# SUPPLEMENTARY INFORMATION

## SARS-CoV-2 binding and neutralizing antibody levels after Ad26.COV2.S vaccination predict durable protection in rhesus macaques

Ramon Roozendaal[1#], Laura Solforosi[1#], Daniel J. Stieh[1#], Jan Serroyen[1], Roel Straetemans[2], Anna Dari[2], Muriel Boulton[2], Frank Wegmann[1], Sietske K. Rosendahl Huber[1], Joan E. M. van der Lubbe[1], Jenny Hendriks[1], Mathieu Le Gars[1], Liesbeth Dekking[1], Dominika N. Czapska-Casey[1], Nuria Guimera[1], Sarah Janssen[1], Sarah Tete[1], Abishek Chandrashekar[3], Noe B. Mercado[3], Jingyou Yu[3], Wouter Koudstaal[4], Juan J. Perez-Ruixo[2], Jerry Sadoff[1], Dan H. Barouch[3,5,6,7], Hanneke Schuitemaker[1], Roland Zahn[1*]

[1]Janssen Vaccines & Prevention B.V., Leiden, The Netherlands

[2]Janssen R&D, Beerse, Belgium

[3]Center for Virology and Vaccine Research, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, USA.

[4]Lucidity Biomedical Consulting, , Granada, Spain.

[5]Ragon Institute of MGH, MIT and Harvard, Cambridge, MA, USA

[6]Harvard Medical School, Boston, MA, USA

[7]Massachusetts Consortium on Pathogen Readiness, Boston, MA, USA.

[#]These authors contributed equally

*Corresponding Author: Roland Zahn (RZahn@its.jnj.com)

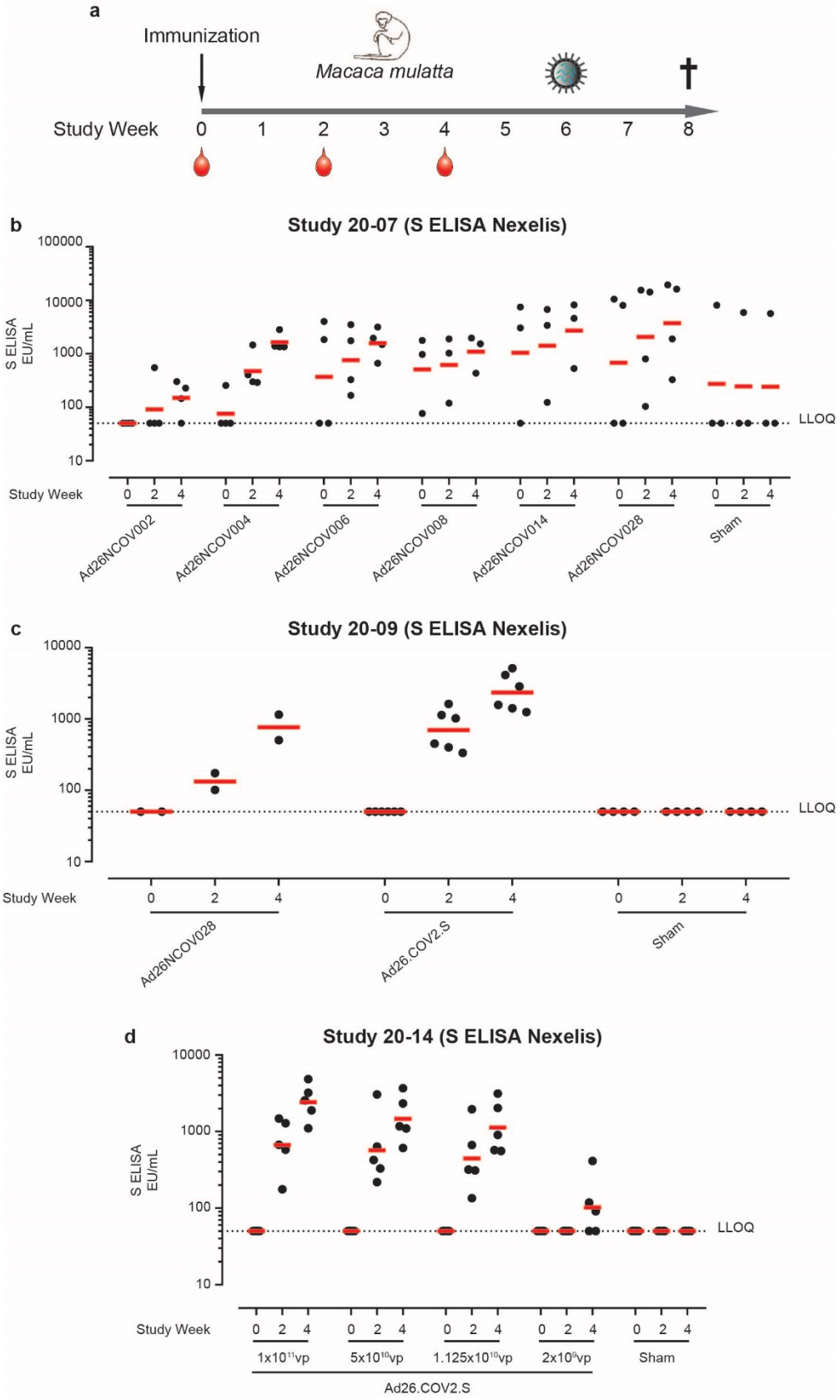
## SUPPLEMENTARY FIGURES



## SUPPLEMENTARY TABLES

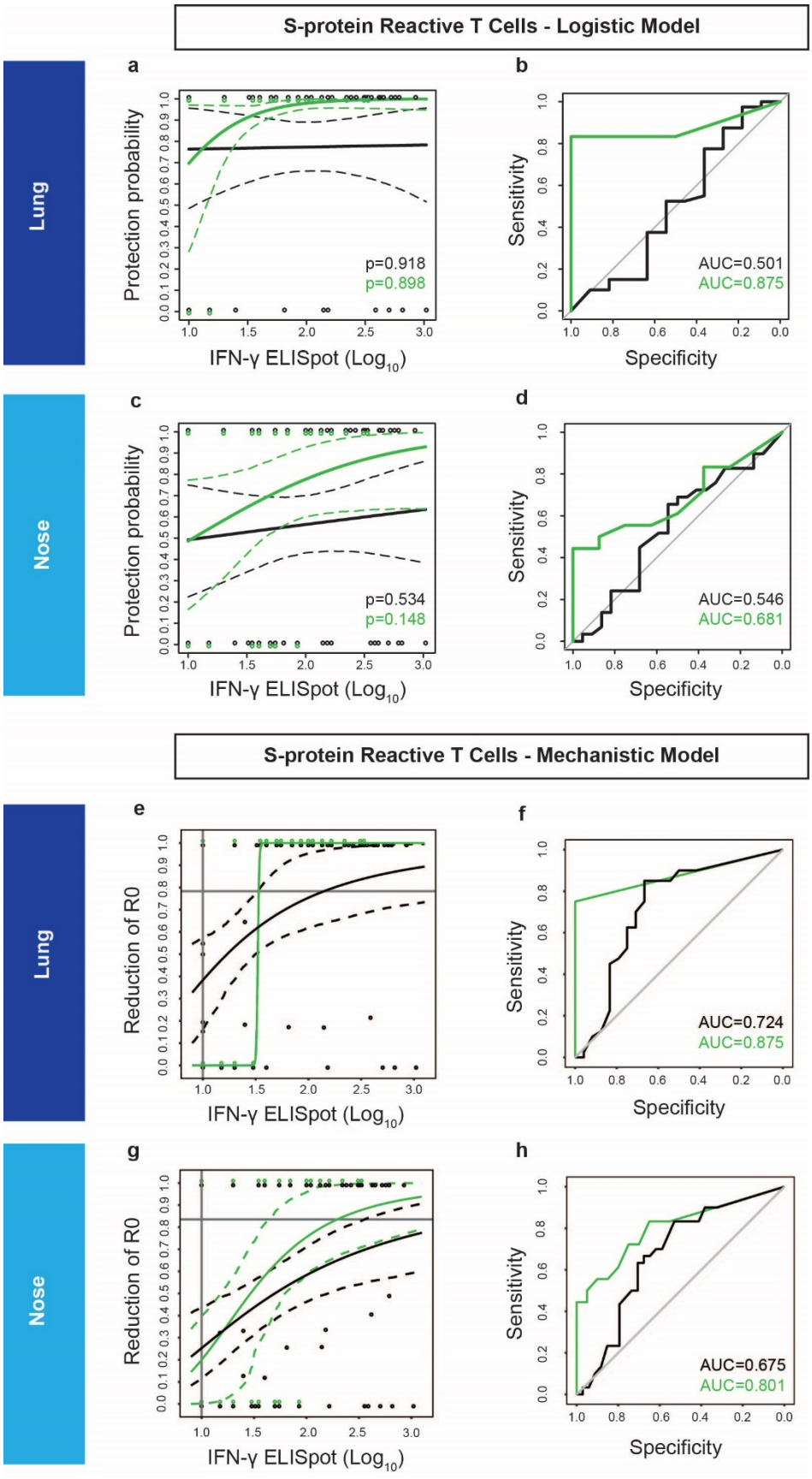
## SUPPLEMENTARY FIGURES

**Supplementary Figure 1: S-protein binding antibody levels from preceding vaccine studies**



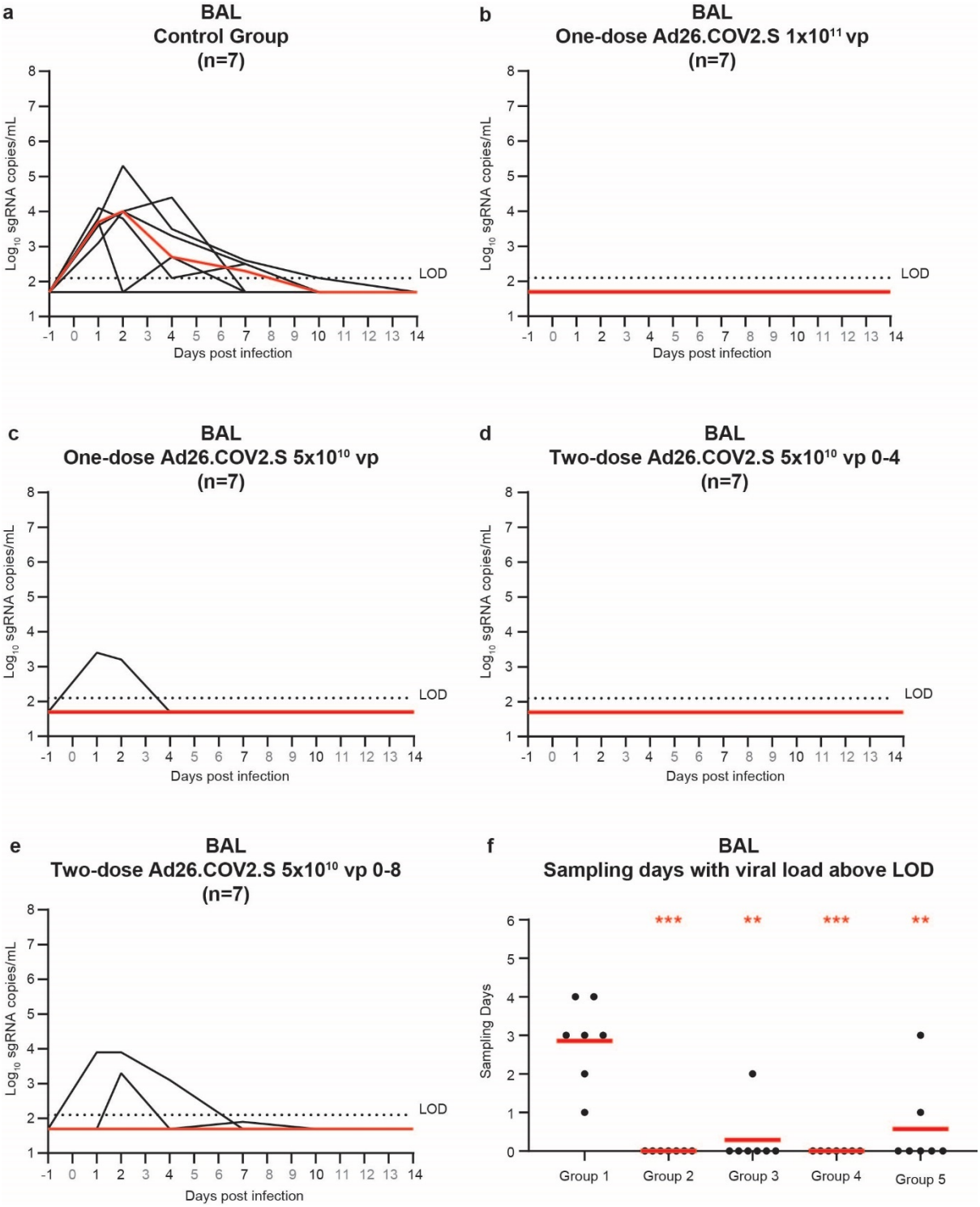
**(a)** Schematic representation of studies 20-07, 20-09 and 20-14, three independent NHP studies testing the immunogenicity and efficacy of Ad26-based vaccine candidates. A total of 52 monkeys received a one-dose regimen of Ad26 based vaccine candidates. In total a group of 30 unvaccinated controls was included in the studies. Six weeks after the vaccination animals were challenged with $1x10^5$ $TCID_{50}$ SARS-CoV-2 via the intranasal and intratracheal routes. Ad26 constructs: tPA.S (Ad26NCOV002), full length spike protein (S) in which the wild-type (wt) signal peptide (SP) is replaced by tissue plasminogen activator (tPA) SP; tPA.S.PP (Ad26NCOV004), full length S in which SP is replaced by tPA and in which the furin cleavage site mutations and proline substitutions (K986P, V987P) have been introduced; S (Ad26NCOV006), native full length spike protein; S.dCT (Ad26NCOV008), full length S in which the cytoplasmic tail (CT) is deleted; tPA.WT.S (Ad26NCOV014), full-length S in which tPA SP is added upstream of the wt SP; S.dTM.PP (Ad26NCOV028), full length S in which the transmembrane domain (TM) is deleted and the furin cleavage site mutations and proline substitutions (K986P, V987P) have been introduced; S.PP (Ad26NCOV030, later named Ad26.COV2.S), full length S in which furin cleavage site mutations and proline substitutions have been introduced.. **(b, c, d)** S-protein binding antibody levels (S ELISA, EU/ml, log10) were determined at baseline, 2-, and 4-weeks post-vaccination. Some animals in the candidate selection study (20-07) had background reactivity prior to vaccination (Week 0). Background reactivity was not observed in psVNA, and likely represents aspecific binding. Assay LLOQ is shown as dashed lines. Data were obtained as technical duplicates. Horizontal bars indicate geometric mean of response within each group.

**Supplementary Figure 2: Correlation of cellular immune responses with protection against SARS-CoV-2 in the lung and the nose.**



(**a, c**) Logistic models of the correlation between the level of S-protein specific T cells (IFN-gamma ELISpot, SFU/$10^6$ PBMC, $\log_{10}$) and protection against viral load in lung (a, BAL) and nose (c, swabs), based on the dataset of all Ad26-based vaccine candidates combined (black line) and Ad26.COV2.S alone (green line), a total of 81 NHP from 3 independent experiments. 95% confidence intervals are represented by dashed lines in the same color. Individual datapoints (y=0: detectable viral load; y=1 undetectable viral load) are represented by open circles in the same color. (**b, d**) ROC curves for the logistic models presented in panels a and c, respectively. Area under the ROC curve (AUC) is indicated and represents a measure of the sensitivity and specificity of the logistic model. (**e, g**) Mechanistic models of the correlation between the level of S-protein specific T cells (IFN-gamma ELISpot, SFU/$10^6$ PBMC, $\log_{10}$) and protection against viral load in lung (e, BAL) and nose (g, swabs), based on the dataset of all Ad26-based vaccine candidates combined (black line) and Ad26.COV2.S alone (green line). 95% confidence intervals are represented by dashed lines in the same color. Individual datapoints are represented by open circles in the same color. (**f, h**) ROC curves for the mechanistic models presented in panels e and g, respectively. Area under the ROC curve (AUC) is indicated and represents a measure of the sensitivity and specificity of the logistic model. The reported p-values correspond to two-sided testing of the slopes of the logistic regression models, based on the Likelihood ratio test (chi-square test). P-values have not been corrected for multiple testing.

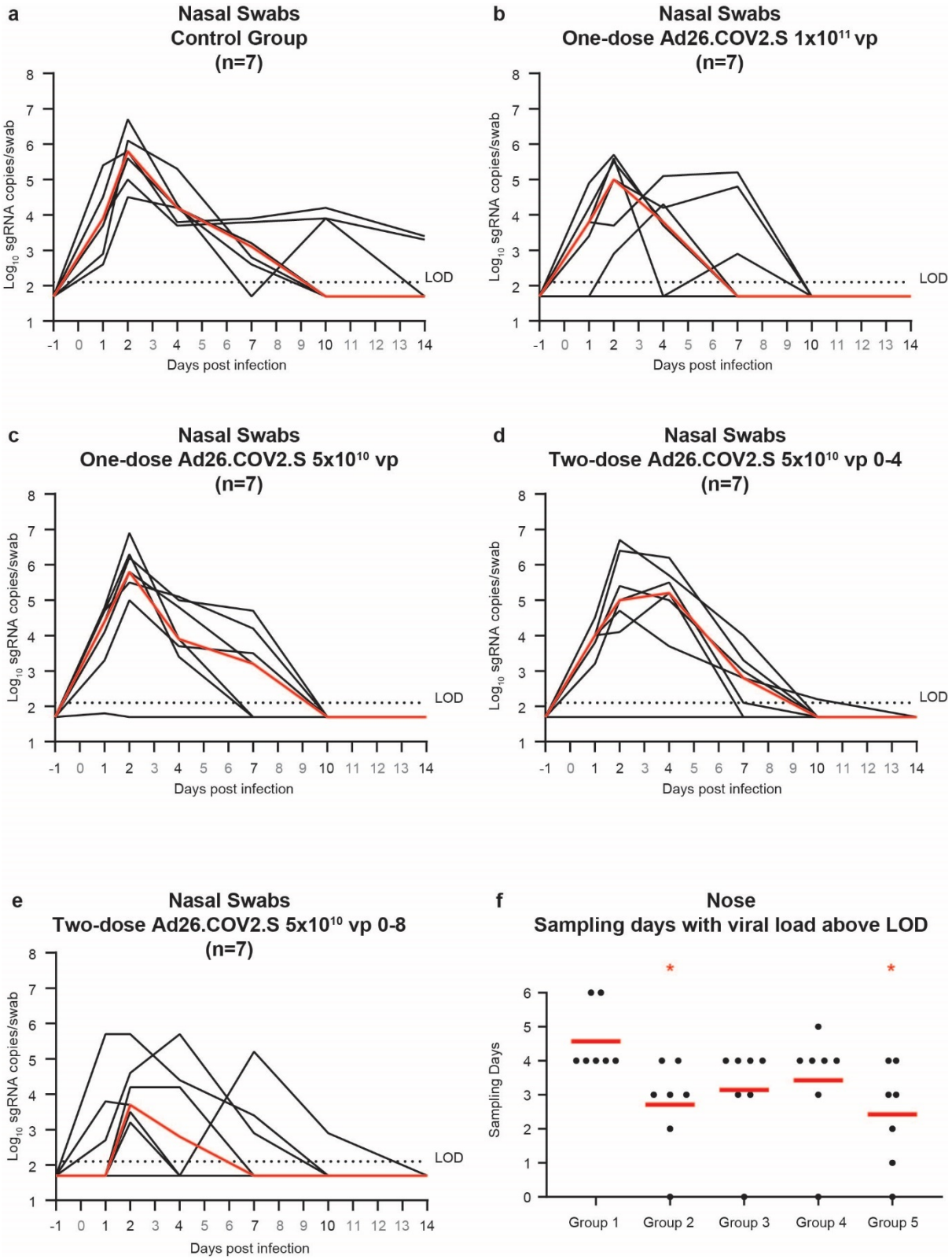
**Supplementary Figure 3: Viral load kinetics and duration in the lungs of individual animals of the 6M durability study**



(**a**-**e**) Six months (25 weeks) post immunization the NHPs were inoculated with SARS-CoV-2. Viral load was analyzed in BAL samples taken from NHPs immunized with a single dose of Ad26.COV2.S at a dose level of $1x10^{11}$ vp (N=7; Group 2; panel **b**), a single dose of Ad26.COV2.S at a dose level of $5x10^{10}$ vp (N=7; Group 3; panel **c**), two doses of Ad26.COV2.S at a dose level of $5x10^{10}$ vp with a 4-week interval (N=7; Group 4; panel **d**), two doses of Ad26.COV2.S at a dose level of $5x10^{10}$ vp with an 8-week interval (N=7; Group 5; panel **e**) or control animals (N=4 immunized with saline, N=3 treatment naïve; Group 1; panel **a**) at Day -1, 1, 2, 4, 7, 10 and at sacrifice (Day 13 or 14 depending on animal cohort assignment) after SARS-CoV-2 challenge. In these graphs viral load values observed at sacrifice are shown at Day 14 for all animals. RNA was extracted from BAL, followed by RT-qPCR using sequences targeting the E gene sgRNA of virus replication cellular intermediates. LOD is set at 125 copies/mL ($Log_{10}$ = 2.1) based on the limit of detection being 1 RNA copy per reaction multiplied by 125 to correct for sample dilutions. The median viral load per group is indicated in red, viral load in individual animals is indicated in black. On the x axis, days post infections on which samples were collected are shown in black; days post infections on which samples were not collected as per study plan are shown in grey. **(f)** Duration (days) of viral load in BAL samples after SARS-CoV-2 challenged of control and vaccinated macaques. Black dots represent individual animals, red lines the group mean. Data represent results from a single study, and were obtained as technical duplicates. The statistical analysis was performed using a 2-sided Mann-Whitney U test, without correction for multiple testing. Red asterisks indicate the statistical significance. (*p<0.05, ** p<0.01, *** p<0.001). Exact p-values for panel **f** are 0.000583 for Group 2, 0.00175 for Group 3, 0.000583 for Group 4 and 0.00641 for Group 5.

BAL = bronchoalveolar lavage; LOD = Limit of detection; LRT = lower respiratory track; N = number of animals; NHPs = nonhuman primates; RNA = ribonucleic acid; RT-qPCR = reverse transcriptase quantitative polymerase chain reaction; sgRNA = subgenomic ribonucleic acid; vp = virus particles.

