were transfected with empty vector (E.V) or individual SARS-CoV-2 protein. After 48 h, the cells were analyzed for GFP-positive cells by flow cytometry to demonstrate the repair efficiency of homologous recombination.

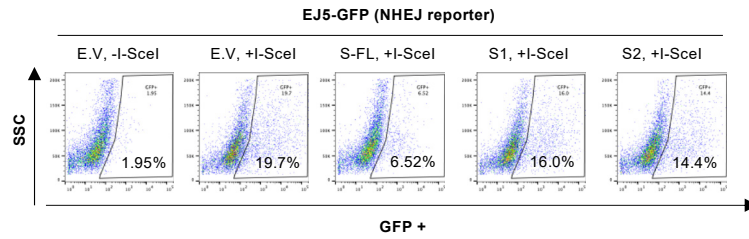
This figure related to **Fig1C, E**.



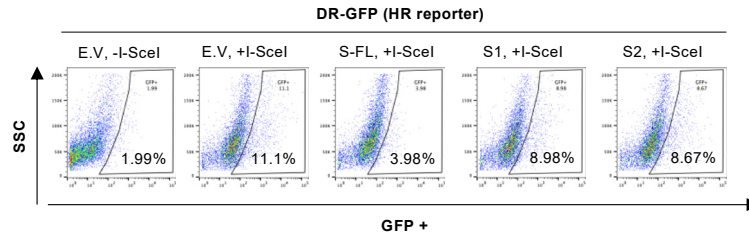
**Figure S3. Nsp1, Nsp5, Nsp13, Nsp14 but not spike inhibit cell proliferation**

(A) Bright-field microscopy of individual SARS-CoV-2 protein transfected HEK293T cells. (B) Analysis the effect of individual SARS-CoV-2 proteins on cell proliferation via XTT assay. Data are presented as mean  $\pm$  s.d. of  $n=3$  independent experiments. Statistical significance was assessed using one-way ANOVA test. \*\*\*\* $p<0.0001$ .

**A**



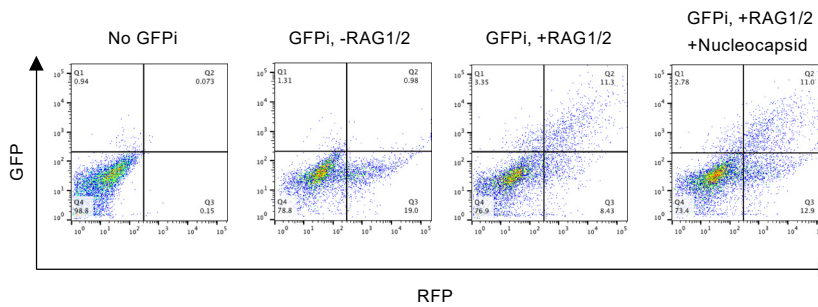
**B**



**Figure S4. Effect of SARS-CoV-2 spike mutants on NHEJ- and HR- DNA repair pathway.**

(A) Analysis effect of SARS-CoV-2 spike mutants on NHEJ repair by using EJ5-GFP reporter assay. (B) Analysis effect of SARS-CoV-2 spike mutants on HR repair by using DR-GFP reporter assay. This figure related to **Fig2D, E**.

**A**



**Figure S5. In vitro V(D)J recombination assay**

(A) GFP/RFP flow cytometry analysis of a representative in vitro V(D)J recombination assay. This figure related to **Figure 4**.