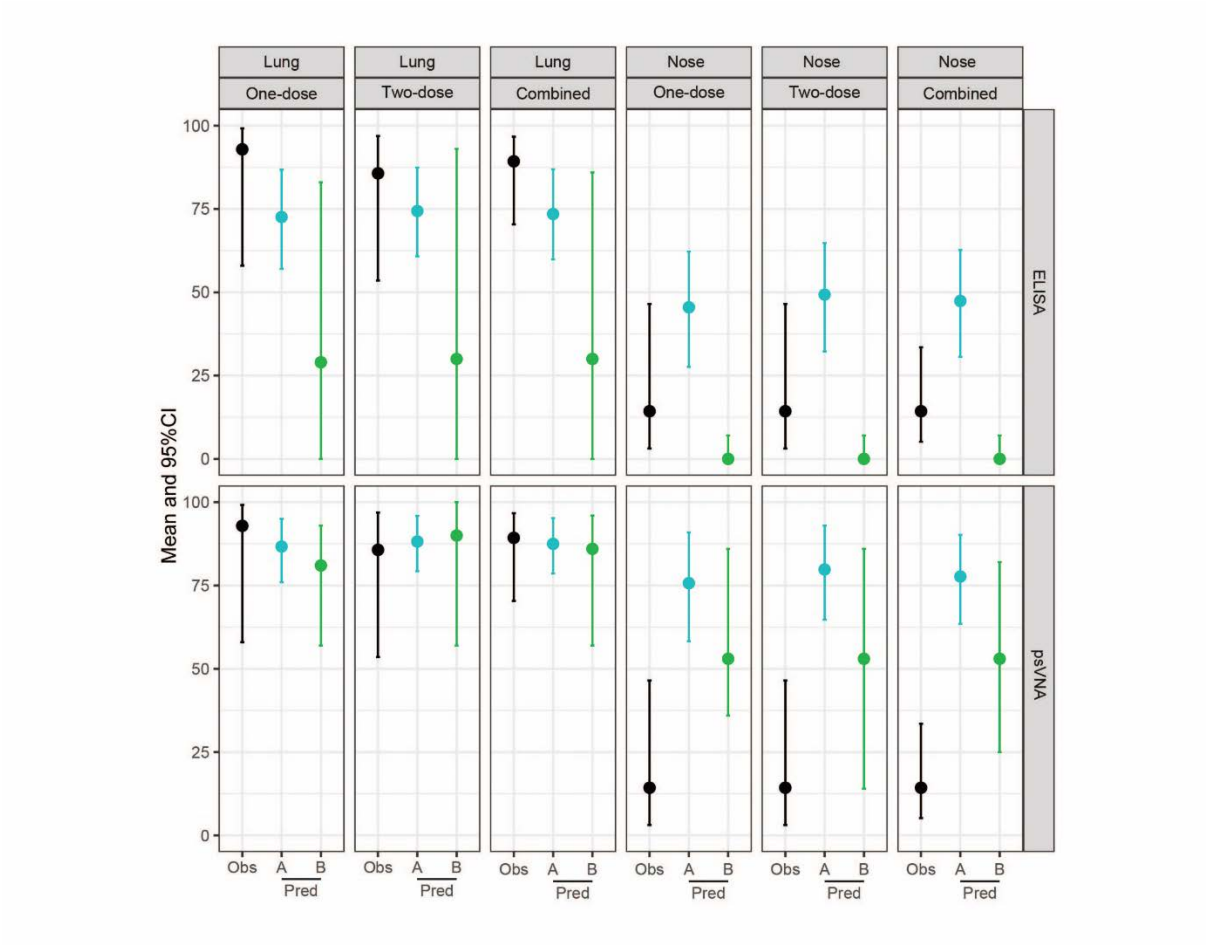
**Supplementary Figure 4: Viral load kinetics in the nose of individual animals of the 6M durability study**



(**a**-**e**) Six months (25 weeks) post immunization the NHPs were inoculated with SARS-CoV-2. Viral load was analyzed in nasal swabs taken from NHPs immunized with a single dose of Ad26.COV2.S at a dose level of $1x10^{11}$ vp (N=7; Group 2; panel **b**), a single dose of Ad26.COV2.S at a dose level of $5x10^{10}$ vp (N=7; Group 3; panel **c**), two doses of Ad26.COV2.S at a dose level of $5x10^{10}$ vp with a 4-week interval (N=7; Group 4; panel **d**), two doses of Ad26.COV2.S at a dose level of $5x10^{10}$ vp with an 8-week interval (N=7; Group 5; panel **e**) or control animals (N=4 immunized with saline, N=3 treatment naïve; Group 1; panel **a**) at Day -1, 1, 2, 4, 7, 10 and at sacrifice (Day 13 or 14 depending on animal cohort assignment) after SARS-CoV-2 challenge. In these graphs viral load values observed at sacrifice are shown at Day 14 for all animals. RNA was extracted from nasal swabs, followed by RT-qPCR using sequences targeting the E gene sgRNA of virus replication cellular intermediates. LOD is set at 125 copies/mL ($Log_{10}$ = 2.1) based on the limit of detection being 1 RNA copy per reaction multiplied by 125 to correct for sample dilutions. The median viral load per group is indicated in red, viral load in individual animals is indicated in black. On the x axis, days post infections on which samples were collected are shown in black; days post infections on which samples were not collected as per study plan are shown in grey. **(f)** Duration (days) of viral load in nasal swabs after SARS-CoV-2 challenged of control and vaccinated macaques. Black dots represent individual animals, red lines the group mean. Data represent results from a single study, and were obtained as technical duplicates. The statistical analysis was performed using a two-sided Mann-Whitney U test. Red asterisks indicate the statistical significance. (*$p<0.05$, ** $p<0.01$, *** $p<0.001$). Exact p-values for panel **f** are 0.0122 for Group 2, 0.0734 for Group 3, 0.196 for Group 4 and 0.0122 for Group 5.

LOD = Limit of detection; LRT = lower respiratory track; N = number of animals; NHPs = nonhuman primates; RNA = ribonucleic acid; RT-qPCR = reverse transcriptase quantitative polymerase chain reaction; sgRNA = subgenomic ribonucleic acid; vp = virus particles.

**Supplementary Figure 5: Comparison between observed and predicted protection based on correlate models obtained with data of all vaccine candidates combined.**




Comparison of the observed (Obs, One-Dose n=14, Two-Dose n=14, Combined n=28) protection probability 6 months after vaccination with Ad26.COV2.S with the predicted (Pred) protection probability based on pre-challenge binding (S-ELISA) and neutralizing antibody (psVNA) levels and correlate of protection models (logistic models (Pred A) and sigmoid Emax models (Pred B)) constructed based on immunogenicity data of all Ad26-based vaccine candidates, obtained 4 weeks after vaccination in a total of 81 NHP from 3-independent studies. Dots are the mean values and the vertical lines represent the 95% CI. Predictions are shown for both models based on data of all vaccine candidates in both the lung and the nose.

## SUPPLEMENTARY TABLES

### Supplementary Table 1: Schematic representation of the three NHP studies used to build the models

| Study | Immunization (Week 0) | Construct | Dose (vp) | SARS-CoV-2 Challenge (Week 6) | Number of NHP |
|---|---|---|---|---|---|
| 20-07 | Ad26NCOV002 | tPA.S | $1x10^{11}$ | $1x10^5$ $TCID_{50}$ USA-WA1/2020 | 4 |
| | Ad26NCOV004 | tPA.S.PP | $1x10^{11}$ | | 4 |
| | Ad26NCOV006 | S | $1x10^{11}$ | | 4 |
| | Ad26NCOV008 | S.dCT | $1x10^{11}$ | | 4 |
| | Ad26NCOV014 | tPA.WT.S | $1x10^{11}$ | | 4 |
| | Ad26NCOV028 | S.dTM.PP | $1x10^{11}$ | | 4 |
| 20-09 | Ad26NCOV028 | S.dTM.PP | $1x10^{11}$ | | 2 |
| | Ad26.COV2.S (Ad26NCOV030) | S.PP | $1x10^{11}$ | | 6 |
| 20-14 | Ad26.COV2.S (Ad26NCOV030) | S.PP | $1x10^{11}$ | | 5 |
| | | | $5x10^{10}$ | | 5 |
| | | | $1.125x10^{10}$ | | 5 |
| | | | $2x10^9$ | | 5 |
| 20-07 | N/A | N/A | N/A | | 10 |
| 20-09 | N/A | N/A | N/A | | 10 |
| 20-14 | N/A | N/A | N/A | | 10 |

Vp: viral particles; NHP: nonhuman primates; tPA.S: full length spike protein (S) in which the wild-type (wt) signal peptide (SP) is replaced by tissue plasminogen activator (tPA) SP; tPA.S.PP: full length S in which SP is replaced by tPA and in which the furin cleavage site mutations and proline substitutions (K986P, V987P) have been introduced; S: native full length spike protein; S.dCT: full length S in which the cytoplasmic tail (CT) is deleted; tPA.WT.S: full-length S in which tPA SP is added upstream of the wt SP; S.dTM.PP: full length S in which the transmembrane domain (TM) is deleted and the furin cleavage site mutations and proline substitutions (K986P, V987P) have been introduced; S.PP: full length S in which furin cleavage site mutations and proline substitutions have been introduced; $TCID_{50}$: 50% Tissue Culture Infectious Dose; N/A: not applicable, which refer to the placebo animal group.

## Supplementary Table 2: Six-month durability study design

| **Group** | **N** | **Treatment** | **Dose 1 (vp)** | **Dose 2 (vp)** | **Interval (Weeks)** | **SARS-CoV-2 Inoculation $1x10^5$ $TCID_{50}$ USA-WA1/2020 (Week^)** |
|---|---|---|---|---|---|---|
| 1 | 7 | Control (Placebo)[a] | Saline | Saline | 8/- | 25 |
| 2 | 7 | Single dose of Ad26.COV2.S | $1 \times 10^{11}$ | N/A | 0 | 25 |
| 3 | 7 | Single dose of Ad26.COV2.S | $5 \times 10^{10}$ | N/A | 0 | 25 |
| 4 | 7 | Two doses of Ad26.COV2.S | $5 \times 10^{10}$ | $5 \times 10^{10}$ | 4 | 25 |
| 5 | 7 | Two doses of Ad26.COV2.S | $5 \times 10^{10}$ | $5 \times 10^{10}$ | 8 | 25 |

[a]In the control group, four animals in the control group received saline whereas three were added to the control group after immunization and did not receive saline. ^Week number refers to the total number of weeks that passed between the first day of immunization (Ad26.COV2.S or saline) and the SARS-CoV-2 challenge day. Week 0 is considered the week of the first immunization.
N/A: not applicable; PFU: plaque forming units; $TCID_{50}$: 50% Tissue Culture Infectious Dose; vp: viral particles.

## Supplementary Table 3: Statistical comparison between vaccinated vs control groups in the six-month durability study

| **Lung** | | |
|---|---|---|
| **Ad26.COV2.S dose level and regimen** | **Peak viral load** | **Number of sampling days with viral load above LOD** |
| $1x10^{11}$ vp | 0.000583 *** | 0.000583 *** |
| $5x10^{10}$ vp | 0.00116 ** | 0.00175 ** |
| $5x10^{10}$ vp Week 0,4 | 0.000583 *** | 0.000583 *** |
| $5x10^{10}$ vp Week 0,8 | 0.00350 ** | 0.00641** |
| **Nose** | | |
| **Ad26.COV2.S dose level and regimen** | **Peak viral load** | **Number of sampling days with viral load above LOD** |
| $1x10^{11}$ vp | 0.0730 | 0.0122 * |
| $5x10^{10}$ vp | 1.000 | 0.0734 |
| $5x10^{10}$ vp Week 0,4 | 0.535 | 0.196 |
| $5x10^{10}$ vp Week 0,8 | 0.0379 * | 0.0122 * |

Comparison of peak viral load and number of sampling days with viral load above lower limit of detection (LOD) of lung and nose samples taken at Day 13 after SARS-CoV-2 inoculation. Pairwise comparison of nonhuman primates (NHPs) immunized with different Ad26.COV2.S dose levels and regimens versus NHPs included in the control group was done with a 2-sided Mann-Whitney test. Significant difference is indicated by asterisks: ***: $p \leq 0.001$; **: $p \leq 0.01$; *: $p \leq 0.05$.

## Supplementary Table 4: Source data file for Figure 1

## Panel a and b

| Animal ID | Study # | Vaccine construct | Lung peak viral load (copies/mL) | psVNA ($log_{10}$ $IC_{50}$) | Protection_lung |
|---|---|---|---|---|---|
| 6418 | 20-07 | Sham | 4.543 | 1.415 | 0 |
| 6768 | 20-07 | S.dCT | ≤LOD | 1.987 | 1 |
| 6770 | 20-07 | tPA.WT.S | ≤LOD | 2.079 | 1 |
| 6855 | 20-07 | tPA.S | ≤LOD | 1.892 | 1 |
| 6856 | 20-07 | tPA.S | 5.097 | 1.613 | 0 |
| 6905 | 20-07 | S.dTM.PP | ≤LOD | 2.225 | 1 |
| 6906 | 20-07 | S.dTM.PP | 3.812 | 1.908 | 0 |
| 7028 | 20-07 | tPA.S.PP | 3.341 | 2.083 | 0 |
| 7056 | 20-07 | tPA.S.PP | 4.641 | 1.892 | 0 |
| 7123 | 20-07 | Sham | 5.575 | NA | 0 |
| 7130 | 20-07 | Sham | 4.895 | NA | 0 |
| 7145 | 20-07 | Sham | 6.103 | NA | 0 |
| 7154 | 20-07 | Sham | 4.615 | NA | 0 |
| 7157 | 20-07 | Sham | 4.871 | NA | 0 |
| 7245 | 20-07 | Sham | 6.288 | NA | 0 |
| 7261 | 20-07 | Sham | 5.400 | NA | 0 |
| BM39 | 20-07 | tPA.S | 4.170 | 1.505 | 0 |
| BO49 | 20-07 | tPA.S | ≤LOD | 1.732 | 1 |
| BO93 | 20-07 | tPA.S.PP | ≤LOD | 2.236 | 1 |
| BO95 | 20-07 | tPA.S.PP | ≤LOD | 2.072 | 1 |
| BP11 | 20-07 | S.dCT | 3.514 | 2.100 | 0 |
| BS64 | 20-07 | Sham | 4.036 | 1.491 | 0 |
| BS80 | 20-07 | Sham | 4.927 | 1.398 | 0 |
| BS82 | 20-07 | S | 3.636 | 2.009 | 0 |
| BV16 | 20-07 | S | ≤LOD | 2.017 | 1 |
| BV35 | 20-07 | S.dCT | ≤LOD | 1.987 | 1 |
| BV36 | 20-07 | S.dCT | ≤LOD | 2.037 | 1 |
| BV58 | 20-07 | tPA.WT.S | ≤LOD | 2.017 | 1 |
| BV79 | 20-07 | tPA.WT.S | ≤LOD | 2.312 | 1 |
| BV95 | 20-07 | S.dTM.PP | ≤LOD | 2.111 | 1 |
| BV96 | 20-07 | S.dTM.PP | 3.070 | 1.724 | 0 |
| T781 | 20-07 | S | 3.733 | 2.201 | 0 |
| T796 | 20-07 | S | ≤LOD | 2.305 | 1 |
| T799 | 20-07 | tPA.WT.S | ≤LOD | 1.748 | 1 |
| 171170 | 20-09 | S.dTM.PP | ≤LOD | 1.716 | 1 |
| 171219 | 20-09 | Sham | 4.934 | 1.505 | 0 |
| 171264 | 20-09 | Sham | 3.958 | 1.301 | 0 |
| 180662 | 20-09 | S.PP | ≤LOD | 2.751 | 1 |
| 180689 | 20-09 | S.PP | ≤LOD | 2.318 | 1 |
| 181267 | 20-09 | S.PP | ≤LOD | 2.637 | 1 |
| 181302 | 20-09 | S.PP | ≤LOD | 2.808 | 1 |

| Animal ID | Study # | Vaccine construct | Lung peak viral load (copies/mL) | psVNA ($log_{10}$ $IC_{50}$) | Protection_lung |
|---|---|---|---|---|---|
| 181343 | 20-09 | S.PP | ≤LOD | 2.581 | 1 |
| 181363 | 20-09 | S.PP | ≤LOD | 2.525 | 1 |
| 191358 | 20-09 | Sham | 5.912 | 1.519 | 0 |
| 191372 | 20-09 | Sham | 4.443 | 1.462 | 0 |
| T414 | 20-09 | Sham | 3.846 | NA | 0 |
| T423 | 20-09 | Sham | 3.587 | NA | 0 |
| T436 | 20-09 | Sham | 6.510 | NA | 0 |
| T440 | 20-09 | Sham | 5.316 | NA | 0 |
| T457 | 20-09 | Sham | 4.614 | NA | 0 |
| T463 | 20-09 | Sham | 4.592 | NA | 0 |
| 15-072 | 20-14 | S.PP | ≤LOD | 2.369 | 1 |
| 15-084 | 20-14 | S.PP | ≤LOD | 2.840 | 1 |
| 15-086 | 20-14 | S.PP | ≤LOD | 2.643 | 1 |
| 15-104 | 20-14 | S.PP | ≤LOD | 2.061 | 1 |
| 15-108 | 20-14 | S.PP | ≤LOD | 1.886 | 1 |
| 15-114 | 20-14 | S.PP | 2.623 | 1.973 | 0 |
| 15-115 | 20-14 | S.PP | ≤LOD | 2.173 | 1 |
| 15-117 | 20-14 | S.PP | ≤LOD | 2.910 | 1 |
| 15-118 | 20-14 | S.PP | ≤LOD | 1.301 | 1 |
| 15-131 | 20-14 | S.PP | ≤LOD | 2.455 | 1 |
| 15-139 | 20-14 | S.PP | ≤LOD | 2.519 | 1 |
| 15-140 | 20-14 | S.PP | 3.962 | 1.301 | 0 |
| 15-143 | 20-14 | S.PP | ≤LOD | 2.267 | 1 |
| 15-145 | 20-14 | S.PP | ≤LOD | 2.840 | 1 |
| 15-146 | 20-14 | Sham | 4.691 | 1.301 | 0 |
| 15-148 | 20-14 | Sham | 3.164 | 1.301 | 0 |
| 15-157 | 20-14 | S.PP | ≤LOD | 2.456 | 1 |
| 15-159 | 20-14 | S.PP | ≤LOD | 2.910 | 1 |
| 15-161 | 20-14 | S.PP | ≤LOD | 2.146 | 1 |
| 15-169 | 20-14 | S.PP | ≤LOD | 1.301 | 1 |
| 15-171 | 20-14 | S.PP | ≤LOD | 2.053 | 1 |
| 15-173 | 20-14 | S.PP | ≤LOD | 1.699 | 1 |
| 15-175 | 20-14 | Sham | 5.064 | 1.301 | 0 |
| 15-179 | 20-14 | Sham | 3.877 | 1.301 | 0 |
| 15-183 | 20-14 | Sham | 3.888 | 1.301 | 0 |
| T434F | 20-14 | Sham | 2.696 | NA | 0 |
| T435F | 20-14 | Sham | 4.277 | NA | 0 |
| T455M | 20-14 | Sham | 3.905 | NA | 0 |
| T458M | 20-14 | Sham | 6.487 | NA | 0 |
| T459M | 20-14 | Sham | 4.182 | NA | 0 |

psVNA: pseudotyped virus neutralization assay; $IC_{50}$: 50% neutralization antibody titer; LOD: limit of detection; NA: not available

## Panel c and d

| Animal ID | Study # | Vaccine construct | Lung peak viral load (copies/mL) | ELISA ($log_{10}$ EU/ml) | Protection_lung |
|---|---|---|---|---|---|
| 6418 | 20-07 | Sham | 4.543 | 1.702 | 0 |
| 6768 | 20-07 | S.dCT | ≤LOD | NA | 1 |
| 6770 | 20-07 | tPA.WT.S | ≤LOD | NA | 1 |
| 6855 | 20-07 | tPA.S | ≤LOD | 2.479 | 1 |
| 6856 | 20-07 | tPA.S | 5.097 | 2.163 | 0 |
| 6905 | 20-07 | S.dTM.PP | ≤LOD | 3.279 | 1 |
| 6906 | 20-07 | S.dTM.PP | 3.812 | 2.515 | 0 |
| 7028 | 20-07 | tPA.S.PP | 3.341 | 3.452 | 0 |
| 7056 | 20-07 | tPA.S.PP | 4.641 | 3.142 | 0 |
| 7123 | 20-07 | Sham | 5.575 | NA | 0 |
| 7130 | 20-07 | Sham | 4.895 | NA | 0 |
| 7145 | 20-07 | Sham | 6.103 | NA | 0 |
| 7154 | 20-07 | Sham | 4.615 | NA | 0 |
| 7157 | 20-07 | Sham | 4.871 | NA | 0 |
| 7245 | 20-07 | Sham | 6.288 | NA | 0 |
| 7261 | 20-07 | Sham | 5.400 | NA | 0 |
| BM39 | 20-07 | tPA.S | 4.170 | 1.702 | 0 |
| BO49 | 20-07 | tPA.S | ≤LOD | 2.357 | 1 |
| BO93 | 20-07 | tPA.S.PP | ≤LOD | 3.130 | 1 |
| BO95 | 20-07 | tPA.S.PP | ≤LOD | 3.132 | 1 |
| BP11 | 20-07 | S.dCT | 3.514 | 3.185 | 0 |
| BS64 | 20-07 | Sham | 4.036 | 1.702 | 0 |
| BS80 | 20-07 | Sham | 4.927 | 3.752 | 0 |
| BS82 | 20-07 | S | 3.636 | 3.290 | 0 |
| BV16 | 20-07 | S | ≤LOD | 3.500 | 1 |
| BV35 | 20-07 | S.dCT | ≤LOD | 2.637 | 1 |
| BV36 | 20-07 | S.dCT | ≤LOD | 3.293 | 1 |
| BV58 | 20-07 | tPA.WT.S | ≤LOD | 3.662 | 1 |
| BV79 | 20-07 | tPA.WT.S | ≤LOD | 3.914 | 1 |
| BV95 | 20-07 | S.dTM.PP | ≤LOD | 4.288 | 1 |
| BV96 | 20-07 | S.dTM.PP | 3.070 | 4.209 | 0 |
| T781 | 20-07 | S | 3.733 | 2.822 | 0 |
| T796 | 20-07 | S | ≤LOD | 3.174 | 1 |
| T799 | 20-07 | tPA.WT.S | ≤LOD | 2.724 | 1 |
| 171170 | 20-09 | S.dTM.PP | ≤LOD | 3.060 | 1 |
| 171219 | 20-09 | Sham | 4.934 | 1.702 | 0 |
| 171264 | 20-09 | Sham | 3.958 | 1.702 | 0 |
| 180662 | 20-09 | S.PP | ≤LOD | 3.615 | 1 |
| 180689 | 20-09 | S.PP | ≤LOD | 3.149 | 1 |
| 181267 | 20-09 | S.PP | ≤LOD | 3.455 | 1 |
| 181302 | 20-09 | S.PP | ≤LOD | 3.710 | 1 |
| 181343 | 20-09 | S.PP | ≤LOD | 3.198 | 1 |
| 181363 | 20-09 | S.PP | ≤LOD | 3.097 | 1 |

| Animal ID | Study # | Vaccine construct | Lung peak viral load (copies/mL) | ELISA ($log_{10}$ EU/ml) | Protection_lung |
|---|---|---|---|---|---|
| 191358 | 20-09 | Sham | 5.912 | 1.702 | 0 |
| 191372 | 20-09 | Sham | 4.443 | 1.702 | 0 |
| T414 | 20-09 | Sham | 3.846 | NA | 0 |
| T423 | 20-09 | Sham | 3.587 | NA | 0 |
| T436 | 20-09 | Sham | 6.510 | NA | 0 |
| T440 | 20-09 | Sham | 5.316 | NA | 0 |
| T457 | 20-09 | Sham | 4.614 | NA | 0 |
| T463 | 20-09 | Sham | 4.592 | NA | 0 |
| 15-072 | 20-14 | S.PP | ≤LOD | 3.407 | 1 |
| 15-084 | 20-14 | S.PP | ≤LOD | 3.687 | 1 |
| 15-086 | 20-14 | S.PP | ≤LOD | 3.567 | 1 |
| 15-104 | 20-14 | S.PP | ≤LOD | 2.785 | 1 |
| 15-108 | 20-14 | S.PP | ≤LOD | 2.759 | 1 |
| 15-114 | 20-14 | S.PP | 2.623 | 2.746 | 0 |
| 15-115 | 20-14 | S.PP | ≤LOD | 3.042 | 1 |
| 15-117 | 20-14 | S.PP | ≤LOD | 3.507 | 1 |
| 15-118 | 20-14 | S.PP | ≤LOD | 2.073 | 1 |
| 15-131 | 20-14 | S.PP | ≤LOD | 3.277 | 1 |
| 15-139 | 20-14 | S.PP | ≤LOD | 3.368 | 1 |
| 15-140 | 20-14 | S.PP | 3.962 | 1.702 | 0 |
| 15-143 | 20-14 | S.PP | ≤LOD | 3.068 | 1 |
| 15-145 | 20-14 | S.PP | ≤LOD | 3.041 | 1 |
| 15-146 | 20-14 | Sham | 4.691 | 1.702 | 0 |
| 15-148 | 20-14 | Sham | 3.164 | 1.702 | 0 |
| 15-157 | 20-14 | S.PP | ≤LOD | 3.308 | 1 |
| 15-159 | 20-14 | S.PP | ≤LOD | 3.496 | 1 |
| 15-161 | 20-14 | S.PP | ≤LOD | 2.956 | 1 |
| 15-169 | 20-14 | S.PP | ≤LOD | 1.702 | 1 |
| 15-171 | 20-14 | S.PP | ≤LOD | 2.617 | 1 |
| 15-173 | 20-14 | S.PP | ≤LOD | 1.958 | 1 |
| 15-175 | 20-14 | Sham | 5.064 | 1.702 | 0 |
| 15-179 | 20-14 | Sham | 3.877 | 1.702 | 0 |
| 15-183 | 20-14 | Sham | 3.888 | 1.702 | 0 |
| T434F | 20-14 | Sham | 2.696 | NA | 0 |
| T435F | 20-14 | Sham | 4.277 | NA | 0 |
| T455M | 20-14 | Sham | 3.905 | NA | 0 |
| T458M | 20-14 | Sham | 6.487 | NA | 0 |
| T459M | 20-14 | Sham | 4.182 | NA | 0 |

ELISA: enzyme-linked immunosorbent assay; EU/mL: ELISA unit per milliliter; LOD: limit of detection; NA: not available

## Panel e and f

| Animal ID | Study # | Vaccine construct | Nose peak viral load (copies/swab) | psVNA ($log_{10}$ $IC_{50}$) | Protection_nose |
|---|---|---|---|---|---|
| 6418 | 20-07 | Sham | 6.209 | 1.415 | 0 |
| 6768 | 20-07 | S.dCT | ≤LOD | 1.987 | 1 |
| 6770 | 20-07 | tPA.WT.S | 6.162 | 2.079 | 0 |
| 6855 | 20-07 | tPA.S | ≤LOD | 1.892 | 1 |
| 6856 | 20-07 | tPA.S | 5.087 | 1.613 | 0 |
| 6905 | 20-07 | S.dTM.PP | ≤LOD | 2.225 | 1 |
| 6906 | 20-07 | S.dTM.PP | 6.104 | 1.908 | 0 |
| 7028 | 20-07 | tPA.S.PP | 5.965 | 2.083 | 0 |
| 7056 | 20-07 | tPA.S.PP | 5.701 | 1.892 | 0 |
| 7123 | 20-07 | Sham | 6.345 | NA | 0 |
| 7130 | 20-07 | Sham | 5.386 | NA | 0 |
| 7145 | 20-07 | Sham | 5.632 | NA | 0 |
| 7154 | 20-07 | Sham | NA | NA | NA |
| 7157 | 20-07 | Sham | 5.958 | NA | 0 |
| 7245 | 20-07 | Sham | 4.726 | NA | 0 |
| 7261 | 20-07 | Sham | 6.089 | NA | 0 |
| BM39 | 20-07 | tPA.S | 6.513 | 1.505 | 0 |
| BO49 | 20-07 | tPA.S | ≤LOD | 1.732 | 1 |
| BO93 | 20-07 | tPA.S.PP | ≤LOD | 2.236 | 1 |
| BO95 | 20-07 | tPA.S.PP | 5.031 | 2.072 | 0 |
| BP11 | 20-07 | S.dCT | 5.930 | 2.100 | 0 |
| BS64 | 20-07 | Sham | 4.485 | 1.491 | 0 |
| BS80 | 20-07 | Sham | 5.111 | 1.398 | 0 |
| BS82 | 20-07 | S | 5.078 | 2.009 | 0 |
| BV16 | 20-07 | S | ≤LOD | 2.017 | 1 |
| BV35 | 20-07 | S.dCT | ≤LOD | 1.987 | 1 |
| BV36 | 20-07 | S.dCT | ≤LOD | 2.037 | 1 |
| BV58 | 20-07 | tPA.WT.S | 5.620 | 2.017 | 0 |
| BV79 | 20-07 | tPA.WT.S | ≤LOD | 2.312 | 1 |
| BV95 | 20-07 | S.dTM.PP | ≤LOD | 2.111 | 1 |
| BV96 | 20-07 | S.dTM.PP | 5.785 | 1.724 | 0 |
| T781 | 20-07 | S | 6.220 | 2.201 | 0 |
| T796 | 20-07 | S | ≤LOD | 2.305 | 1 |
| T799 | 20-07 | tPA.WT.S | 5.951 | 1.748 | 0 |
| 171170 | 20-09 | S.dTM.PP | 3.858 | 1.716 | 0 |
| 171219 | 20-09 | Sham | 6.342 | 1.505 | 0 |
| 171264 | 20-09 | Sham | 6.705 | 1.301 | 0 |
| 180662 | 20-09 | S.PP | ≤LOD | 2.751 | 1 |
| 180689 | 20-09 | S.PP | ≤LOD | 2.318 | 1 |
| 181267 | 20-09 | S.PP | ≤LOD | 2.637 | 1 |
| 181302 | 20-09 | S.PP | ≤LOD | 2.808 | 1 |
| 181343 | 20-09 | S.PP | ≤LOD | 2.581 | 1 |
| 181363 | 20-09 | S.PP | 3.604 | 2.525 | 0 |

| Animal ID | Study # | Vaccine construct | Nose peak viral load (copies/swab) | psVNA ($log_{10}$ $IC_{50}$) | Protection_nose |
|---|---|---|---|---|---|
| 191358 | 20-09 | Sham | 8.010 | 1.519 | 0 |
| 191372 | 20-09 | Sham | 6.838 | 1.462 | 0 |
| T414 | 20-09 | Sham | 4.989 | NA | 0 |
| T423 | 20-09 | Sham | 5.199 | NA | 0 |
| T436 | 20-09 | Sham | 5.587 | NA | 0 |
| T440 | 20-09 | Sham | 4.073 | NA | 0 |
| T457 | 20-09 | Sham | 3.781 | NA | 0 |
| T463 | 20-09 | Sham | 5.709 | NA | 0 |
| 15-072 | 20-14 | S.PP | ≤LOD | 2.369 | 1 |
| 15-084 | 20-14 | S.PP | ≤LOD | 2.840 | 1 |
| 15-086 | 20-14 | S.PP | ≤LOD | 2.643 | 1 |
| 15-104 | 20-14 | S.PP | 4.265 | 2.061 | 0 |
| 15-108 | 20-14 | S.PP | 4.981 | 1.886 | 0 |
| 15-114 | 20-14 | S.PP | 3.639 | 1.973 | 0 |
| 15-115 | 20-14 | S.PP | ≤LOD | 2.173 | 1 |
| 15-117 | 20-14 | S.PP | ≤LOD | 2.910 | 1 |
| 15-118 | 20-14 | S.PP | 5.460 | 1.301 | 0 |
| 15-131 | 20-14 | S.PP | ≤LOD | 2.455 | 1 |
| 15-139 | 20-14 | S.PP | ≤LOD | 2.519 | 1 |
| 15-140 | 20-14 | S.PP | 5.569 | 1.301 | 0 |
| 15-143 | 20-14 | S.PP | ≤LOD | 2.267 | 1 |
| 15-145 | 20-14 | S.PP | ≤LOD | 2.840 | 1 |
| 15-146 | 20-14 | Sham | 6.154 | 1.301 | 0 |
| 15-148 | 20-14 | Sham | 6.895 | 1.301 | 0 |
| 15-157 | 20-14 | S.PP | ≤LOD | 2.456 | 1 |
| 15-159 | 20-14 | S.PP | ≤LOD | 2.910 | 1 |
| 15-161 | 20-14 | S.PP | ≤LOD | 2.146 | 1 |
| 15-169 | 20-14 | S.PP | 6.187 | 1.301 | 0 |
| 15-171 | 20-14 | S.PP | ≤LOD | 2.053 | 1 |
| 15-173 | 20-14 | S.PP | 4.763 | 1.699 | 0 |
| 15-175 | 20-14 | Sham | 5.786 | 1.301 | 0 |
| 15-179 | 20-14 | Sham | 3.215 | 1.301 | 0 |
| 15-183 | 20-14 | Sham | 6.093 | 1.301 | 0 |
| T434F | 20-14 | Sham | 5.096 | NA | 0 |
| T435F | 20-14 | Sham | 5.926 | NA | 0 |
| T455M | 20-14 | Sham | 5.239 | NA | 0 |
| T458M | 20-14 | Sham | 5.324 | NA | 0 |
| T459M | 20-14 | Sham | 6.465 | NA | 0 |

psVNA: pseudotyped virus neutralization assay; $IC_{50}$: 50% neutralization antibody titer; LOD: limit of detection; NA: not available

## Panel g and h

| Animal ID | Study # | Vaccine construct | Nose peak viral load (copies/swab) | ELISA ($log_{10}$ EU/ml) | Protection_nose |
|---|---|---|---|---|---|
| 6418 | 20-07 | Sham | 6.209 | 1.702 | 0 |
| 6768 | 20-07 | S.dCT | ≤LOD | NA | 1 |
| 6770 | 20-07 | tPA.WT.S | 6.162 | NA | 0 |
| 6855 | 20-07 | tPA.S | ≤LOD | 2.479 | 1 |
| 6856 | 20-07 | tPA.S | 5.087 | 2.163 | 0 |
| 6905 | 20-07 | S.dTM.PP | ≤LOD | 3.279 | 1 |
| 6906 | 20-07 | S.dTM.PP | 6.104 | 2.515 | 0 |
| 7028 | 20-07 | tPA.S.PP | 5.965 | 3.452 | 0 |
| 7056 | 20-07 | tPA.S.PP | 5.701 | 3.142 | 0 |
| 7123 | 20-07 | Sham | 6.345 | NA | 0 |
| 7130 | 20-07 | Sham | 5.386 | NA | 0 |
| 7145 | 20-07 | Sham | 5.632 | NA | 0 |
| 7154 | 20-07 | Sham | NA | NA | NA |
| 7157 | 20-07 | Sham | 5.958 | NA | 0 |
| 7245 | 20-07 | Sham | 4.726 | NA | 0 |
| 7261 | 20-07 | Sham | 6.089 | NA | 0 |
| BM39 | 20-07 | tPA.S | 6.513 | 1.702 | 0 |
| BO49 | 20-07 | tPA.S | ≤LOD | 2.357 | 1 |
| BO93 | 20-07 | tPA.S.PP | ≤LOD | 3.130 | 1 |
| BO95 | 20-07 | tPA.S.PP | 5.031 | 3.132 | 0 |
| BP11 | 20-07 | S.dCT | 5.930 | 3.185 | 0 |
| BS64 | 20-07 | Sham | 4.485 | 1.702 | 0 |
| BS80 | 20-07 | Sham | 5.111 | 3.752 | 0 |
| BS82 | 20-07 | S | 5.078 | 3.290 | 0 |
| BV16 | 20-07 | S | ≤LOD | 3.500 | 1 |
| BV35 | 20-07 | S.dCT | ≤LOD | 2.637 | 1 |
| BV36 | 20-07 | S.dCT | ≤LOD | 3.293 | 1 |
| BV58 | 20-07 | tPA.WT.S | 5.620 | 3.662 | 0 |
| BV79 | 20-07 | tPA.WT.S | ≤LOD | 3.914 | 1 |
| BV95 | 20-07 | S.dTM.PP | ≤LOD | 4.288 | 1 |
| BV96 | 20-07 | S.dTM.PP | 5.785 | 4.209 | 0 |
| T781 | 20-07 | S | 6.220 | 2.822 | 0 |
| T796 | 20-07 | S | ≤LOD | 3.174 | 1 |
| T799 | 20-07 | tPA.WT.S | 5.951 | 2.724 | 0 |
| 171170 | 20-09 | S.dTM.PP | 3.858 | 3.060 | 0 |
| 171219 | 20-09 | Sham | 6.342 | 1.702 | 0 |
| 171264 | 20-09 | Sham | 6.705 | 1.702 | 0 |
| 180662 | 20-09 | S.PP | ≤LOD | 3.615 | 1 |
| 180689 | 20-09 | S.PP | ≤LOD | 3.149 | 1 |
| 181267 | 20-09 | S.PP | ≤LOD | 3.455 | 1 |
| 181302 | 20-09 | S.PP | ≤LOD | 3.710 | 1 |
| 181343 | 20-09 | S.PP | ≤LOD | 3.198 | 1 |
| 181363 | 20-09 | S.PP | 3.604 | 3.097 | 0 |

| Animal ID | Study # | Vaccine construct | Nose peak viral load (copies/swab) | ELISA ($log_{10}$ EU/ml) | Protection_nose |
|---|---|---|---|---|---|
| 191358 | 20-09 | Sham | 8.010 | 1.702 | 0 |
| 191372 | 20-09 | Sham | 6.838 | 1.702 | 0 |
| T414 | 20-09 | Sham | 4.989 | NA | 0 |
| T423 | 20-09 | Sham | 5.199 | NA | 0 |
| T436 | 20-09 | Sham | 5.587 | NA | 0 |
| T440 | 20-09 | Sham | 4.073 | NA | 0 |
| T457 | 20-09 | Sham | 3.781 | NA | 0 |
| T463 | 20-09 | Sham | 5.709 | NA | 0 |
| 15-072 | 20-14 | S.PP | ≤LOD | 3.407 | 1 |
| 15-084 | 20-14 | S.PP | ≤LOD | 3.687 | 1 |
| 15-086 | 20-14 | S.PP | ≤LOD | 3.567 | 1 |
| 15-104 | 20-14 | S.PP | 4.265 | 2.785 | 0 |
| 15-108 | 20-14 | S.PP | 4.981 | 2.759 | 0 |
| 15-114 | 20-14 | S.PP | 3.639 | 2.746 | 0 |
| 15-115 | 20-14 | S.PP | ≤LOD | 3.042 | 1 |
| 15-117 | 20-14 | S.PP | ≤LOD | 3.507 | 1 |
| 15-118 | 20-14 | S.PP | 5.460 | 2.073 | 0 |
| 15-131 | 20-14 | S.PP | ≤LOD | 3.277 | 1 |
| 15-139 | 20-14 | S.PP | ≤LOD | 3.368 | 1 |
| 15-140 | 20-14 | S.PP | 5.569 | 1.702 | 0 |
| 15-143 | 20-14 | S.PP | ≤LOD | 3.068 | 1 |
| 15-145 | 20-14 | S.PP | ≤LOD | 3.041 | 1 |
| 15-146 | 20-14 | Sham | 6.154 | 1.702 | 0 |
| 15-148 | 20-14 | Sham | 6.895 | 1.702 | 0 |
| 15-157 | 20-14 | S.PP | ≤LOD | 3.308 | 1 |
| 15-159 | 20-14 | S.PP | ≤LOD | 3.496 | 1 |
| 15-161 | 20-14 | S.PP | ≤LOD | 2.956 | 1 |
| 15-169 | 20-14 | S.PP | 6.187 | 1.702 | 0 |
| 15-171 | 20-14 | S.PP | ≤LOD | 2.617 | 1 |
| 15-173 | 20-14 | S.PP | 4.763 | 1.958 | 0 |
| 15-175 | 20-14 | Sham | 5.786 | 1.702 | 0 |
| 15-179 | 20-14 | Sham | 3.215 | 1.702 | 0 |
| 15-183 | 20-14 | Sham | 6.093 | 1.702 | 0 |
| T434F | 20-14 | Sham | 5.096 | NA | 0 |
| T435F | 20-14 | Sham | 5.926 | NA | 0 |
| T455M | 20-14 | Sham | 5.239 | NA | 0 |
| T458M | 20-14 | Sham | 5.324 | NA | 0 |
| T459M | 20-14 | Sham | 6.465 | NA | 0 |

ELISA: enzyme-linked immunosorbent assay; EU/mL: ELISA unit per milliliter; LOD: limit of detection; NA: not available

## Supplementary Table 5: Source data file for Figure 2

## Panel a and b

| Animal ID | Study # | Vaccine construct | psVNA ($log_{10}$ $IC_{50}$) | Lung_reduction_R0 | Protection_lung |
|---|---|---|---|---|---|
| 6418 | 20-07 | Sham | 1.415 | 0.001 | 0 |
| 6768 | 20-07 | S.dCT | 1.987 | 0.973 | 1 |
| 6770 | 20-07 | tPA.WT.S | 2.079 | 0.973 | 1 |
| 6855 | 20-07 | tPA.S | 1.892 | 0.973 | 1 |
| 6856 | 20-07 | tPA.S | 1.613 | 0.170 | 0 |
| 6905 | 20-07 | S.dTM.PP | 2.225 | 0.973 | 1 |
| 6906 | 20-07 | S.dTM.PP | 1.908 | 0.172 | 0 |
| 7028 | 20-07 | tPA.S.PP | 2.083 | 0.002 | 0 |
| 7056 | 20-07 | tPA.S.PP | 1.892 | 0.001 | 0 |
| 7123 | 20-07 | Sham | NA | 0.262 | 0 |
| 7130 | 20-07 | Sham | NA | 0.297 | 0 |
| 7145 | 20-07 | Sham | NA | 0.168 | 0 |
| 7154 | 20-07 | Sham | NA | 0.122 | 0 |
| 7157 | 20-07 | Sham | NA | 0.001 | 0 |
| 7245 | 20-07 | Sham | NA | 0.001 | 0 |
| 7261 | 20-07 | Sham | NA | 0.001 | 0 |
| BM39 | 20-07 | tPA.S | 1.505 | 0.002 | 0 |
| BO49 | 20-07 | tPA.S | 1.732 | 0.973 | 1 |
| BO93 | 20-07 | tPA.S.PP | 2.236 | 0.973 | 1 |
| BO95 | 20-07 | tPA.S.PP | 2.072 | 0.973 | 1 |
| BP11 | 20-07 | S.dCT | 2.100 | 0.214 | 0 |
| BS64 | 20-07 | Sham | 1.491 | 0.002 | 0 |
| BS80 | 20-07 | Sham | 1.398 | 0.001 | 0 |
| BS82 | 20-07 | S | 2.009 | 0.645 | 0 |
| BV16 | 20-07 | S | 2.017 | 0.973 | 1 |
| BV35 | 20-07 | S.dCT | 1.987 | 0.973 | 1 |
| BV36 | 20-07 | S.dCT | 2.037 | 0.973 | 1 |
| BV58 | 20-07 | tPA.WT.S | 2.017 | 0.973 | 1 |
| BV79 | 20-07 | tPA.WT.S | 2.312 | 0.973 | 1 |
| BV95 | 20-07 | S.dTM.PP | 2.111 | 0.973 | 1 |
| BV96 | 20-07 | S.dTM.PP | 1.724 | 0.002 | 0 |
| T781 | 20-07 | S | 2.201 | 0.183 | 0 |
| T796 | 20-07 | S | 2.305 | 0.973 | 1 |
| T799 | 20-07 | tPA.WT.S | 1.748 | 0.973 | 1 |
| 171170 | 20-09 | S.dTM.PP | 1.716 | 0.973 | 1 |
| 171219 | 20-09 | Sham | 1.505 | 0.001 | 0 |
| 171264 | 20-09 | Sham | 1.301 | 0.001 | 0 |
| 180662 | 20-09 | S.PP | 2.751 | 0.973 | 1 |

| Animal ID | Study # | Vaccine construct | psVNA ($log_{10}$ $IC_{50}$) | Lung_reduction_R0 | Protection_lung |
|---|---|---|---|---|---|
| 180689 | 20-09 | S.PP | 2.318 | 0.973 | 1 |
| 181267 | 20-09 | S.PP | 2.637 | 0.973 | 1 |
| 181302 | 20-09 | S.PP | 2.808 | 0.973 | 1 |
| 181343 | 20-09 | S.PP | 2.581 | 0.973 | 1 |
| 181363 | 20-09 | S.PP | 2.525 | 0.973 | 1 |
| 191358 | 20-09 | Sham | 1.519 | 0.001 | 0 |
| 191372 | 20-09 | Sham | 1.462 | 0.001 | 0 |
| T414 | 20-09 | Sham | NA | 0.481 | 0 |
| T423 | 20-09 | Sham | NA | 0.001 | 0 |
| T436 | 20-09 | Sham | NA | 0.000 | 0 |
| T440 | 20-09 | Sham | NA | 0.001 | 0 |
| T457 | 20-09 | Sham | NA | 0.001 | 0 |
| T463 | 20-09 | Sham | NA | 0.001 | 0 |
| 15-072 | 20-14 | S.PP | 2.369 | 0.973 | 1 |
| 15-084 | 20-14 | S.PP | 2.840 | 0.973 | 1 |
| 15-086 | 20-14 | S.PP | 2.643 | 0.973 | 1 |
| 15-104 | 20-14 | S.PP | 2.061 | 0.973 | 1 |
| 15-108 | 20-14 | S.PP | 1.886 | 0.973 | 1 |
| 15-114 | 20-14 | S.PP | 1.973 | 0.001 | 0 |
| 15-115 | 20-14 | S.PP | 2.173 | 0.973 | 1 |
| 15-117 | 20-14 | S.PP | 2.910 | 0.973 | 1 |
| 15-118 | 20-14 | S.PP | 1.301 | 0.973 | 1 |
| 15-131 | 20-14 | S.PP | 2.455 | 0.973 | 1 |
| 15-139 | 20-14 | S.PP | 2.519 | 0.973 | 1 |
| 15-140 | 20-14 | S.PP | 1.301 | 0.152 | 0 |
| 15-143 | 20-14 | S.PP | 2.267 | 0.973 | 1 |
| 15-145 | 20-14 | S.PP | 2.840 | 0.973 | 1 |
| 15-146 | 20-14 | Sham | 1.301 | 0.002 | 0 |
| 15-148 | 20-14 | Sham | 1.301 | 0.547 | 0 |
| 15-157 | 20-14 | S.PP | 2.456 | 0.973 | 1 |
| 15-159 | 20-14 | S.PP | 2.910 | 0.973 | 1 |
| 15-161 | 20-14 | S.PP | 2.146 | 0.973 | 1 |
| 15-169 | 20-14 | S.PP | 1.301 | 0.973 | 1 |
| 15-171 | 20-14 | S.PP | 2.053 | 0.973 | 1 |
| 15-173 | 20-14 | S.PP | 1.699 | 0.973 | 1 |
| 15-175 | 20-14 | Sham | 1.301 | 0.001 | 0 |
| 15-179 | 20-14 | Sham | 1.301 | 0.499 | 0 |
| 15-183 | 20-14 | Sham | 1.301 | 0.194 | 0 |
| T434F | 20-14 | Sham | NA | 0.000 | 0 |
| T435F | 20-14 | Sham | NA | 0.001 | 0 |
| T455M | 20-14 | Sham | NA | 0.568 | 0 |

| Animal ID | Study # | Vaccine construct | psVNA ($log_{10}$ $IC_{50}$) | Lung_reduction_R0 | Protection_lung |
|---|---|---|---|---|---|
| T458M | 20-14 | Sham | NA | 0.000 | 0 |
| T459M | 20-14 | Sham | NA | 0.001 | 0 |

psVNA: pseudotyped virus neutralization assay; $IC_{50}$: 50% neutralization antibody titer; R0: virus basic reproductive ratio; NA: not available

## Panel c and d

| Animal ID | Study # | Vaccine construct | ELISA ($log_{10}$ EU/ml) | Lung_reduction_R0 | Protection_lung |
|---|---|---|---|---|---|
| 6418 | 20-07 | Sham | 1.702 | 0.001 | 0 |
| 6768 | 20-07 | S.dCT | NA | 0.973 | 1 |
| 6770 | 20-07 | tPA.WT.S | NA | 0.973 | 1 |
| 6855 | 20-07 | tPA.S | 2.479 | 0.973 | 1 |
| 6856 | 20-07 | tPA.S | 2.163 | 0.170 | 0 |
| 6905 | 20-07 | S.dTM.PP | 3.279 | 0.973 | 1 |
| 6906 | 20-07 | S.dTM.PP | 2.515 | 0.172 | 0 |
| 7028 | 20-07 | tPA.S.PP | 3.452 | 0.002 | 0 |
| 7056 | 20-07 | tPA.S.PP | 3.142 | 0.001 | 0 |
| 7123 | 20-07 | Sham | NA | 0.262 | 0 |
| 7130 | 20-07 | Sham | NA | 0.297 | 0 |
| 7145 | 20-07 | Sham | NA | 0.168 | 0 |
| 7154 | 20-07 | Sham | NA | 0.122 | 0 |
| 7157 | 20-07 | Sham | NA | 0.001 | 0 |
| 7245 | 20-07 | Sham | NA | 0.001 | 0 |
| 7261 | 20-07 | Sham | NA | 0.001 | 0 |
| BM39 | 20-07 | tPA.S | 1.702 | 0.002 | 0 |
| BO49 | 20-07 | tPA.S | 2.357 | 0.973 | 1 |
| BO93 | 20-07 | tPA.S.PP | 3.130 | 0.973 | 1 |
| BO95 | 20-07 | tPA.S.PP | 3.132 | 0.973 | 1 |
| BP11 | 20-07 | S.dCT | 3.185 | 0.214 | 0 |
| BS64 | 20-07 | Sham | 1.702 | 0.002 | 0 |
| BS80 | 20-07 | Sham | 3.752 | 0.001 | 0 |
| BS82 | 20-07 | S | 3.290 | 0.645 | 0 |
| BV16 | 20-07 | S | 3.500 | 0.973 | 1 |
| BV35 | 20-07 | S.dCT | 2.637 | 0.973 | 1 |
| BV36 | 20-07 | S.dCT | 3.293 | 0.973 | 1 |
| BV58 | 20-07 | tPA.WT.S | 3.662 | 0.973 | 1 |
| BV79 | 20-07 | tPA.WT.S | 3.914 | 0.973 | 1 |
| BV95 | 20-07 | S.dTM.PP | 4.288 | 0.973 | 1 |
| BV96 | 20-07 | S.dTM.PP | 4.209 | 0.002 | 0 |
| T781 | 20-07 | S | 2.822 | 0.183 | 0 |
| T796 | 20-07 | S | 3.174 | 0.973 | 1 |
| T799 | 20-07 | tPA.WT.S | 2.724 | 0.973 | 1 |
| 171170 | 20-09 | S.dTM.PP | 3.060 | 0.973 | 1 |
| 171219 | 20-09 | Sham | 1.702 | 0.001 | 0 |
| 171264 | 20-09 | Sham | 1.702 | 0.001 | 0 |
| 180662 | 20-09 | S.PP | 3.615 | 0.973 | 1 |
| 180689 | 20-09 | S.PP | 3.149 | 0.973 | 1 |
| 181267 | 20-09 | S.PP | 3.455 | 0.973 | 1 |
| 181302 | 20-09 | S.PP | 3.710 | 0.973 | 1 |
| 181343 | 20-09 | S.PP | 3.198 | 0.973 | 1 |
| 181363 | 20-09 | S.PP | 3.097 | 0.973 | 1 |

| Animal ID | Study # | Vaccine construct | ELISA ($log_{10}$ EU/ml) | Lung_reduction_R0 | Protection_lung |
|---|---|---|---|---|---|
| 191358 | 20-09 | Sham | 1.702 | 0.001 | 0 |
| 191372 | 20-09 | Sham | 1.702 | 0.001 | 0 |
| T414 | 20-09 | Sham | NA | 0.481 | 0 |
| T423 | 20-09 | Sham | NA | 0.001 | 0 |
| T436 | 20-09 | Sham | NA | 0.000 | 0 |
| T440 | 20-09 | Sham | NA | 0.001 | 0 |
| T457 | 20-09 | Sham | NA | 0.001 | 0 |
| T463 | 20-09 | Sham | NA | 0.001 | 0 |
| 15-072 | 20-14 | S.PP | 3.407 | 0.973 | 1 |
| 15-084 | 20-14 | S.PP | 3.687 | 0.973 | 1 |
| 15-086 | 20-14 | S.PP | 3.567 | 0.973 | 1 |
| 15-104 | 20-14 | S.PP | 2.785 | 0.973 | 1 |
| 15-108 | 20-14 | S.PP | 2.759 | 0.973 | 1 |
| 15-114 | 20-14 | S.PP | 2.746 | 0.001 | 0 |
| 15-115 | 20-14 | S.PP | 3.042 | 0.973 | 1 |
| 15-117 | 20-14 | S.PP | 3.507 | 0.973 | 1 |
| 15-118 | 20-14 | S.PP | 2.073 | 0.973 | 1 |
| 15-131 | 20-14 | S.PP | 3.277 | 0.973 | 1 |
| 15-139 | 20-14 | S.PP | 3.368 | 0.973 | 1 |
| 15-140 | 20-14 | S.PP | 1.702 | 0.152 | 0 |
| 15-143 | 20-14 | S.PP | 3.068 | 0.973 | 1 |
| 15-145 | 20-14 | S.PP | 3.041 | 0.973 | 1 |
| 15-146 | 20-14 | Sham | 1.702 | 0.002 | 0 |
| 15-148 | 20-14 | Sham | 1.702 | 0.547 | 0 |
| 15-157 | 20-14 | S.PP | 3.308 | 0.973 | 1 |
| 15-159 | 20-14 | S.PP | 3.496 | 0.973 | 1 |
| 15-161 | 20-14 | S.PP | 2.956 | 0.973 | 1 |
| 15-169 | 20-14 | S.PP | 1.702 | 0.973 | 1 |
| 15-171 | 20-14 | S.PP | 2.617 | 0.973 | 1 |
| 15-173 | 20-14 | S.PP | 1.958 | 0.973 | 1 |
| 15-175 | 20-14 | Sham | 1.702 | 0.001 | 0 |
| 15-179 | 20-14 | Sham | 1.702 | 0.499 | 0 |
| 15-183 | 20-14 | Sham | 1.702 | 0.194 | 0 |
| T434F | 20-14 | Sham | NA | 0.000 | 0 |
| T435F | 20-14 | Sham | NA | 0.001 | 0 |
| T455M | 20-14 | Sham | NA | 0.568 | 0 |
| T458M | 20-14 | Sham | NA | 0.000 | 0 |
| T459M | 20-14 | Sham | NA | 0.001 | 0 |

ELISA: enzyme-linked immunosorbent assay; EU/mL: ELISA unit per milliliter; R0: virus basic reproductive ratio; NA: not available

## Panel e and f

| Animal ID | Study # | Vaccine construct | psVNA ($log_{10}$ $IC_{50}$) | Nose_reduction_R0 | Protection_nose |
|---|---|---|---|---|---|
| 6418 | 20-07 | Sham | 1.415 | 0.000 | 0 |
| 6768 | 20-07 | S.dCT | 1.987 | 0.967 | 1 |
| 6770 | 20-07 | tPA.WT.S | 2.079 | 0.405 | 0 |
| 6855 | 20-07 | tPA.S | 1.892 | 0.967 | 1 |
| 6856 | 20-07 | tPA.S | 1.613 | 0.258 | 0 |
| 6905 | 20-07 | S.dTM.PP | 2.225 | 0.967 | 1 |
| 6906 | 20-07 | S.dTM.PP | 1.908 | 0.255 | 0 |
| 7028 | 20-07 | tPA.S.PP | 2.083 | 0.336 | 0 |
| 7056 | 20-07 | tPA.S.PP | 1.892 | 0.064 | 0 |
| 7123 | 20-07 | Sham | NA | 0.000 | 0 |
| 7130 | 20-07 | Sham | NA | 0.000 | 0 |
| 7145 | 20-07 | Sham | NA | 0.000 | 0 |
| 7154 | 20-07 | Sham | NA | 0.000 | 0 |
| 7157 | 20-07 | Sham | NA | 0.000 | 0 |
| 7245 | 20-07 | Sham | NA | 0.000 | 0 |
| 7261 | 20-07 | Sham | NA | 0.000 | 0 |
| BM39 | 20-07 | tPA.S | 1.505 | 0.069 | 0 |
| BO49 | 20-07 | tPA.S | 1.732 | 0.967 | 1 |
| BO93 | 20-07 | tPA.S.PP | 2.236 | 0.967 | 1 |
| BO95 | 20-07 | tPA.S.PP | 2.072 | 0.023 | 0 |
| BP11 | 20-07 | S.dCT | 2.100 | 0.060 | 0 |
| BS64 | 20-07 | Sham | 1.491 | 0.000 | 0 |
| BS80 | 20-07 | Sham | 1.398 | 0.042 | 0 |
| BS82 | 20-07 | S | 2.009 | 0.127 | 0 |
| BV16 | 20-07 | S | 2.017 | 0.967 | 1 |
| BV35 | 20-07 | S.dCT | 1.987 | 0.967 | 1 |
| BV36 | 20-07 | S.dCT | 2.037 | 0.967 | 1 |
| BV58 | 20-07 | tPA.WT.S | 2.017 | 0.489 | 0 |
| BV79 | 20-07 | tPA.WT.S | 2.312 | 0.967 | 1 |
| BV95 | 20-07 | S.dTM.PP | 2.111 | 0.967 | 1 |
| BV96 | 20-07 | S.dTM.PP | 1.724 | 0.064 | 0 |
| T781 | 20-07 | S | 2.201 | 0.331 | 0 |
| T796 | 20-07 | S | 2.305 | 0.967 | 1 |
| T799 | 20-07 | tPA.WT.S | 1.748 | 0.063 | 0 |
| 171170 | 20-09 | S.dTM.PP | 1.716 | 0.020 | 0 |
| 171219 | 20-09 | Sham | 1.505 | 0.000 | 0 |
| 171264 | 20-09 | Sham | 1.301 | 0.000 | 0 |
| 180662 | 20-09 | S.PP | 2.751 | 0.967 | 1 |
| 180689 | 20-09 | S.PP | 2.318 | 0.967 | 1 |
| 181267 | 20-09 | S.PP | 2.637 | 0.967 | 1 |
| 181302 | 20-09 | S.PP | 2.808 | 0.967 | 1 |
| 181343 | 20-09 | S.PP | 2.581 | 0.967 | 1 |
| 181363 | 20-09 | S.PP | 2.525 | 0.023 | 0 |

| Animal ID | Study # | Vaccine construct | psVNA ($log_{10}$ $IC_{50}$) | Nose_reduction_R0 | Protection_nose |
|---|---|---|---|---|---|
| 191358 | 20-09 | Sham | 1.519 | 0.000 | 0 |
| 191372 | 20-09 | Sham | 1.462 | 0.000 | 0 |
| T414 | 20-09 | Sham | NA | 0.000 | 0 |
| T423 | 20-09 | Sham | NA | 0.015 | 0 |
| T436 | 20-09 | Sham | NA | 0.044 | 0 |
| T440 | 20-09 | Sham | NA | 0.099 | 0 |
| T457 | 20-09 | Sham | NA | 0.000 | 0 |
| T463 | 20-09 | Sham | NA | 0.000 | 0 |
| 15-072 | 20-14 | S.PP | 2.369 | 0.967 | 1 |
| 15-084 | 20-14 | S.PP | 2.840 | 0.967 | 1 |
| 15-086 | 20-14 | S.PP | 2.643 | 0.967 | 1 |
| 15-104 | 20-14 | S.PP | 2.061 | 0.026 | 0 |
| 15-108 | 20-14 | S.PP | 1.886 | 0.050 | 0 |
| 15-114 | 20-14 | S.PP | 1.973 | 0.322 | 0 |
| 15-115 | 20-14 | S.PP | 2.173 | 0.967 | 1 |
| 15-117 | 20-14 | S.PP | 2.910 | 0.967 | 1 |
| 15-118 | 20-14 | S.PP | 1.301 | 0.118 | 0 |
| 15-131 | 20-14 | S.PP | 2.455 | 0.967 | 1 |
| 15-139 | 20-14 | S.PP | 2.519 | 0.967 | 1 |
| 15-140 | 20-14 | S.PP | 1.301 | 0.039 | 0 |
| 15-143 | 20-14 | S.PP | 2.267 | 0.967 | 1 |
| 15-145 | 20-14 | S.PP | 2.840 | 0.967 | 1 |
| 15-146 | 20-14 | Sham | 1.301 | 0.000 | 0 |
| 15-148 | 20-14 | Sham | 1.301 | 0.000 | 0 |
| 15-157 | 20-14 | S.PP | 2.456 | 0.967 | 1 |
| 15-159 | 20-14 | S.PP | 2.910 | 0.967 | 1 |
| 15-161 | 20-14 | S.PP | 2.146 | 0.967 | 1 |
| 15-169 | 20-14 | S.PP | 1.301 | 0.033 | 0 |
| 15-171 | 20-14 | S.PP | 2.053 | 0.967 | 1 |
| 15-173 | 20-14 | S.PP | 1.699 | 0.070 | 0 |
| 15-175 | 20-14 | Sham | 1.301 | 0.000 | 0 |
| 15-179 | 20-14 | Sham | 1.301 | 0.000 | 0 |
| 15-183 | 20-14 | Sham | 1.301 | 0.000 | 0 |
| T434F | 20-14 | Sham | NA | 0.152 | 0 |
| T435F | 20-14 | Sham | NA | 0.047 | 0 |
| T455M | 20-14 | Sham | NA | 0.174 | 0 |
| T458M | 20-14 | Sham | NA | 0.126 | 0 |
| T459M | 20-14 | Sham | NA | 0.000 | 0 |

psVNA: pseudotyped virus neutralization assay; $IC_{50}$: 50% neutralization antibody titer; R0: virus basic reproductive ratio; NA: not available

## Panel g and h

| Animal ID | Study # | Vaccine construct | ELISA ($log_{10}$ EU/ml) | Nose_reduction_R0 | Protection_nose |
|---|---|---|---|---|---|
| 6418 | 20-07 | Sham | 1.702 | 0.000 | 0 |
| 6768 | 20-07 | S.dCT | NA | 0.967 | 1 |
| 6770 | 20-07 | tPA.WT.S | NA | 0.405 | 0 |
| 6855 | 20-07 | tPA.S | 2.479 | 0.967 | 1 |
| 6856 | 20-07 | tPA.S | 2.163 | 0.258 | 0 |
| 6905 | 20-07 | S.dTM.PP | 3.279 | 0.967 | 1 |
| 6906 | 20-07 | S.dTM.PP | 2.515 | 0.255 | 0 |
| 7028 | 20-07 | tPA.S.PP | 3.452 | 0.336 | 0 |
| 7056 | 20-07 | tPA.S.PP | 3.142 | 0.064 | 0 |
| 7123 | 20-07 | Sham | NA | 0.000 | 0 |
| 7130 | 20-07 | Sham | NA | 0.000 | 0 |
| 7145 | 20-07 | Sham | NA | 0.000 | 0 |
| 7154 | 20-07 | Sham | NA | 0.000 | 0 |
| 7157 | 20-07 | Sham | NA | 0.000 | 0 |
| 7245 | 20-07 | Sham | NA | 0.000 | 0 |
| 7261 | 20-07 | Sham | NA | 0.000 | 0 |
| BM39 | 20-07 | tPA.S | 1.702 | 0.069 | 0 |
| BO49 | 20-07 | tPA.S | 2.357 | 0.967 | 1 |
| BO93 | 20-07 | tPA.S.PP | 3.130 | 0.967 | 1 |
| BO95 | 20-07 | tPA.S.PP | 3.132 | 0.023 | 0 |
| BP11 | 20-07 | S.dCT | 3.185 | 0.060 | 0 |
| BS64 | 20-07 | Sham | 1.702 | 0.000 | 0 |
| BS80 | 20-07 | Sham | 3.752 | 0.042 | 0 |
| BS82 | 20-07 | S | 3.290 | 0.127 | 0 |
| BV16 | 20-07 | S | 3.500 | 0.967 | 1 |
| BV35 | 20-07 | S.dCT | 2.637 | 0.967 | 1 |
| BV36 | 20-07 | S.dCT | 3.293 | 0.967 | 1 |
| BV58 | 20-07 | tPA.WT.S | 3.662 | 0.489 | 0 |
| BV79 | 20-07 | tPA.WT.S | 3.914 | 0.967 | 1 |
| BV95 | 20-07 | S.dTM.PP | 4.288 | 0.967 | 1 |
| BV96 | 20-07 | S.dTM.PP | 4.209 | 0.064 | 0 |
| T781 | 20-07 | S | 2.822 | 0.331 | 0 |
| T796 | 20-07 | S | 3.174 | 0.967 | 1 |
| T799 | 20-07 | tPA.WT.S | 2.724 | 0.063 | 0 |
| 171170 | 20-09 | S.dTM.PP | 3.060 | 0.020 | 0 |
| 171219 | 20-09 | Sham | 1.702 | 0.000 | 0 |
| 171264 | 20-09 | Sham | 1.702 | 0.000 | 0 |
| 180662 | 20-09 | S.PP | 3.615 | 0.967 | 1 |
| 180689 | 20-09 | S.PP | 3.149 | 0.967 | 1 |
| 181267 | 20-09 | S.PP | 3.455 | 0.967 | 1 |
| 181302 | 20-09 | S.PP | 3.710 | 0.967 | 1 |
| 181343 | 20-09 | S.PP | 3.198 | 0.967 | 1 |
| 181363 | 20-09 | S.PP | 3.097 | 0.023 | 0 |

| Animal ID | Study # | Vaccine construct | ELISA ($log_{10}$ EU/ml) | Nose_reduction_R0 | Protection_nose |
|---|---|---|---|---|---|
| 191358 | 20-09 | Sham | 1.702 | 0.000 | 0 |
| 191372 | 20-09 | Sham | 1.702 | 0.000 | 0 |
| T414 | 20-09 | Sham | NA | 0.000 | 0 |
| T423 | 20-09 | Sham | NA | 0.015 | 0 |
| T436 | 20-09 | Sham | NA | 0.044 | 0 |
| T440 | 20-09 | Sham | NA | 0.099 | 0 |
| T457 | 20-09 | Sham | NA | 0.000 | 0 |
| T463 | 20-09 | Sham | NA | 0.000 | 0 |
| 15-072 | 20-14 | S.PP | 3.407 | 0.967 | 1 |
| 15-084 | 20-14 | S.PP | 3.687 | 0.967 | 1 |
| 15-086 | 20-14 | S.PP | 3.567 | 0.967 | 1 |
| 15-104 | 20-14 | S.PP | 2.785 | 0.026 | 0 |
| 15-108 | 20-14 | S.PP | 2.759 | 0.050 | 0 |
| 15-114 | 20-14 | S.PP | 2.746 | 0.322 | 0 |
| 15-115 | 20-14 | S.PP | 3.042 | 0.967 | 1 |
| 15-117 | 20-14 | S.PP | 3.507 | 0.967 | 1 |
| 15-118 | 20-14 | S.PP | 2.073 | 0.118 | 0 |
| 15-131 | 20-14 | S.PP | 3.277 | 0.967 | 1 |
| 15-139 | 20-14 | S.PP | 3.368 | 0.967 | 1 |
| 15-140 | 20-14 | S.PP | 1.702 | 0.039 | 0 |
| 15-143 | 20-14 | S.PP | 3.068 | 0.967 | 1 |
| 15-145 | 20-14 | S.PP | 3.041 | 0.967 | 1 |
| 15-146 | 20-14 | Sham | 1.702 | 0.000 | 0 |
| 15-148 | 20-14 | Sham | 1.702 | 0.000 | 0 |
| 15-157 | 20-14 | S.PP | 3.308 | 0.967 | 1 |
| 15-159 | 20-14 | S.PP | 3.496 | 0.967 | 1 |
| 15-161 | 20-14 | S.PP | 2.956 | 0.967 | 1 |
| 15-169 | 20-14 | S.PP | 1.702 | 0.033 | 0 |
| 15-171 | 20-14 | S.PP | 2.617 | 0.967 | 1 |
| 15-173 | 20-14 | S.PP | 1.958 | 0.070 | 0 |
| 15-175 | 20-14 | Sham | 1.702 | 0.000 | 0 |
| 15-179 | 20-14 | Sham | 1.702 | 0.000 | 0 |
| 15-183 | 20-14 | Sham | 1.702 | 0.000 | 0 |
| T434F | 20-14 | Sham | NA | 0.152 | 0 |
| T435F | 20-14 | Sham | NA | 0.047 | 0 |
| T455M | 20-14 | Sham | NA | 0.174 | 0 |
| T458M | 20-14 | Sham | NA | 0.126 | 0 |
| T459M | 20-14 | Sham | NA | 0.000 | 0 |

ELISA: enzyme-linked immunosorbent assay; EU/mL: ELISA unit per milliliter; R0: virus basic reproductive ratio; NA: not available

**Supplementary Table 6: Source data file for Figure 3**

**Panel a:** graphical representation of the 6-month durability study; source data not applicable

**Panel b:** Peak Viral Load (bronchoalveolar lavage [BAL])

| Animal Group | Animal_ID | Study | Vaccine construct | Lung (BAL) peak viral load ($Log_{10}$ sgRNA copies/mL) |
|---|---|---|---|---|
| 1 | 158274 | 6-month durability study | Sham | 4.43 |
| 1 | 158411 | 6-month durability study | Sham | 2.66 |
| 1 | 158422 | 6-month durability study | Sham | 4.02 |
| 1 | 1606400 | 6-month durability study | Sham | 4.13 |
| 1 | 1680940 | 6-month durability study | Sham | 3.74 |
| 1 | 1682980 | 6-month durability study | Sham | 4.00 |
| 1 | 1683040 | 6-month durability study | Sham | 5.32 |
| 2 | 158270 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 1.70 |
| 2 | 158272 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 1.70 |
| 2 | 158300 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 1.70 |
| 2 | 1606460 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 1.70 |
| 2 | 1681960 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 1.70 |
| 2 | 1683000 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 1.70 |
| 2 | 1683360 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 1.70 |
| 3 | 1506260 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 1.70 |
| 3 | 158284 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 3.36 |
| 3 | 158298 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 1.70 |
| 3 | 1680780 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 1.70 |
| 3 | 1682300 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 1.70 |
| 3 | 1683160 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 1.70 |
| 3 | 1801551 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 1.70 |
| 4 | 158278 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 1.70 |
| 4 | 158282 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 1.70 |
| 4 | 1600560 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 1.70 |
| 4 | 1680120 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 1.70 |
| 4 | 1683440 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 1.70 |
| 4 | 1701220 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 1.70 |
| 4 | 1706171 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 1.70 |
| 5 | 158280 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 1.70 |
| 5 | 1606520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 1.70 |
| 5 | 1680260 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 1.70 |

| **Animal Group** | **Animal_ID** | **Study** | **Vaccine construct** | **Lung (BAL) peak viral load ($Log_{10}$ sgRNA copies/mL)** |
|---|---|---|---|---|
| 5 | 1682671 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 3.87 |
| 5 | 1683140 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 1.70 |
| 5 | 1683520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 3.32 |
| 5 | 1683640 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 1.70 |

sgRNA: subgenomic RNA

**Panel c:** Peak Viral Load (nose)

| Animal Group | Animal_ID | Study | Vaccine construct | Nose peak viral load ($Log_{10}$ sgRNA copies/swab) |
|---|---|---|---|---|
| 1 | 158274 | 6-month durability study | Sham | 6.11 |
| 1 | 158411 | 6-month durability study | Sham | 5.83 |
| 1 | 158422 | 6-month durability study | Sham | 4.47 |
| 1 | 1606400 | 6-month durability study | Sham | 5.04 |
| 1 | 1680940 | 6-month durability study | Sham | 5.83 |
| 1 | 1682980 | 6-month durability study | Sham | 5.64 |
| 1 | 1683040 | 6-month durability study | Sham | 6.72 |
| 2 | 158270 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 4.32 |
| 2 | 158272 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 2.10 |
| 2 | 158300 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 5.72 |
| 2 | 1606460 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 5.50 |
| 2 | 1681960 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 5.19 |
| 2 | 1683000 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 5.58 |
| 2 | 1683360 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 4.96 |
| 3 | 1506260 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 5.78 |
| 3 | 158284 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 6.27 |
| 3 | 158298 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 2.10 |
| 3 | 1680780 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 6.18 |
| 3 | 1682300 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 6.88 |
| 3 | 1683160 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 4.98 |
| 3 | 1801551 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 5.50 |
| 4 | 158278 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 5.44 |
| 4 | 158282 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 5.15 |
| 4 | 1600560 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 6.66 |
| 4 | 1680120 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 5.52 |
| 4 | 1683440 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 4.74 |
| 4 | 1701220 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 6.42 |
| 4 | 1706171 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 2.10 |
| 5 | 158280 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 5.74 |
| 5 | 1606520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 3.22 |
| 5 | 1680260 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 3.78 |
| 5 | 1682671 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 2.10 |
| 5 | 1683140 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 4.16 |

| **Animal Group** | **Animal_ID** | **Study** | **Vaccine construct** | **Nose peak viral load ($Log_{10}$ sgRNA copies/swab)** |
|---|---|---|---|---|
| 5 | 1683520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 5.75 |
| 5 | 1683640 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 5.20 |

sgRNA: subgenomic RNA

**Panel d:** pseudotyped virus neutralization assay

| Animal Group | Animal_ID | Study | Vaccine | psVNA (N50 titer) |
|---|---|---|---|---|
| 1 | 158274 | 6-month durability study | Sham | 20 |
| 1 | 158411 | 6-month durability study | Sham | 20 |
| 1 | 158422 | 6-month durability study | Sham | 20 |
| 1 | 1606400 | 6-month durability study | Sham | 20 |
| 1 | 1680940 | 6-month durability study | Sham | 20 |
| 1 | 1682980 | 6-month durability study | Sham | 20 |
| 1 | 1683040 | 6-month durability study | Sham | 20 |
| 2 | 158270 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 254 |
| 2 | 158272 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 491 |
| 2 | 158300 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 255 |
| 2 | 1606460 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 662 |
| 2 | 1681960 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 733 |
| 2 | 1683000 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 811 |
| 2 | 1683360 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 632 |
| 3 | 1506260 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 83 |
| 3 | 158284 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 140 |
| 3 | 158298 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 201 |
| 3 | 1680780 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 58 |
| 3 | 1682300 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 141 |
| 3 | 1683160 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 194 |
| 3 | 1801551 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 143 |
| 4 | 158278 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 316 |
| 4 | 158282 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 134 |
| 4 | 1600560 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 173 |
| 4 | 1680120 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 123 |
| 4 | 1683440 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 277 |
| 4 | 1701220 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 289 |
| 4 | 1706171 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 129 |
| 5 | 158280 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 224 |
| 5 | 1606520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 2306 |
| 5 | 1680260 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 348 |
| 5 | 1682671 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 145 |
| 5 | 1683140 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 677 |
| 5 | 1683520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 192 |

| Animal Group | Animal_ID | Study | Vaccine | psVNA (N50 titer) |
|---|---|---|---|---|
| 5 | 1683640 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 311 |

psVNA: pseudotyped virus neutralization assay

**Panel e:** Spike protein (S) Enzyme-linked immunosorbent assay (ELISA)

| Animal Group | Animal_ID | Study | Vaccine | S ELISA (EU/mL) |
|---|---|---|---|---|
| 1 | 1680940 | 6-month durability study | Sham | 3.4 |
| 1 | 1682980 | 6-month durability study | Sham | 3.6 |
| 1 | 1683040 | 6-month durability study | Sham | 5.1 |
| 1 | 158274 | 6-month durability study | Sham | 3.4 |
| 1 | 158411 | 6-month durability study | Sham | 3.4 |
| 1 | 1606400 | 6-month durability study | Sham | 3.4 |
| 1 | 158422 | 6-month durability study | Sham | 3.4 |
| 2 | 1683000 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 1187.9 |
| 2 | 158300 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 894 |
| 2 | 1681960 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 1703.6 |
| 2 | 1683360 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 1223.5 |
| 2 | 158272 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 623 |
| 2 | 1606460 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 419.3 |
| 2 | 158270 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 999.6 |
| 3 | 1801551 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 775.4 |
| 3 | 158284 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 415 |
| 3 | 1683160 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 810.7 |
| 3 | 1682300 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 366 |
| 3 | 1506260 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 86.3 |
| 3 | 1680780 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 149.9 |
| 3 | 158298 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 237.7 |
| 4 | 1706171 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 1524.2 |
| 4 | 158282 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 365.8 |
| 4 | 1600560 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 413.9 |
| 4 | 1701220 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 914.8 |
| 4 | 1680120 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 336.5 |
| 4 | 158278 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 709 |
| 4 | 1683440 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 875.1 |
| 5 | 1682671 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 829.6 |
| 5 | 1683640 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 259.3 |
| 5 | 1606520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 1608.7 |
| 5 | 1683520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 376.2 |
| 5 | 1683140 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 1800.2 |
| 5 | 1680260 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 780.9 |

| Animal Group | Animal_ID | Study | Vaccine | S ELISA (EU/mL) |
|---|---|---|---|---|
| 5 | 158280 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 708.5 |

S-ELISA: Spike protein Enzyme-linked immunosorbent assay; EU/mL: ELISA units per milliliter

## Panel f

| | | Lung | Lung | Lung | Nose | Nose | Nose |
|---|---|---|---|---|---|---|---|
| | | **One-dose** | **Two-dose** | **Combined** | **One-dose** | **Two-dose** | **Combined** |
| **S-ELISA** | Observed (Mean) | 92.9% | 85.7% | 89.3% | 14.3% | 14.3% | 14.30% |
| | [95% CI] | [58.0-99.2%] | [53.5-96.9%] | [70.4-96.7%] | [3.1-46.5%] | [3.1-46.5%] | [5.2-33.5%] |
| | Prediction Analysis A (Mean) | 88.0% | 90.5% | 89.3% | 47.4% | 53.7% | 50.60% |
| | [95% CI] | [69.4-96.4%] | [76.7-96.8%] | [74.9-96.4%] | [20.1-76.5%] | [24.6-80.9%] | [25.0-76.6%] |
| | Prediction Analysis B (Mean) | 99.0% | 100% | 100% | 15.0% | 19.0% | 17.00% |
| | [95% CI] | [93.0-100%] | [100-100%] | [100-100%] | [0.0-56.0%] | [0.0-64.0%] | [0.0-61.0%] |
| **psVNA** | Observed (Mean) | 92.9% | 85.7% | 89.3% | 14.3% | 14.3% | 14.30% |
| | [95% CI] | [58-99.2%] | [53.5-96.9%] | [70.4-96.7%] | [3.1-46.5%] | [3.1-46.5%] | [5.2-33.5%] |
| | Prediction Analysis A (Mean) | 93.5% | 94.3% | 93.9% | 75.1% | 79.1% | 77.10% |
| | [95% CI] | [86.9-98.3%] | [89.5-98.3%] | [86.3-98.3%] | [52.9-95.7%] | [58.4-97.5%] | [59.7-93.9%] |
| | Prediction Analysis B (Mean) | 87% | 95.0% | 91.0% | 77.0% | 82.0% | 80.00% |
| | [95% CI] | [64.0-100%] | [64.0-100%] | [64.0-100%] | [36.0-86.0%] | [14.0-100%] | [25.0-93.0%] |

S-ELISA: Spike protein Enzyme-linked immunosorbent assay; psVNA: pseudotyped virus neutralization assay; CI: confidence interval

**Supplementary Table 7:** Source data file for Supplementary Figure 1

**Panel a:** graphical representation of studies 20-07, 20-09 and 20-124; source data not applicable

**Panel b:** Study 20-07 S ELISA Nexelis

| Animal Group | Animal_ID | Study | Vaccine | Timepoint | S ELISA (EU/mL) |
|---|---|---|---|---|---|
| 1 | 6855 | 20-07 | Ad26NCOV002 | 0 | 50.3 |
| 1 | 6856 | 20-07 | Ad26NCOV002 | 0 | 50.3 |
| 1 | BM39 | 20-07 | Ad26NCOV002 | 0 | 50.3 |
| 1 | BO49 | 20-07 | Ad26NCOV002 | 0 | 50.3 |
| 1 | 6855 | 20-07 | Ad26NCOV002 | 2 | 551.3 |
| 1 | 6856 | 20-07 | Ad26NCOV002 | 2 | 50.3 |
| 1 | BM39 | 20-07 | Ad26NCOV002 | 2 | 50.3 |
| 1 | BO49 | 20-07 | Ad26NCOV002 | 2 | 50.3 |
| 1 | 6855 | 20-07 | Ad26NCOV002 | 4 | 301.5 |
| 1 | 6856 | 20-07 | Ad26NCOV002 | 4 | 145.5 |
| 1 | BM39 | 20-07 | Ad26NCOV002 | 4 | 50.3 |
| 1 | BO49 | 20-07 | Ad26NCOV002 | 4 | 227.7 |
| 2 | 7028 | 20-07 | Ad26NCOV004 | 0 | 50.3 |
| 2 | 7056 | 20-07 | Ad26NCOV004 | 0 | 50.3 |
| 2 | BO93 | 20-07 | Ad26NCOV004 | 0 | 50.3 |
| 2 | BO95 | 20-07 | Ad26NCOV004 | 0 | 256.5 |
| 2 | 7028 | 20-07 | Ad26NCOV004 | 2 | 1461 |
| 2 | 7056 | 20-07 | Ad26NCOV004 | 2 | 291.7 |
| 2 | BO93 | 20-07 | Ad26NCOV004 | 2 | 299.6 |
| 2 | BO95 | 20-07 | Ad26NCOV004 | 2 | 403 |
| 2 | 7028 | 20-07 | Ad26NCOV004 | 4 | 2828.9 |
| 2 | 7056 | 20-07 | Ad26NCOV004 | 4 | 1387.5 |
| 2 | BO93 | 20-07 | Ad26NCOV004 | 4 | 1350.5 |
| 2 | BO95 | 20-07 | Ad26NCOV004 | 4 | 1354.1 |
| 3 | BS82 | 20-07 | Ad26NCOV006 | 0 | 1840.2 |
| 3 | BV16 | 20-07 | Ad26NCOV006 | 0 | 4018.6 |
| 3 | T781 | 20-07 | Ad26NCOV006 | 0 | 50.3 |
| 3 | T796 | 20-07 | Ad26NCOV006 | 0 | 50.3 |
| 3 | BS82 | 20-07 | Ad26NCOV006 | 2 | 1751.3 |
| 3 | BV16 | 20-07 | Ad26NCOV006 | 2 | 3497.2 |
| 3 | T781 | 20-07 | Ad26NCOV006 | 2 | 329 |
| 3 | T796 | 20-07 | Ad26NCOV006 | 2 | 166.5 |
| 3 | BS82 | 20-07 | Ad26NCOV006 | 4 | 1951.4 |
| 3 | BV16 | 20-07 | Ad26NCOV006 | 4 | 3164.4 |
| 3 | T781 | 20-07 | Ad26NCOV006 | 4 | 663.1 |
| 3 | T796 | 20-07 | Ad26NCOV006 | 4 | 1492.1 |
| 4 | BP11 | 20-07 | Ad26NCOV008 | 0 | 971.7 |
| 4 | BV35 | 20-07 | Ad26NCOV008 | 0 | 76.6 |
| 4 | BV36 | 20-07 | Ad26NCOV008 | 0 | 1770.1 |

| Animal Group | Animal_ID | Study | Vaccine | Timepoint | S ELISA (EU/mL) |
|---|---|---|---|---|---|
| 4 | BP11 | 20-07 | Ad26NCOV008 | 2 | 1028.3 |
| 4 | BV35 | 20-07 | Ad26NCOV008 | 2 | 119.5 |
| 4 | BV36 | 20-07 | Ad26NCOV008 | 2 | 1897.8 |
| 4 | BP11 | 20-07 | Ad26NCOV008 | 4 | 1532.6 |
| 4 | BV35 | 20-07 | Ad26NCOV008 | 4 | 433.5 |
| 4 | BV36 | 20-07 | Ad26NCOV008 | 4 | 1961.6 |
| 5 | BV58 | 20-07 | Ad26NCOV014 | 0 | 3050.3 |
| 5 | BV79 | 20-07 | Ad26NCOV014 | 0 | 7493.6 |
| 5 | T799 | 20-07 | Ad26NCOV014 | 0 | 50.3 |
| 5 | BV58 | 20-07 | Ad26NCOV014 | 2 | 3398.3 |
| 5 | BV79 | 20-07 | Ad26NCOV014 | 2 | 6754.2 |
| 5 | T799 | 20-07 | Ad26NCOV014 | 2 | 123.6 |
| 5 | BV58 | 20-07 | Ad26NCOV014 | 4 | 4590.7 |
| 5 | BV79 | 20-07 | Ad26NCOV014 | 4 | 8206.4 |
| 5 | T799 | 20-07 | Ad26NCOV014 | 4 | 529.5 |
| 7 | 6905 | 20-07 | Ad26NCOV028 | 0 | 50.3 |
| 7 | 6906 | 20-07 | Ad26NCOV028 | 0 | 50.3 |
| 7 | BV95 | 20-07 | Ad26NCOV028 | 0 | 8058 |
| 7 | BV96 | 20-07 | Ad26NCOV028 | 0 | 10480.8 |
| 7 | 6905 | 20-07 | Ad26NCOV028 | 2 | 800 |
| 7 | 6906 | 20-07 | Ad26NCOV028 | 2 | 103.7 |
| 7 | BV95 | 20-07 | Ad26NCOV028 | 2 | 14179.8 |
| 7 | BV96 | 20-07 | Ad26NCOV028 | 2 | 15499 |
| 7 | 6905 | 20-07 | Ad26NCOV028 | 4 | 1900.9 |
| 7 | 6906 | 20-07 | Ad26NCOV028 | 4 | 327.7 |
| 7 | BV95 | 20-07 | Ad26NCOV028 | 4 | 19423.7 |
| 7 | BV96 | 20-07 | Ad26NCOV028 | 4 | 16187.3 |
| 8 | 6418 | 20-07 | sham | 0 | 50.3 |
| 8 | BS64 | 20-07 | sham | 0 | 50.3 |
| 8 | BS80 | 20-07 | sham | 0 | 8099.5 |
| 8 | 6418 | 20-07 | sham | 2 | 50.3 |
| 8 | BS64 | 20-07 | sham | 2 | 50.3 |
| 8 | BS80 | 20-07 | sham | 2 | 5887.5 |
| 8 | 6418 | 20-07 | sham | 4 | 50.3 |
| 8 | BS64 | 20-07 | sham | 4 | 50.3 |
| 8 | BS80 | 20-07 | sham | 4 | 5651.8 |

S-ELISA: Spike protein Enzyme-linked immunosorbent assay; EU/mL: ELISA units per milliliter

**Panel c:** Study 20-09 (S ELISA Nexelis)

| Animal Group | Animal_ID | Study | Vaccine | Timepoint | S ELISA (EU/mL) |
|---|---|---|---|---|---|
| 1 | 171170 | 20-09 | Ad26NCOV028 | 0 | 50.3 |
| 1 | 180215 | 20-09 | Ad26NCOV028 | 0 | 50.3 |
| 1 | 171170 | 20-09 | Ad26NCOV028 | 2 | 173.7 |
| 1 | 180215 | 20-09 | Ad26NCOV028 | 2 | 101.2 |
| 1 | 171170 | 20-09 | Ad26NCOV028 | 4 | 1149.1 |
| 1 | 180215 | 20-09 | Ad26NCOV028 | 4 | 504.3 |
| 2 | 180662 | 20-09 | Ad26NCOV030 | 0 | 50.3 |
| 2 | 180689 | 20-09 | Ad26NCOV030 | 0 | 50.3 |
| 2 | 181267 | 20-09 | Ad26NCOV030 | 0 | 50.3 |
| 2 | 181302 | 20-09 | Ad26NCOV030 | 0 | 50.3 |
| 2 | 181343 | 20-09 | Ad26NCOV030 | 0 | 50.3 |
| 2 | 181363 | 20-09 | Ad26NCOV030 | 0 | 50.3 |
| 2 | 180662 | 20-09 | Ad26NCOV030 | 2 | 1625.1 |
| 2 | 180689 | 20-09 | Ad26NCOV030 | 2 | 450.1 |
| 2 | 181267 | 20-09 | Ad26NCOV030 | 2 | 399.9 |
| 2 | 181302 | 20-09 | Ad26NCOV030 | 2 | 1135.1 |
| 2 | 181343 | 20-09 | Ad26NCOV030 | 2 | 1019.3 |
| 2 | 181363 | 20-09 | Ad26NCOV030 | 2 | 334.4 |
| 2 | 180662 | 20-09 | Ad26NCOV030 | 4 | 4122.7 |
| 2 | 180689 | 20-09 | Ad26NCOV030 | 4 | 1410.6 |
| 2 | 181267 | 20-09 | Ad26NCOV030 | 4 | 2851.5 |
| 2 | 181302 | 20-09 | Ad26NCOV030 | 4 | 5124.3 |
| 2 | 181343 | 20-09 | Ad26NCOV030 | 4 | 1576.1 |
| 2 | 181363 | 20-09 | Ad26NCOV030 | 4 | 1249.4 |
| 3 | 171219 | 20-09 | Sham | 0 | 50.3 |
| 3 | 171264 | 20-09 | Sham | 0 | 50.3 |
| 3 | 191358 | 20-09 | Sham | 0 | 50.3 |
| 3 | 191372 | 20-09 | Sham | 0 | 50.3 |
| 3 | 171219 | 20-09 | Sham | 2 | 50.3 |
| 3 | 171264 | 20-09 | Sham | 2 | 50.3 |
| 3 | 191358 | 20-09 | Sham | 2 | 50.3 |
| 3 | 191372 | 20-09 | Sham | 2 | 50.3 |
| 3 | 171219 | 20-09 | Sham | 4 | 50.3 |
| 3 | 171264 | 20-09 | Sham | 4 | 50.3 |
| 3 | 191358 | 20-09 | Sham | 4 | 50.3 |
| 3 | 191372 | 20-09 | Sham | 4 | 50.3 |

S-ELISA: Spike protein Enzyme-linked immunosorbent assay; EU/mL: ELISA units per milliliter

**Panel d:** Study 20-14 (S ELISA Nexelis)

| Animal Group | Animal_ID | Study | Vaccine | Timepoint | S ELISA (EU/mL) |
|---|---|---|---|---|---|
| 1 | 15-072 | 20-14 | $1x10^{11}$ vp Ad26NCOV030 | 0 | 50.3 |
| 1 | 15-084 | 20-14 | $1x10^{11}$ vp Ad26NCOV030 | 0 | 50.3 |
| 1 | 15-115 | 20-14 | $1x10^{11}$ vp Ad26NCOV030 | 0 | 50.3 |
| 1 | 15-117 | 20-14 | $1x10^{11}$ vp Ad26NCOV030 | 0 | 50.3 |
| 1 | 15-131 | 20-14 | $1x10^{11}$ vp Ad26NCOV030 | 0 | 50.3 |
| 1 | 15-072 | 20-14 | $1x10^{11}$ vp Ad26NCOV030 | 2 | 1289.6 |
| 1 | 15-084 | 20-14 | $1x10^{11}$ vp Ad26NCOV030 | 2 | 1483.2 |
| 1 | 15-115 | 20-14 | $1x10^{11}$ vp Ad26NCOV030 | 2 | 176.1 |
| 1 | 15-117 | 20-14 | $1x10^{11}$ vp Ad26NCOV030 | 2 | 580.2 |
| 1 | 15-131 | 20-14 | $1x10^{11}$ vp Ad26NCOV030 | 2 | 671.4 |
| 1 | 15-072 | 20-14 | $1x10^{11}$ vp Ad26NCOV030 | 4 | 2553.8 |
| 1 | 15-084 | 20-14 | $1x10^{11}$ vp Ad26NCOV030 | 4 | 4859.6 |
| 1 | 15-115 | 20-14 | $1x10^{11}$ vp Ad26NCOV030 | 4 | 1102.8 |
| 1 | 15-117 | 20-14 | $1x10^{11}$ vp Ad26NCOV030 | 4 | 3216.8 |
| 1 | 15-131 | 20-14 | $1x10^{11}$ vp Ad26NCOV030 | 4 | 1894.2 |
| 2 | 15-086 | 20-14 | $5x10^{10}$ vp Ad26NCOV030 | 0 | 50.3 |
| 2 | 15-104 | 20-14 | $5x10^{10}$ vp Ad26NCOV030 | 0 | 50.3 |
| 2 | 15-139 | 20-14 | $5x10^{10}$ vp Ad26NCOV030 | 0 | 50.3 |
| 2 | 15-143 | 20-14 | $5x10^{10}$ vp Ad26NCOV030 | 0 | 50.3 |
| 2 | 15-145 | 20-14 | $5x10^{10}$ vp Ad26NCOV030 | 0 | 50.3 |
| 2 | 15-086 | 20-14 | $5x10^{10}$ vp Ad26NCOV030 | 2 | 3061.8 |
| 2 | 15-104 | 20-14 | $5x10^{10}$ vp Ad26NCOV030 | 2 | 218.7 |
| 2 | 15-139 | 20-14 | $5x10^{10}$ vp Ad26NCOV030 | 2 | 330.2 |
| 2 | 15-143 | 20-14 | $5x10^{10}$ vp Ad26NCOV030 | 2 | 636 |
| 2 | 15-145 | 20-14 | $5x10^{10}$ vp Ad26NCOV030 | 2 | 425.4 |
| 2 | 15-086 | 20-14 | $5x10^{10}$ vp Ad26NCOV030 | 4 | 3687.3 |
| 2 | 15-104 | 20-14 | $5x10^{10}$ vp Ad26NCOV030 | 4 | 610 |
| 2 | 15-139 | 20-14 | $5x10^{10}$ vp Ad26NCOV030 | 4 | 2332.7 |
| 2 | 15-143 | 20-14 | $5x10^{10}$ vp Ad26NCOV030 | 4 | 1170 |
| 2 | 15-145 | 20-14 | $5x10^{10}$ vp Ad26NCOV030 | 4 | 1099.8 |
| 3 | 15-108 | 20-14 | $1.125x10^{10}$ vp Ad26NCOV030 | 0 | 50.3 |
| 3 | 15-114 | 20-14 | $1.125x10^{10}$ vp Ad26NCOV030 | 0 | 50.3 |
| 3 | 15-157 | 20-14 | $1.125x10^{10}$ vp Ad26NCOV030 | 0 | 50.3 |
| 3 | 15-159 | 20-14 | $1.125x10^{10}$ vp Ad26NCOV030 | 0 | 50.3 |
| 3 | 15-161 | 20-14 | $1.125x10^{10}$ vp Ad26NCOV030 | 0 | 50.3 |
| 3 | 15-108 | 20-14 | $1.125x10^{10}$ vp Ad26NCOV030 | 2 | 318.9 |
| 3 | 15-114 | 20-14 | $1.125x10^{10}$ vp Ad26NCOV030 | 2 | 310.4 |
| 3 | 15-157 | 20-14 | $1.125x10^{10}$ vp Ad26NCOV030 | 2 | 1962.1 |

| Animal Group | Animal_ID | Study | Vaccine | Timepoint | S ELISA (EU/mL) |
|---|---|---|---|---|---|
| 3 | 15-159 | 20-14 | $1.125x10^{10}$ vp Ad26NCOV030 | 2 | 665.7 |
| 3 | 15-161 | 20-14 | $1.125x10^{10}$ vp Ad26NCOV030 | 2 | 134.8 |
| 3 | 15-108 | 20-14 | $1.125x10^{10}$ vp Ad26NCOV030 | 4 | 573.5 |
| 3 | 15-114 | 20-14 | $1.125x10^{10}$ vp Ad26NCOV030 | 4 | 557.5 |
| 3 | 15-157 | 20-14 | $1.125x10^{10}$ vp Ad26NCOV030 | 4 | 2031.4 |
| 3 | 15-159 | 20-14 | $1.125x10^{10}$ vp Ad26NCOV030 | 4 | 3134.3 |
| 3 | 15-161 | 20-14 | $1.125x10^{10}$ vp Ad26NCOV030 | 4 | 904.5 |
| 4 | 15-118 | 20-14 | $2x10^{9}$ vp Ad26NCOV030 | 0 | 50.3 |
| 4 | 15-140 | 20-14 | $2x10^{9}$ vp Ad26NCOV030 | 0 | 50.3 |
| 4 | 15-169 | 20-14 | $2x10^{9}$ vp Ad26NCOV030 | 0 | 50.3 |
| 4 | 15-171 | 20-14 | $2x10^{9}$ vp Ad26NCOV030 | 0 | 50.3 |
| 4 | 15-173 | 20-14 | $2x10^{9}$ vp Ad26NCOV030 | 0 | 50.3 |
| 4 | 15-118 | 20-14 | $2x10^{9}$ vp Ad26NCOV030 | 2 | 50.3 |
| 4 | 15-140 | 20-14 | $2x10^{9}$ vp Ad26NCOV030 | 2 | 50.3 |
| 4 | 15-169 | 20-14 | $2x10^{9}$ vp Ad26NCOV030 | 2 | 50.3 |
| 4 | 15-171 | 20-14 | $2x10^{9}$ vp Ad26NCOV030 | 2 | 50.3 |
| 4 | 15-173 | 20-14 | $2x10^{9}$ vp Ad26NCOV030 | 2 | 50.3 |
| 4 | 15-118 | 20-14 | $2x10^{9}$ vp Ad26NCOV030 | 4 | 118.3 |
| 4 | 15-140 | 20-14 | $2x10^{9}$ vp Ad26NCOV030 | 4 | 50.3 |
| 4 | 15-169 | 20-14 | $2x10^{9}$ vp Ad26NCOV030 | 4 | 50.3 |
| 4 | 15-171 | 20-14 | $2x10^{9}$ vp Ad26NCOV030 | 4 | 413.7 |
| 4 | 15-173 | 20-14 | $2x10^{9}$ vp Ad26NCOV030 | 4 | 90.8 |
| 5 | 15-146 | 20-14 | Sham | 0 | 50.3 |
| 5 | 15-148 | 20-14 | Sham | 0 | 50.3 |
| 5 | 15-175 | 20-14 | Sham | 0 | 50.3 |
| 5 | 15-179 | 20-14 | Sham | 0 | 50.3 |
| 5 | 15-183 | 20-14 | Sham | 0 | 50.3 |
| 5 | 15-146 | 20-14 | Sham | 2 | 50.3 |
| 5 | 15-148 | 20-14 | Sham | 2 | 50.3 |
| 5 | 15-175 | 20-14 | Sham | 2 | 50.3 |
| 5 | 15-179 | 20-14 | Sham | 2 | 50.3 |
| 5 | 15-183 | 20-14 | Sham | 2 | 50.3 |
| 5 | 15-146 | 20-14 | Sham | 4 | 50.3 |
| 5 | 15-148 | 20-14 | Sham | 4 | 50.3 |
| 5 | 15-175 | 20-14 | Sham | 4 | 50.3 |
| 5 | 15-179 | 20-14 | Sham | 4 | 50.3 |
| 5 | 15-183 | 20-14 | Sham | 4 | 50.3 |

S-ELISA: Spike protein Enzyme-linked immunosorbent assay; EU/mL: ELISA units per milliliter

**Supplementary Table 8:** Source data file for Supplementary Figure 2

**Panel a and b**

| Animal ID | Study # | Vaccine construct | Lung peak viral load (copies/mL) | ELISpot ($log_{10}$ spots/$10^6$ PBMC) | Protection_lung |
|---|---|---|---|---|---|
| 6418 | 20-07 | Sham | 4.543 | 1.000 | 0 |
| 6768 | 20-07 | S.dCT | ≤LOD | 2.631 | 1 |
| 6770 | 20-07 | tPA.WT.S | ≤LOD | 2.618 | 1 |
| 6855 | 20-07 | tPA.S | ≤LOD | 2.380 | 1 |
| 6856 | 20-07 | tPA.S | 5.097 | 2.146 | 0 |
| 6905 | 20-07 | S.dTM.PP | ≤LOD | 2.756 | 1 |
| 6906 | 20-07 | S.dTM.PP | 3.812 | 1.813 | 0 |
| 7028 | 20-07 | tPA.S.PP | 3.341 | 2.183 | 0 |
| 7056 | 20-07 | tPA.S.PP | 4.641 | 3.020 | 0 |
| 7123 | 20-07 | Sham | 5.575 | NA | 0 |
| 7130 | 20-07 | Sham | 4.895 | NA | 0 |
| 7145 | 20-07 | Sham | 6.103 | NA | 0 |
| 7154 | 20-07 | Sham | 4.615 | NA | 0 |
| 7157 | 20-07 | Sham | 4.871 | NA | 0 |
| 7245 | 20-07 | Sham | 6.288 | NA | 0 |
| 7261 | 20-07 | Sham | 5.400 | NA | 0 |
| BM39 | 20-07 | tPA.S | 4.170 | 2.703 | 0 |
| BO49 | 20-07 | tPA.S | ≤LOD | 2.183 | 1 |
| BO93 | 20-07 | tPA.S.PP | ≤LOD | 2.720 | 1 |
| BO95 | 20-07 | tPA.S.PP | ≤LOD | 2.553 | 1 |
| BP11 | 20-07 | S.dCT | 3.514 | 2.588 | 0 |
| BS64 | 20-07 | Sham | 4.036 | 1.000 | 0 |
| BS80 | 20-07 | Sham | 4.927 | 1.477 | 0 |
| BS82 | 20-07 | S | 3.636 | 1.398 | 0 |
| BV16 | 20-07 | S | ≤LOD | 2.929 | 1 |
| BV35 | 20-07 | S.dCT | ≤LOD | 2.789 | 1 |
| BV36 | 20-07 | S.dCT | ≤LOD | 2.423 | 1 |
| BV58 | 20-07 | tPA.WT.S | ≤LOD | 2.789 | 1 |
| BV79 | 20-07 | tPA.WT.S | ≤LOD | 2.626 | 1 |
| BV95 | 20-07 | S.dTM.PP | ≤LOD | 2.505 | 1 |
| BV96 | 20-07 | S.dTM.PP | 3.070 | 2.818 | 0 |
| T781 | 20-07 | S | 3.733 | 1.398 | 0 |
| T796 | 20-07 | S | ≤LOD | 2.656 | 1 |
| T799 | 20-07 | tPA.WT.S | ≤LOD | 1.512 | 1 |
| 171170 | 20-09 | S.dTM.PP | ≤LOD | 2.217 | 1 |
| 171219 | 20-09 | Sham | 4.934 | 1.000 | 0 |
| 171264 | 20-09 | Sham | 3.958 | 1.000 | 0 |
| 180662 | 20-09 | S.PP | ≤LOD | 2.491 | 1 |
| 180689 | 20-09 | S.PP | ≤LOD | 2.041 | 1 |
| 181267 | 20-09 | S.PP | ≤LOD | 2.130 | 1 |
| 181302 | 20-09 | S.PP | ≤LOD | 1.845 | 1 |

| Animal ID | Study # | Vaccine construct | Lung peak viral load (copies/mL) | ELISpot ($log_{10}$ spots/$10^6$ PBMC) | Protection_lung |
|---|---|---|---|---|---|
| 181343 | 20-09 | S.PP | ≤LOD | 1.544 | 1 |
| 181363 | 20-09 | S.PP | ≤LOD | 1.740 | 1 |
| 191358 | 20-09 | Sham | 5.912 | 1.176 | 0 |
| 191372 | 20-09 | Sham | 4.443 | 1.301 | 0 |
| T414 | 20-09 | Sham | 3.846 | NA | 0 |
| T423 | 20-09 | Sham | 3.587 | NA | 0 |
| T436 | 20-09 | Sham | 6.510 | NA | 0 |
| T440 | 20-09 | Sham | 5.316 | NA | 0 |
| T457 | 20-09 | Sham | 4.614 | NA | 0 |
| T463 | 20-09 | Sham | 4.592 | NA | 0 |
| 15-072 | 20-14 | S.PP | ≤LOD | 2.525 | 1 |
| 15-084 | 20-14 | S.PP | ≤LOD | 2.130 | 1 |
| 15-086 | 20-14 | S.PP | ≤LOD | 2.217 | 1 |
| 15-104 | 20-14 | S.PP | ≤LOD | 1.699 | 1 |
| 15-108 | 20-14 | S.PP | ≤LOD | 1.544 | 1 |
| 15-114 | 20-14 | S.PP | 2.623 | 1.176 | 0 |
| 15-115 | 20-14 | S.PP | ≤LOD | 1.301 | 1 |
| 15-117 | 20-14 | S.PP | ≤LOD | 1.602 | 1 |
| 15-118 | 20-14 | S.PP | ≤LOD | 1.602 | 1 |
| 15-131 | 20-14 | S.PP | ≤LOD | 2.000 | 1 |
| 15-139 | 20-14 | S.PP | ≤LOD | 2.342 | 1 |
| 15-140 | 20-14 | S.PP | 3.962 | 1.000 | 0 |
| 15-143 | 20-14 | S.PP | ≤LOD | 1.000 | 1 |
| 15-145 | 20-14 | S.PP | ≤LOD | 1.301 | 1 |
| 15-146 | 20-14 | Sham | 4.691 | 1.000 | 0 |
| 15-148 | 20-14 | Sham | 3.164 | 1.000 | 0 |
| 15-157 | 20-14 | S.PP | ≤LOD | 1.544 | 1 |
| 15-159 | 20-14 | S.PP | ≤LOD | 1.740 | 1 |
| 15-161 | 20-14 | S.PP | ≤LOD | 1.000 | 1 |
| 15-169 | 20-14 | S.PP | ≤LOD | 1.000 | 1 |
| 15-171 | 20-14 | S.PP | ≤LOD | 1.000 | 1 |
| 15-173 | 20-14 | S.PP | ≤LOD | 1.929 | 1 |
| 15-175 | 20-14 | Sham | 5.064 | 1.000 | 0 |
| 15-179 | 20-14 | Sham | 3.877 | 1.000 | 0 |
| 15-183 | 20-14 | Sham | 3.888 | 1.000 | 0 |
| T434F | 20-14 | Sham | 2.696 | NA | 0 |
| T435F | 20-14 | Sham | 4.277 | NA | 0 |
| T455M | 20-14 | Sham | 3.905 | NA | 0 |
| T458M | 20-14 | Sham | 6.487 | NA | 0 |
| T459M | 20-14 | Sham | 4.182 | NA | 0 |

ELISpot: enzyme-linked immunospot assay; PBMC: peripheral blood mononuclear cells; LOD: limit of detection; NA: not available

## Panel c and d

| Animal ID | Study # | Vaccine construct | Nose peak viral load (copies/swab) | ELISpot ($log_{10}$ spots/$10^6$ PBMC) | Protection_nose |
|---|---|---|---|---|---|
| 6418 | 20-07 | Sham | 6.209 | 1.000 | 0 |
| 6768 | 20-07 | S.dCT | ≤LOD | 2.631 | 1 |
| 6770 | 20-07 | tPA.WT.S | 6.162 | 2.618 | 0 |
| 6855 | 20-07 | tPA.S | ≤LOD | 2.380 | 1 |
| 6856 | 20-07 | tPA.S | 5.087 | 2.146 | 0 |
| 6905 | 20-07 | S.dTM.PP | ≤LOD | 2.756 | 1 |
| 6906 | 20-07 | S.dTM.PP | 6.104 | 1.813 | 0 |
| 7028 | 20-07 | tPA.S.PP | 5.965 | 2.183 | 0 |
| 7056 | 20-07 | tPA.S.PP | 5.701 | 3.020 | 0 |
| 7123 | 20-07 | Sham | 6.345 | NA | 0 |
| 7130 | 20-07 | Sham | 5.386 | NA | 0 |
| 7145 | 20-07 | Sham | 5.632 | NA | 0 |
| 7154 | 20-07 | Sham | NA | NA | NA |
| 7157 | 20-07 | Sham | 5.958 | NA | 0 |
| 7245 | 20-07 | Sham | 4.726 | NA | 0 |
| 7261 | 20-07 | Sham | 6.089 | NA | 0 |
| BM39 | 20-07 | tPA.S | 6.513 | 2.703 | 0 |
| BO49 | 20-07 | tPA.S | ≤LOD | 2.183 | 1 |
| BO93 | 20-07 | tPA.S.PP | ≤LOD | 2.720 | 1 |
| BO95 | 20-07 | tPA.S.PP | 5.031 | 2.553 | 0 |
| BP11 | 20-07 | S.dCT | 5.930 | 2.588 | 0 |
| BS64 | 20-07 | Sham | 4.485 | 1.000 | 0 |
| BS80 | 20-07 | Sham | 5.111 | 1.477 | 0 |
| BS82 | 20-07 | S | 5.078 | 1.398 | 0 |
| BV16 | 20-07 | S | ≤LOD | 2.929 | 1 |
| BV35 | 20-07 | S.dCT | ≤LOD | 2.789 | 1 |
| BV36 | 20-07 | S.dCT | ≤LOD | 2.423 | 1 |
| BV58 | 20-07 | tPA.WT.S | 5.620 | 2.789 | 0 |
| BV79 | 20-07 | tPA.WT.S | ≤LOD | 2.626 | 1 |
| BV95 | 20-07 | S.dTM.PP | ≤LOD | 2.505 | 1 |
| BV96 | 20-07 | S.dTM.PP | 5.785 | 2.818 | 0 |
| T781 | 20-07 | S | 6.220 | 1.398 | 0 |
| T796 | 20-07 | S | ≤LOD | 2.656 | 1 |
| T799 | 20-07 | tPA.WT.S | 5.951 | 1.512 | 0 |
| 171170 | 20-09 | S.dTM.PP | 3.858 | 2.217 | 0 |
| 171219 | 20-09 | Sham | 6.342 | 1.000 | 0 |
| 171264 | 20-09 | Sham | 6.705 | 1.000 | 0 |
| 180662 | 20-09 | S.PP | ≤LOD | 2.491 | 1 |
| 180689 | 20-09 | S.PP | ≤LOD | 2.041 | 1 |
| 181267 | 20-09 | S.PP | ≤LOD | 2.130 | 1 |
| 181302 | 20-09 | S.PP | ≤LOD | 1.845 | 1 |
| 181343 | 20-09 | S.PP | ≤LOD | 1.544 | 1 |

| Animal ID | Study # | Vaccine construct | Nose peak viral load (copies/swab) | ELISpot ($log_{10}$ spots/$10^6$ PBMC) | Protection_nose |
|---|---|---|---|---|---|
| 181363 | 20-09 | S.PP | 3.604 | 1.740 | 0 |
| 191358 | 20-09 | Sham | 8.010 | 1.176 | 0 |
| 191372 | 20-09 | Sham | 6.838 | 1.301 | 0 |
| T414 | 20-09 | Sham | 4.989 | NA | 0 |
| T423 | 20-09 | Sham | 5.199 | NA | 0 |
| T436 | 20-09 | Sham | 5.587 | NA | 0 |
| T440 | 20-09 | Sham | 4.073 | NA | 0 |
| T457 | 20-09 | Sham | 3.781 | NA | 0 |
| T463 | 20-09 | Sham | 5.709 | NA | 0 |
| 15-072 | 20-14 | S.PP | ≤LOD | 2.525 | 1 |
| 15-084 | 20-14 | S.PP | ≤LOD | 2.130 | 1 |
| 15-086 | 20-14 | S.PP | ≤LOD | 2.217 | 1 |
| 15-104 | 20-14 | S.PP | 4.265 | 1.699 | 0 |
| 15-108 | 20-14 | S.PP | 4.981 | 1.544 | 0 |
| 15-114 | 20-14 | S.PP | 3.639 | 1.176 | 0 |
| 15-115 | 20-14 | S.PP | ≤LOD | 1.301 | 1 |
| 15-117 | 20-14 | S.PP | ≤LOD | 1.602 | 1 |
| 15-118 | 20-14 | S.PP | 5.460 | 1.602 | 0 |
| 15-131 | 20-14 | S.PP | ≤LOD | 2.000 | 1 |
| 15-139 | 20-14 | S.PP | ≤LOD | 2.342 | 1 |
| 15-140 | 20-14 | S.PP | 5.569 | 1.000 | 0 |
| 15-143 | 20-14 | S.PP | ≤LOD | 1.000 | 1 |
| 15-145 | 20-14 | S.PP | ≤LOD | 1.301 | 1 |
| 15-146 | 20-14 | Sham | 6.154 | 1.000 | 0 |
| 15-148 | 20-14 | Sham | 6.895 | 1.000 | 0 |
| 15-157 | 20-14 | S.PP | ≤LOD | 1.544 | 1 |
| 15-159 | 20-14 | S.PP | ≤LOD | 1.740 | 1 |
| 15-161 | 20-14 | S.PP | ≤LOD | 1.000 | 1 |
| 15-169 | 20-14 | S.PP | 6.187 | 1.000 | 0 |
| 15-171 | 20-14 | S.PP | ≤LOD | 1.000 | 1 |
| 15-173 | 20-14 | S.PP | 4.763 | 1.929 | 0 |
| 15-175 | 20-14 | Sham | 5.786 | 1.000 | 0 |
| 15-179 | 20-14 | Sham | 3.215 | 1.000 | 0 |
| 15-183 | 20-14 | Sham | 6.093 | 1.000 | 0 |
| T434F | 20-14 | Sham | 5.096 | NA | 0 |
| T435F | 20-14 | Sham | 5.926 | NA | 0 |
| T455M | 20-14 | Sham | 5.239 | NA | 0 |
| T458M | 20-14 | Sham | 5.324 | NA | 0 |
| T459M | 20-14 | Sham | 6.465 | NA | 0 |

ELISpot: enzyme-linked immunospot assay; PBMC: peripheral blood mononuclear cells; LOD: limit of detection; NA: not available

## Panel e and f

| Animal ID | Study # | Vaccine construct | ELISpot ($log_{10}$ spots/$10^6$ PBMC) | Lung_reduction_R0 | Protection_lung |
|---|---|---|---|---|---|
| 6418 | 20-07 | Sham | 1.000 | 0.001 | 0 |
| 6768 | 20-07 | S.dCT | 2.631 | 0.973 | 1 |
| 6770 | 20-07 | tPA.WT.S | 2.618 | 0.973 | 1 |
| 6855 | 20-07 | tPA.S | 2.380 | 0.973 | 1 |
| 6856 | 20-07 | tPA.S | 2.146 | 0.170 | 0 |
| 6905 | 20-07 | S.dTM.PP | 2.756 | 0.973 | 1 |
| 6906 | 20-07 | S.dTM.PP | 1.813 | 0.172 | 0 |
| 7028 | 20-07 | tPA.S.PP | 2.183 | 0.002 | 0 |
| 7056 | 20-07 | tPA.S.PP | 3.020 | 0.001 | 0 |
| 7123 | 20-07 | Sham | NA | 0.262 | 0 |
| 7130 | 20-07 | Sham | NA | 0.297 | 0 |
| 7145 | 20-07 | Sham | NA | 0.168 | 0 |
| 7154 | 20-07 | Sham | NA | 0.122 | 0 |
| 7157 | 20-07 | Sham | NA | 0.001 | 0 |
| 7245 | 20-07 | Sham | NA | 0.001 | 0 |
| 7261 | 20-07 | Sham | NA | 0.001 | 0 |
| BM39 | 20-07 | tPA.S | 2.703 | 0.002 | 0 |
| BO49 | 20-07 | tPA.S | 2.183 | 0.973 | 1 |
| BO93 | 20-07 | tPA.S.PP | 2.720 | 0.973 | 1 |
| BO95 | 20-07 | tPA.S.PP | 2.553 | 0.973 | 1 |
| BP11 | 20-07 | S.dCT | 2.588 | 0.214 | 0 |
| BS64 | 20-07 | Sham | 1.000 | 0.002 | 0 |
| BS80 | 20-07 | Sham | 1.477 | 0.001 | 0 |
| BS82 | 20-07 | S | 1.398 | 0.645 | 0 |
| BV16 | 20-07 | S | 2.929 | 0.973 | 1 |
| BV35 | 20-07 | S.dCT | 2.789 | 0.973 | 1 |
| BV36 | 20-07 | S.dCT | 2.423 | 0.973 | 1 |
| BV58 | 20-07 | tPA.WT.S | 2.789 | 0.973 | 1 |
| BV79 | 20-07 | tPA.WT.S | 2.626 | 0.973 | 1 |
| BV95 | 20-07 | S.dTM.PP | 2.505 | 0.973 | 1 |
| BV96 | 20-07 | S.dTM.PP | 2.818 | 0.002 | 0 |
| T781 | 20-07 | S | 1.398 | 0.183 | 0 |
| T796 | 20-07 | S | 2.656 | 0.973 | 1 |
| T799 | 20-07 | tPA.WT.S | 1.512 | 0.973 | 1 |
| 171170 | 20-09 | S.dTM.PP | 2.217 | 0.973 | 1 |
| 171219 | 20-09 | Sham | 1.000 | 0.001 | 0 |
| 171264 | 20-09 | Sham | 1.000 | 0.001 | 0 |
| 180662 | 20-09 | S.PP | 2.491 | 0.973 | 1 |
| 180689 | 20-09 | S.PP | 2.041 | 0.973 | 1 |
| 181267 | 20-09 | S.PP | 2.130 | 0.973 | 1 |
| 181302 | 20-09 | S.PP | 1.845 | 0.973 | 1 |
| 181343 | 20-09 | S.PP | 1.544 | 0.973 | 1 |

| Animal ID | Study # | Vaccine construct | ELISpot ($log_{10}$ spots/$10^6$ PBMC) | Lung_reduction_R0 | Protection_lung |
|---|---|---|---|---|---|
| 181363 | 20-09 | S.PP | 1.740 | 0.973 | 1 |
| 191358 | 20-09 | Sham | 1.176 | 0.001 | 0 |
| 191372 | 20-09 | Sham | 1.301 | 0.001 | 0 |
| T414 | 20-09 | Sham | NA | 0.481 | 0 |
| T423 | 20-09 | Sham | NA | 0.001 | 0 |
| T436 | 20-09 | Sham | NA | 0.000 | 0 |
| T440 | 20-09 | Sham | NA | 0.001 | 0 |
| T457 | 20-09 | Sham | NA | 0.001 | 0 |
| T463 | 20-09 | Sham | NA | 0.001 | 0 |
| 15-072 | 20-14 | S.PP | 2.525 | 0.973 | 1 |
| 15-084 | 20-14 | S.PP | 2.130 | 0.973 | 1 |
| 15-086 | 20-14 | S.PP | 2.217 | 0.973 | 1 |
| 15-104 | 20-14 | S.PP | 1.699 | 0.973 | 1 |
| 15-108 | 20-14 | S.PP | 1.544 | 0.973 | 1 |
| 15-114 | 20-14 | S.PP | 1.176 | 0.001 | 0 |
| 15-115 | 20-14 | S.PP | 1.301 | 0.973 | 1 |
| 15-117 | 20-14 | S.PP | 1.602 | 0.973 | 1 |
| 15-118 | 20-14 | S.PP | 1.602 | 0.973 | 1 |
| 15-131 | 20-14 | S.PP | 2.000 | 0.973 | 1 |
| 15-139 | 20-14 | S.PP | 2.342 | 0.973 | 1 |
| 15-140 | 20-14 | S.PP | 1.000 | 0.152 | 0 |
| 15-143 | 20-14 | S.PP | 1.000 | 0.973 | 1 |
| 15-145 | 20-14 | S.PP | 1.301 | 0.973 | 1 |
| 15-146 | 20-14 | Sham | 1.000 | 0.002 | 0 |
| 15-148 | 20-14 | Sham | 1.000 | 0.547 | 0 |
| 15-157 | 20-14 | S.PP | 1.544 | 0.973 | 1 |
| 15-159 | 20-14 | S.PP | 1.740 | 0.973 | 1 |
| 15-161 | 20-14 | S.PP | 1.000 | 0.973 | 1 |
| 15-169 | 20-14 | S.PP | 1.000 | 0.973 | 1 |
| 15-171 | 20-14 | S.PP | 1.000 | 0.973 | 1 |
| 15-173 | 20-14 | S.PP | 1.929 | 0.973 | 1 |
| 15-175 | 20-14 | Sham | 1.000 | 0.001 | 0 |
| 15-179 | 20-14 | Sham | 1.000 | 0.499 | 0 |
| 15-183 | 20-14 | Sham | 1.000 | 0.194 | 0 |
| T434F | 20-14 | Sham | NA | 0.000 | 0 |
| T435F | 20-14 | Sham | NA | 0.001 | 0 |
| T455M | 20-14 | Sham | NA | 0.568 | 0 |
| T458M | 20-14 | Sham | NA | 0.000 | 0 |
| T459M | 20-14 | Sham | NA | 0.001 | 0 |

ELISpot: enzyme-linked immunospot assay; PBMC: peripheral blood mononuclear cells; NA: not available

## Panel g and h

| Animal ID | Study # | Vaccine construct | ELISpot ($log_{10}$ spots/$10^6$ PBMC) | Nose_reduction_R0 | Protection_nose |
|---|---|---|---|---|---|
| 6418 | 20-07 | Sham | 1.000 | 0.000 | 0 |
| 6768 | 20-07 | S.dCT | 2.631 | 0.967 | 1 |
| 6770 | 20-07 | tPA.WT.S | 2.618 | 0.405 | 0 |
| 6855 | 20-07 | tPA.S | 2.380 | 0.967 | 1 |
| 6856 | 20-07 | tPA.S | 2.146 | 0.258 | 0 |
| 6905 | 20-07 | S.dTM.PP | 2.756 | 0.967 | 1 |
| 6906 | 20-07 | S.dTM.PP | 1.813 | 0.255 | 0 |
| 7028 | 20-07 | tPA.S.PP | 2.183 | 0.336 | 0 |
| 7056 | 20-07 | tPA.S.PP | 3.020 | 0.064 | 0 |
| 7123 | 20-07 | Sham | NA | 0.000 | 0 |
| 7130 | 20-07 | Sham | NA | 0.000 | 0 |
| 7145 | 20-07 | Sham | NA | 0.000 | 0 |
| 7154 | 20-07 | Sham | NA | 0.000 | 0 |
| 7157 | 20-07 | Sham | NA | 0.000 | 0 |
| 7245 | 20-07 | Sham | NA | 0.000 | 0 |
| 7261 | 20-07 | Sham | NA | 0.000 | 0 |
| BM39 | 20-07 | tPA.S | 2.703 | 0.069 | 0 |
| BO49 | 20-07 | tPA.S | 2.183 | 0.967 | 1 |
| BO93 | 20-07 | tPA.S.PP | 2.720 | 0.967 | 1 |
| BO95 | 20-07 | tPA.S.PP | 2.553 | 0.023 | 0 |
| BP11 | 20-07 | S.dCT | 2.588 | 0.060 | 0 |
| BS64 | 20-07 | Sham | 1.000 | 0.000 | 0 |
| BS80 | 20-07 | Sham | 1.477 | 0.042 | 0 |
| BS82 | 20-07 | S | 1.398 | 0.127 | 0 |
| BV16 | 20-07 | S | 2.929 | 0.967 | 1 |
| BV35 | 20-07 | S.dCT | 2.789 | 0.967 | 1 |
| BV36 | 20-07 | S.dCT | 2.423 | 0.967 | 1 |
| BV58 | 20-07 | tPA.WT.S | 2.789 | 0.489 | 0 |
| BV79 | 20-07 | tPA.WT.S | 2.626 | 0.967 | 1 |
| BV95 | 20-07 | S.dTM.PP | 2.505 | 0.967 | 1 |
| BV96 | 20-07 | S.dTM.PP | 2.818 | 0.064 | 0 |
| T781 | 20-07 | S | 1.398 | 0.331 | 0 |
| T796 | 20-07 | S | 2.656 | 0.967 | 1 |
| T799 | 20-07 | tPA.WT.S | 1.512 | 0.063 | 0 |
| 171170 | 20-09 | S.dTM.PP | 2.217 | 0.020 | 0 |
| 171219 | 20-09 | Sham | 1.000 | 0.000 | 0 |
| 171264 | 20-09 | Sham | 1.000 | 0.000 | 0 |
| 180662 | 20-09 | S.PP | 2.491 | 0.967 | 1 |
| 180689 | 20-09 | S.PP | 2.041 | 0.967 | 1 |
| 181267 | 20-09 | S.PP | 2.130 | 0.967 | 1 |
| 181302 | 20-09 | S.PP | 1.845 | 0.967 | 1 |
| 181343 | 20-09 | S.PP | 1.544 | 0.967 | 1 |

| Animal ID | Study # | Vaccine construct | ELISpot ($log_{10}$ spots/$10^6$ PBMC) | Nose_reduction_R0 | Protection_nose |
|---|---|---|---|---|---|
| 181363 | 20-09 | S.PP | 1.740 | 0.023 | 0 |
| 191358 | 20-09 | Sham | 1.176 | 0.000 | 0 |
| 191372 | 20-09 | Sham | 1.301 | 0.000 | 0 |
| T414 | 20-09 | Sham | NA | 0.000 | 0 |
| T423 | 20-09 | Sham | NA | 0.015 | 0 |
| T436 | 20-09 | Sham | NA | 0.044 | 0 |
| T440 | 20-09 | Sham | NA | 0.099 | 0 |
| T457 | 20-09 | Sham | NA | 0.000 | 0 |
| T463 | 20-09 | Sham | NA | 0.000 | 0 |
| 15-072 | 20-14 | S.PP | 2.525 | 0.967 | 1 |
| 15-084 | 20-14 | S.PP | 2.130 | 0.967 | 1 |
| 15-086 | 20-14 | S.PP | 2.217 | 0.967 | 1 |
| 15-104 | 20-14 | S.PP | 1.699 | 0.026 | 0 |
| 15-108 | 20-14 | S.PP | 1.544 | 0.050 | 0 |
| 15-114 | 20-14 | S.PP | 1.176 | 0.322 | 0 |
| 15-115 | 20-14 | S.PP | 1.301 | 0.967 | 1 |
| 15-117 | 20-14 | S.PP | 1.602 | 0.967 | 1 |
| 15-118 | 20-14 | S.PP | 1.602 | 0.118 | 0 |
| 15-131 | 20-14 | S.PP | 2.000 | 0.967 | 1 |
| 15-139 | 20-14 | S.PP | 2.342 | 0.967 | 1 |
| 15-140 | 20-14 | S.PP | 1.000 | 0.039 | 0 |
| 15-143 | 20-14 | S.PP | 1.000 | 0.967 | 1 |
| 15-145 | 20-14 | S.PP | 1.301 | 0.967 | 1 |
| 15-146 | 20-14 | Sham | 1.000 | 0.000 | 0 |
| 15-148 | 20-14 | Sham | 1.000 | 0.000 | 0 |
| 15-157 | 20-14 | S.PP | 1.544 | 0.967 | 1 |
| 15-159 | 20-14 | S.PP | 1.740 | 0.967 | 1 |
| 15-161 | 20-14 | S.PP | 1.000 | 0.967 | 1 |
| 15-169 | 20-14 | S.PP | 1.000 | 0.033 | 0 |
| 15-171 | 20-14 | S.PP | 1.000 | 0.967 | 1 |
| 15-173 | 20-14 | S.PP | 1.929 | 0.070 | 0 |
| 15-175 | 20-14 | Sham | 1.000 | 0.000 | 0 |
| 15-179 | 20-14 | Sham | 1.000 | 0.000 | 0 |
| 15-183 | 20-14 | Sham | 1.000 | 0.000 | 0 |
| T434F | 20-14 | Sham | NA | 0.152 | 0 |
| T435F | 20-14 | Sham | NA | 0.047 | 0 |
| T455M | 20-14 | Sham | NA | 0.174 | 0 |
| T458M | 20-14 | Sham | NA | 0.126 | 0 |
| T459M | 20-14 | Sham | NA | 0.000 | 0 |

ELISpot: enzyme-linked immunospot assay; PBMC: peripheral blood mononuclear cells; NA: not available

**Supplementary Table 9:** Source data file for Supplementary Figure 3

**Panel a**

| Animal Group | Animal_ID | Study | Vaccine | Timepoint | Lung Viral Load (Log10 sgRNA copies/mL) |
|---|---|---|---|---|---|
| 1 | 158274 | 6-month durability study | Sham | -1 | 1.70 |
| 1 | 158411 | 6-month durability study | Sham | -1 | 1.70 |
| 1 | 158422 | 6-month durability study | Sham | -1 | 1.70 |
| 1 | 1606400 | 6-month durability study | Sham | -1 | 1.70 |
| 1 | 1680940 | 6-month durability study | Sham | -1 | 1.70 |
| 1 | 1682980 | 6-month durability study | Sham | -1 | 1.70 |
| 1 | 1683040 | 6-month durability study | Sham | -1 | 1.70 |
| 1 | 158274 | 6-month durability study | Sham | 1 | 3.14 |
| 1 | 158411 | 6-month durability study | Sham | 1 | 1.70 |
| 1 | 158422 | 6-month durability study | Sham | 1 | 3.64 |
| 1 | 1606400 | 6-month durability study | Sham | 1 | 4.13 |
| 1 | 1680940 | 6-month durability study | Sham | 1 | 3.74 |
| 1 | 1682980 | 6-month durability study | Sham | 1 | 3.73 |
| 1 | 1683040 | 6-month durability study | Sham | 1 | 3.78 |
| 1 | 158274 | 6-month durability study | Sham | 2 | 3.97 |
| 1 | 158411 | 6-month durability study | Sham | 2 | 1.70 |
| 1 | 158422 | 6-month durability study | Sham | 2 | 4.02 |
| 1 | 1606400 | 6-month durability study | Sham | 2 | 3.82 |
| 1 | 1680940 | 6-month durability study | Sham | 2 | 1.70 |
| 1 | 1682980 | 6-month durability study | Sham | 2 | 4.00 |
| 1 | 1683040 | 6-month durability study | Sham | 2 | 5.32 |
| 1 | 158274 | 6-month durability study | Sham | 4 | 4.43 |
| 1 | 158411 | 6-month durability study | Sham | 4 | 2.66 |
| 1 | 158422 | 6-month durability study | Sham | 4 | 2.70 |
| 1 | 1606400 | 6-month durability study | Sham | 4 | 2.06 |
| 1 | 1680940 | 6-month durability study | Sham | 4 | 1.70 |
| 1 | 1682980 | 6-month durability study | Sham | 4 | 3.29 |
| 1 | 1683040 | 6-month durability study | Sham | 4 | 3.48 |
| 1 | 158274 | 6-month durability study | Sham | 7 | 1.70 |
| 1 | 158411 | 6-month durability study | Sham | 7 | 2.31 |
| 1 | 158422 | 6-month durability study | Sham | 7 | 1.70 |
| 1 | 1606400 | 6-month durability study | Sham | 7 | 2.49 |
| 1 | 1680940 | 6-month durability study | Sham | 7 | 1.70 |
| 1 | 1682980 | 6-month durability study | Sham | 7 | 2.47 |
| 1 | 1683040 | 6-month durability study | Sham | 7 | 2.57 |
| 1 | 158274 | 6-month durability study | Sham | 10 | 1.70 |
| 1 | 158411 | 6-month durability study | Sham | 10 | 1.70 |
| 1 | 158422 | 6-month durability study | Sham | 10 | 1.70 |
| 1 | 1606400 | 6-month durability study | Sham | 10 | 1.70 |
| 1 | 1680940 | 6-month durability study | Sham | 10 | 1.70 |
| 1 | 1682980 | 6-month durability study | Sham | 10 | 1.70 |

| Animal Group | Animal_ID | Study | Vaccine | Timepoint | Lung Viral Load (Log10 sgRNA copies/mL) |
|---|---|---|---|---|---|
| 1 | 1683040 | 6-month durability study | Sham | 10 | 2.09 |
| 1 | 158274 | 6-month durability study | Sham | 14 | 1.70 |
| 1 | 158411 | 6-month durability study | Sham | 14 | 1.70 |
| 1 | 158422 | 6-month durability study | Sham | 14 | 1.70 |
| 1 | 1606400 | 6-month durability study | Sham | 14 | 1.70 |
| 1 | 1680940 | 6-month durability study | Sham | 14 | 1.70 |
| 1 | 1682980 | 6-month durability study | Sham | 14 | 1.70 |
| 1 | 1683040 | 6-month durability study | Sham | 14 | 1.70 |

sgRNA: subgenomic RNA

## Panel b

| Animal Group | Animal_ID | Study | Vaccine | Timepoint | Lung Viral Load (Log10 sgRNA copies/mL) |
|---|---|---|---|---|---|
| 2 | 158270 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | -1 | 1.70 |
| 2 | 158272 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | -1 | 1.70 |
| 2 | 158300 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | -1 | 1.70 |
| 2 | 1606460 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | -1 | 1.70 |
| 2 | 1681960 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | -1 | 1.70 |
| 2 | 1683000 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | -1 | 1.70 |
| 2 | 1683360 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | -1 | 1.70 |
| 2 | 158270 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 1 | 1.70 |
| 2 | 158272 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 1 | 1.70 |
| 2 | 158300 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 1 | 1.70 |
| 2 | 1606460 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 1 | 1.70 |
| 2 | 1681960 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 1 | 1.70 |
| 2 | 1683000 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 1 | 1.70 |
| 2 | 1683360 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 1 | 1.70 |
| 2 | 158270 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 2 | 1.70 |
| 2 | 158272 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 2 | 1.70 |
| 2 | 158300 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 2 | 1.70 |
| 2 | 1606460 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 2 | 1.70 |
| 2 | 1681960 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 2 | 1.70 |
| 2 | 1683000 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 2 | 1.70 |
| 2 | 1683360 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 2 | 1.70 |
| 2 | 158270 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 4 | 1.70 |
| 2 | 158272 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 4 | 1.70 |
| 2 | 158300 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 4 | 1.70 |
| 2 | 1606460 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 4 | 1.70 |
| 2 | 1681960 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 4 | 1.70 |
| 2 | 1683000 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 4 | 1.70 |

| Animal Group | Animal_ID | Study | Vaccine | Timepoint | Lung Viral Load (Log10 sgRNA copies/mL) |
|---|---|---|---|---|---|
| 2 | 1683360 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 4 | 1.70 |
| 2 | 158270 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 7 | 1.70 |
| 2 | 158272 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 7 | 1.70 |
| 2 | 158300 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 7 | 1.70 |
| 2 | 1606460 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 7 | 1.70 |
| 2 | 1681960 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 7 | 1.70 |
| 2 | 1683000 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 7 | 1.70 |
| 2 | 1683360 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 7 | 1.70 |
| 2 | 158270 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 10 | 1.70 |
| 2 | 158272 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 10 | 1.70 |
| 2 | 158300 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 10 | 1.70 |
| 2 | 1606460 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 10 | 1.70 |
| 2 | 1681960 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 10 | 1.70 |
| 2 | 1683000 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 10 | 1.70 |
| 2 | 1683360 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 10 | 1.70 |
| 2 | 158270 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 14 | 1.70 |
| 2 | 158272 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 14 | 1.70 |
| 2 | 158300 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 14 | 1.70 |
| 2 | 1606460 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 14 | 1.70 |
| 2 | 1681960 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 14 | 1.70 |
| 2 | 1683000 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 14 | 1.70 |
| 2 | 1683360 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 14 | 1.70 |

sgRNA: subgenomic RNA; vp: viral particles

## Panel c

| Animal Group | Animal_ID | Study | Vaccine | Timepoint | Lung Viral Load (Log10 sgRNA copies/mL) |
|---|---|---|---|---|---|
| 3 | 1506260 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | -1 | 1.70 |
| 3 | 158284 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | -1 | 1.70 |
| 3 | 158298 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | -1 | 1.70 |
| 3 | 1680780 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | -1 | 1.70 |
| 3 | 1682300 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | -1 | 1.70 |
| 3 | 1683160 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | -1 | 1.70 |
| 3 | 1801551 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | -1 | 1.70 |
| 3 | 1506260 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 1 | 1.70 |
| 3 | 158284 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 1 | 3.36 |
| 3 | 158298 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 1 | 1.70 |
| 3 | 1680780 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 1 | 1.70 |
| 3 | 1682300 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 1 | 1.70 |
| 3 | 1683160 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 1 | 1.70 |
| 3 | 1801551 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 1 | 1.70 |
| 3 | 1506260 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 2 | 1.70 |
| 3 | 158284 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 2 | 3.23 |
| 3 | 158298 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 2 | 1.70 |
| 3 | 1680780 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 2 | 1.70 |
| 3 | 1682300 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 2 | 1.70 |
| 3 | 1683160 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 2 | 1.70 |
| 3 | 1801551 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 2 | 1.70 |
| 3 | 1506260 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 4 | 1.70 |
| 3 | 158284 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 4 | 1.70 |
| 3 | 158298 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 4 | 1.70 |
| 3 | 1680780 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 4 | 1.70 |
| 3 | 1682300 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 4 | 1.70 |
| 3 | 1683160 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 4 | 1.70 |

| Animal Group | Animal_ID | Study | Vaccine | Timepoint | Lung Viral Load (Log10 sgRNA copies/mL) |
|---|---|---|---|---|---|
| 3 | 1801551 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 4 | 1.70 |
| 3 | 1506260 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 7 | 1.70 |
| 3 | 158284 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 7 | 1.70 |
| 3 | 158298 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 7 | 1.70 |
| 3 | 1680780 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 7 | 1.70 |
| 3 | 1682300 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 7 | 1.70 |
| 3 | 1683160 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 7 | 1.70 |
| 3 | 1801551 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 7 | 1.70 |
| 3 | 1506260 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 10 | 1.70 |
| 3 | 158284 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 10 | 1.70 |
| 3 | 158298 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 10 | 1.70 |
| 3 | 1680780 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 10 | 1.70 |
| 3 | 1682300 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 10 | 1.70 |
| 3 | 1683160 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 10 | 1.70 |
| 3 | 1801551 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 10 | 1.70 |
| 3 | 1506260 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 14 | 1.70 |
| 3 | 158284 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 14 | 1.70 |
| 3 | 158298 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 14 | 1.70 |
| 3 | 1680780 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 14 | 1.70 |
| 3 | 1682300 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 14 | 1.70 |
| 3 | 1683160 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 14 | 1.70 |
| 3 | 1801551 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 14 | 1.70 |

sgRNA: subgenomic RNA; vp: viral particles

## Panel d

| Animal Group | Animal_ID | Study | Vaccine | Timepoint | Lung Viral Load (Log10 sgRNA copies/mL) |
|---|---|---|---|---|---|
| 4 | 158278 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | -1 | 1.70 |
| 4 | 158282 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | -1 | 1.70 |
| 4 | 1600560 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | -1 | 1.70 |
| 4 | 1680120 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | -1 | 1.70 |
| 4 | 1683440 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | -1 | 1.70 |
| 4 | 1701220 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | -1 | 1.70 |
| 4 | 1706171 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | -1 | 1.70 |
| 4 | 158278 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 1 | 1.70 |
| 4 | 158282 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 1 | 1.70 |
| 4 | 1600560 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 1 | 1.70 |
| 4 | 1680120 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 1 | 1.70 |
| 4 | 1683440 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 1 | 1.70 |
| 4 | 1701220 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 1 | 1.70 |
| 4 | 1706171 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 1 | 1.70 |
| 4 | 158278 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 2 | 1.70 |
| 4 | 158282 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 2 | 1.70 |
| 4 | 1600560 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 2 | 1.70 |
| 4 | 1680120 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 2 | 1.70 |
| 4 | 1683440 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 2 | 1.70 |
| 4 | 1701220 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 2 | 1.70 |
| 4 | 1706171 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 2 | 1.70 |
| 4 | 158278 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 4 | 1.70 |
| 4 | 158282 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 4 | 1.70 |
| 4 | 1600560 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 4 | 1.70 |
| 4 | 1680120 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 4 | 1.70 |
| 4 | 1683440 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 4 | 1.70 |
| 4 | 1701220 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 4 | 1.70 |

| Animal Group | Animal_ID | Study | Vaccine | Timepoint | Lung Viral Load (Log10 sgRNA copies/mL) |
|---|---|---|---|---|---|
| 4 | 1706171 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 4 | 1.70 |
| 4 | 158278 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 7 | 1.70 |
| 4 | 158282 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 7 | 1.70 |
| 4 | 1600560 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 7 | 1.70 |
| 4 | 1680120 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 7 | 1.70 |
| 4 | 1683440 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 7 | 1.70 |
| 4 | 1701220 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 7 | 1.70 |
| 4 | 1706171 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 7 | 1.70 |
| 4 | 158278 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 10 | 1.70 |
| 4 | 158282 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 10 | 1.70 |
| 4 | 1600560 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 10 | 1.70 |
| 4 | 1680120 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 10 | 1.70 |
| 4 | 1683440 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 10 | 1.70 |
| 4 | 1701220 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 10 | 1.70 |
| 4 | 1706171 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 10 | 1.70 |
| 4 | 158278 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 14 | 1.70 |
| 4 | 158282 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 14 | 1.70 |
| 4 | 1600560 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 14 | 1.70 |
| 4 | 1680120 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 14 | 1.70 |
| 4 | 1683440 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 14 | 1.70 |
| 4 | 1701220 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 14 | 1.70 |
| 4 | 1706171 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 14 | 1.70 |

sgRNA: subgenomic RNA; vp: viral particles

## Panel e

| Animal Group | Animal_ID | Study | Vaccine | Timepoint | Lung Viral Load (Log10 sgRNA copies/mL) |
|---|---|---|---|---|---|
| 5 | 158280 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | -1 | 1.70 |
| 5 | 1606520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | -1 | 1.70 |
| 5 | 1680260 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | -1 | 1.70 |
| 5 | 1682671 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | -1 | 1.70 |
| 5 | 1683140 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | -1 | 1.70 |
| 5 | 1683520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | -1 | 1.70 |
| 5 | 1683640 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | -1 | 1.70 |
| 5 | 158280 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 1 | 1.70 |
| 5 | 1606520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 1 | 1.70 |
| 5 | 1680260 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 1 | 1.70 |
| 5 | 1682671 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 1 | 3.85 |
| 5 | 1683140 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 1 | 1.70 |
| 5 | 1683520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 1 | 1.70 |
| 5 | 1683640 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 1 | 1.70 |
| 5 | 158280 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 2 | 1.70 |
| 5 | 1606520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 2 | 1.70 |
| 5 | 1680260 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 2 | 1.70 |
| 5 | 1682671 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 2 | 3.87 |
| 5 | 1683140 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 2 | 1.70 |
| 5 | 1683520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 2 | 3.32 |
| 5 | 1683640 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 2 | 1.70 |
| 5 | 158280 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 4 | 1.70 |
| 5 | 1606520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 4 | 1.70 |
| 5 | 1680260 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 4 | 1.70 |
| 5 | 1682671 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 4 | 3.14 |
| 5 | 1683140 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 4 | 1.70 |
| 5 | 1683520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 4 | 1.70 |

| Animal Group | Animal_ID | Study | Vaccine | Timepoint | Lung Viral Load (Log10 sgRNA copies/mL) |
|---|---|---|---|---|---|
| 5 | 1683640 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 4 | 1.70 |
| 5 | 158280 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 7 | 1.70 |
| 5 | 1606520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 7 | 1.70 |
| 5 | 1680260 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 7 | 1.70 |
| 5 | 1682671 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 7 | 1.70 |
| 5 | 1683140 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 7 | 1.70 |
| 5 | 1683520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 7 | 1.70 |
| 5 | 1683640 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 7 | 1.95 |
| 5 | 158280 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 10 | 1.70 |
| 5 | 1606520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 10 | 1.70 |
| 5 | 1680260 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 10 | 1.70 |
| 5 | 1682671 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 10 | 1.70 |
| 5 | 1683140 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 10 | 1.70 |
| 5 | 1683520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 10 | 1.70 |
| 5 | 1683640 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 10 | 1.70 |
| 5 | 158280 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 14 | 1.70 |
| 5 | 1606520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 14 | 1.70 |
| 5 | 1680260 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 14 | 1.70 |
| 5 | 1682671 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 14 | 1.70 |
| 5 | 1683140 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 14 | 1.70 |
| 5 | 1683520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 14 | 1.70 |
| 5 | 1683640 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 14 | 1.70 |

sgRNA: subgenomic RNA; vp: viral particles

## Panel f

| Animal Group | Animal_ID | Study | Vaccine | No. sampling days with viral load>LOD (Lung) |
|---|---|---|---|---|
| 1 | 158274 | 6-month durability study | Sham | 3 |
| 1 | 158411 | 6-month durability study | Sham | 2 |
| 1 | 158422 | 6-month durability study | Sham | 3 |
| 1 | 1606400 | 6-month durability study | Sham | 3 |
| 1 | 1680940 | 6-month durability study | Sham | 1 |
| 1 | 1682980 | 6-month durability study | Sham | 4 |
| 1 | 1683040 | 6-month durability study | Sham | 4 |
| 2 | 158270 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 0 |
| 2 | 158272 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 0 |
| 2 | 158300 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 0 |
| 2 | 1606460 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 0 |
| 2 | 1681960 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 0 |
| 2 | 1683000 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 0 |
| 2 | 1683360 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 0 |
| 3 | 1506260 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 0 |
| 3 | 158284 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 2 |
| 3 | 158298 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 0 |
| 3 | 1680780 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 0 |
| 3 | 1682300 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 0 |
| 3 | 1683160 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 0 |
| 3 | 1801551 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 0 |
| 4 | 158278 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 0 |
| 4 | 158282 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 0 |
| 4 | 1600560 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 0 |
| 4 | 1680120 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 0 |
| 4 | 1683440 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 0 |
| 4 | 1701220 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 0 |
| 4 | 1706171 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 0 |
| 5 | 158280 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 0 |
| 5 | 1606520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 0 |

| Animal Group | Animal_ID | Study | Vaccine | No. sampling days with viral load>LOD (Lung) |
|---|---|---|---|---|
| 5 | 1680260 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 0 |
| 5 | 1682671 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 3 |
| 5 | 1683140 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 0 |
| 5 | 1683520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 1 |
| 5 | 1683640 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 0 |

LOD: limit of detection; vp: viral particles

**Supplementary Table 10:** Source data file for Supplementary Figure 4

**Panel a**

| Animal Group | Animal_ID | Study | Vaccine | Timepoint | Nose Viral Load (Log10 sgRNA copies/swab) |
|---|---|---|---|---|---|
| 1 | 158274 | 6-month durability study | Sham | -1 | 1.70 |
| 1 | 158411 | 6-month durability study | Sham | -1 | 1.70 |
| 1 | 158422 | 6-month durability study | Sham | -1 | 1.70 |
| 1 | 1606400 | 6-month durability study | Sham | -1 | 1.70 |
| 1 | 1680940 | 6-month durability study | Sham | -1 | 1.70 |
| 1 | 1682980 | 6-month durability study | Sham | -1 | 1.70 |
| 1 | 1683040 | 6-month durability study | Sham | -1 | 1.70 |
| 1 | 158274 | 6-month durability study | Sham | 1 | 2.91 |
| 1 | 158411 | 6-month durability study | Sham | 1 | 3.93 |
| 1 | 158422 | 6-month durability study | Sham | 1 | 2.58 |
| 1 | 1606400 | 6-month durability study | Sham | 1 | 3.95 |
| 1 | 1680940 | 6-month durability study | Sham | 1 | 5.43 |
| 1 | 1682980 | 6-month durability study | Sham | 1 | 3.66 |
| 1 | 1683040 | 6-month durability study | Sham | 1 | 4.53 |
| 1 | 158274 | 6-month durability study | Sham | 2 | 6.11 |
| 1 | 158411 | 6-month durability study | Sham | 2 | 5.83 |
| 1 | 158422 | 6-month durability study | Sham | 2 | 4.47 |
| 1 | 1606400 | 6-month durability study | Sham | 2 | 5.04 |
| 1 | 1680940 | 6-month durability study | Sham | 2 | 5.83 |
| 1 | 1682980 | 6-month durability study | Sham | 2 | 5.64 |
| 1 | 1683040 | 6-month durability study | Sham | 2 | 6.72 |
| 1 | 158274 | 6-month durability study | Sham | 4 | 5.28 |
| 1 | 158411 | 6-month durability study | Sham | 4 | 4.20 |
| 1 | 158422 | 6-month durability study | Sham | 4 | 4.24 |
| 1 | 1606400 | 6-month durability study | Sham | 4 | 3.68 |
| 1 | 1680940 | 6-month durability study | Sham | 4 | 3.82 |
| 1 | 1682980 | 6-month durability study | Sham | 4 | 4.22 |
| 1 | 1683040 | 6-month durability study | Sham | 4 | 4.28 |
| 1 | 158274 | 6-month durability study | Sham | 7 | 2.76 |
| 1 | 158411 | 6-month durability study | Sham | 7 | 2.56 |
| 1 | 158422 | 6-month durability study | Sham | 7 | 3.20 |
| 1 | 1606400 | 6-month durability study | Sham | 7 | 3.85 |
| 1 | 1680940 | 6-month durability study | Sham | 7 | 3.89 |
| 1 | 1682980 | 6-month durability study | Sham | 7 | 3.13 |
| 1 | 1683040 | 6-month durability study | Sham | 7 | 1.70 |
| 1 | 158274 | 6-month durability study | Sham | 10 | 1.70 |
| 1 | 158411 | 6-month durability study | Sham | 10 | 1.70 |
| 1 | 158422 | 6-month durability study | Sham | 10 | 1.70 |
| 1 | 1606400 | 6-month durability study | Sham | 10 | 3.94 |
| 1 | 1680940 | 6-month durability study | Sham | 10 | 4.18 |
| 1 | 1682980 | 6-month durability study | Sham | 10 | 1.70 |

| Animal Group | Animal_ID | Study | Vaccine | Timepoint | Nose Viral Load (Log10 sgRNA copies/swab) |
|---|---|---|---|---|---|
| 1 | 1683040 | 6-month durability study | Sham | 10 | 3.92 |
| 1 | 158274 | 6-month durability study | Sham | 14 | 1.70 |
| 1 | 158411 | 6-month durability study | Sham | 14 | 1.70 |
| 1 | 158422 | 6-month durability study | Sham | 14 | 1.70 |
| 1 | 1606400 | 6-month durability study | Sham | 14 | 3.27 |
| 1 | 1680940 | 6-month durability study | Sham | 14 | 3.39 |
| 1 | 1682980 | 6-month durability study | Sham | 14 | 1.70 |
| 1 | 1683040 | 6-month durability study | Sham | 14 | 1.70 |

sgRNA: subgenomic RNA

## Panel b

| Animal Group | Animal_ID | Study | Vaccine | Timepoint | Nose Viral Load (Log10 sgRNA copies/swab) |
|---|---|---|---|---|---|
| 2 | 158270 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | -1 | 1.70 |
| 2 | 158272 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | -1 | 1.70 |
| 2 | 158300 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | -1 | 1.70 |
| 2 | 1606460 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | -1 | 1.70 |
| 2 | 1681960 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | -1 | 1.70 |
| 2 | 1683000 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | -1 | 1.70 |
| 2 | 1683360 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | -1 | 1.70 |
| 2 | 158270 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 1 | 1.70 |
| 2 | 158272 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 1 | 1.70 |
| 2 | 158300 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 1 | 4.95 |
| 2 | 1606460 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 1 | 4.25 |
| 2 | 1681960 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 1 | 3.80 |
| 2 | 1683000 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 1 | 3.78 |
| 2 | 1683360 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 1 | 3.42 |
| 2 | 158270 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 2 | 2.86 |
| 2 | 158272 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 2 | 1.70 |
| 2 | 158300 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 2 | 5.72 |
| 2 | 1606460 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 2 | 5.50 |
| 2 | 1681960 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 2 | 3.71 |
| 2 | 1683000 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 2 | 5.58 |
| 2 | 1683360 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 2 | 4.96 |
| 2 | 158270 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 4 | 4.32 |
| 2 | 158272 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 4 | 1.70 |
| 2 | 158300 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 4 | 3.67 |
| 2 | 1606460 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 4 | 3.84 |
| 2 | 1681960 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 4 | 5.14 |
| 2 | 1683000 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 4 | 1.70 |

| Animal Group | Animal_ID | Study | Vaccine | Timepoint | Nose Viral Load (Log10 sgRNA copies/swab) |
|---|---|---|---|---|---|
| 2 | 1683360 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 4 | 4.20 |
| 2 | 158270 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 7 | 1.70 |
| 2 | 158272 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 7 | 1.70 |
| 2 | 158300 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 7 | 1.70 |
| 2 | 1606460 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 7 | 1.70 |
| 2 | 1681960 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 7 | 5.19 |
| 2 | 1683000 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 7 | 2.88 |
| 2 | 1683360 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 7 | 4.76 |
| 2 | 158270 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 10 | 1.70 |
| 2 | 158272 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 10 | 1.70 |
| 2 | 158300 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 10 | 1.70 |
| 2 | 1606460 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 10 | 1.70 |
| 2 | 1681960 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 10 | 1.70 |
| 2 | 1683000 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 10 | 1.70 |
| 2 | 1683360 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 10 | 1.70 |
| 2 | 158270 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 14 | 1.70 |
| 2 | 158272 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 14 | 1.70 |
| 2 | 158300 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 14 | 1.70 |
| 2 | 1606460 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 14 | 1.70 |
| 2 | 1681960 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 14 | 1.70 |
| 2 | 1683000 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 14 | 1.70 |
| 2 | 1683360 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 14 | 1.70 |

sgRNA: subgenomic RNA; vp: viral particles

## Panel c

| Animal Group | Animal_ID | Study | Vaccine | Timepoint | Nose Viral Load (Log10 sgRNA copies/swab) |
|---|---|---|---|---|---|
| 3 | 1506260 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | -1 | 1.70 |
| 3 | 158284 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | -1 | 1.70 |
| 3 | 158298 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | -1 | 1.70 |
| 3 | 1680780 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | -1 | 1.70 |
| 3 | 1682300 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | -1 | 1.70 |
| 3 | 1683160 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | -1 | 1.70 |
| 3 | 1801551 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | -1 | 1.70 |
| 3 | 1506260 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 1 | 4.09 |
| 3 | 158284 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 1 | 4.70 |
| 3 | 158298 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 1 | 1.81 |
| 3 | 1680780 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 1 | 4.38 |
| 3 | 1682300 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 1 | 4.84 |
| 3 | 1683160 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 1 | 3.26 |
| 3 | 1801551 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 1 | 4.71 |
| 3 | 1506260 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 2 | 5.78 |
| 3 | 158284 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 2 | 6.27 |
| 3 | 158298 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 2 | 1.73 |
| 3 | 1680780 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 2 | 6.18 |
| 3 | 1682300 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 2 | 6.88 |
| 3 | 1683160 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 2 | 4.98 |
| 3 | 1801551 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 2 | 5.50 |
| 3 | 1506260 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 4 | 4.82 |
| 3 | 158284 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 4 | 3.38 |
| 3 | 158298 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 4 | 1.70 |
| 3 | 1680780 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 4 | 5.02 |
| 3 | 1682300 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 4 | 3.93 |
| 3 | 1683160 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 4 | 3.74 |

| Animal Group | Animal_ID | Study | Vaccine | Timepoint | Nose Viral Load (Log10 sgRNA copies/swab) |
|---|---|---|---|---|---|
| 3 | 1801551 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 4 | 5.11 |
| 3 | 1506260 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 7 | 3.18 |
| 3 | 158284 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 7 | 1.70 |
| 3 | 158298 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 7 | 1.70 |
| 3 | 1680780 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 7 | 4.72 |
| 3 | 1682300 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 7 | 1.70 |
| 3 | 1683160 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 7 | 3.55 |
| 3 | 1801551 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 7 | 4.24 |
| 3 | 1506260 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 10 | 1.70 |
| 3 | 158284 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 10 | 1.70 |
| 3 | 158298 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 10 | 1.70 |
| 3 | 1680780 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 10 | 1.70 |
| 3 | 1682300 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 10 | 1.70 |
| 3 | 1683160 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 10 | 1.70 |
| 3 | 1801551 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 10 | 1.70 |
| 3 | 1506260 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 14 | 1.70 |
| 3 | 158284 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 14 | 1.70 |
| 3 | 158298 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 14 | 1.70 |
| 3 | 1680780 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 14 | 1.70 |
| 3 | 1682300 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 14 | 1.70 |
| 3 | 1683160 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 14 | 1.70 |
| 3 | 1801551 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 14 | 1.70 |

sgRNA: subgenomic RNA; vp: viral particles

## Panel d

| Animal Group | Animal_ID | Study | Vaccine | Timepoint | Nose Viral Load (Log10 sgRNA copies/swab) |
|---|---|---|---|---|---|
| 4 | 158278 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | -1 | 1.70 |
| 4 | 158282 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | -1 | 1.70 |
| 4 | 1600560 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | -1 | 1.70 |
| 4 | 1680120 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | -1 | 1.70 |
| 4 | 1683440 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | -1 | 1.70 |
| 4 | 1701220 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | -1 | 1.70 |
| 4 | 1706171 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | -1 | 1.70 |
| 4 | 158278 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 1 | 3.75 |
| 4 | 158282 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 1 | 4.02 |
| 4 | 1600560 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 1 | 4.49 |
| 4 | 1680120 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 1 | 3.17 |
| 4 | 1683440 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 1 | 3.96 |
| 4 | 1701220 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 1 | 4.04 |
| 4 | 1706171 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 1 | 1.70 |
| 4 | 158278 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 2 | 5.44 |
| 4 | 158282 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 2 | 4.13 |
| 4 | 1600560 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 2 | 6.66 |
| 4 | 1680120 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 2 | 4.96 |
| 4 | 1683440 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 2 | 4.74 |
| 4 | 1701220 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 2 | 6.42 |
| 4 | 1706171 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 2 | 1.70 |
| 4 | 158278 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 4 | 4.98 |
| 4 | 158282 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 4 | 5.15 |
| 4 | 1600560 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 4 | 5.69 |
| 4 | 1680120 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 4 | 5.52 |
| 4 | 1683440 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 4 | 3.71 |
| 4 | 1701220 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 4 | 6.21 |

| Animal Group | Animal_ID | Study | Vaccine | Timepoint | Nose Viral Load (Log10 sgRNA copies/swab) |
|---|---|---|---|---|---|
| 4 | 1706171 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 4 | 1.70 |
| 4 | 158278 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 7 | 2.95 |
| 4 | 158282 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 7 | 1.70 |
| 4 | 1600560 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 7 | 4.00 |
| 4 | 1680120 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 7 | 2.11 |
| 4 | 1683440 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 7 | 2.79 |
| 4 | 1701220 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 7 | 3.26 |
| 4 | 1706171 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 7 | 1.70 |
| 4 | 158278 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 10 | 1.70 |
| 4 | 158282 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 10 | 1.70 |
| 4 | 1600560 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 10 | 1.70 |
| 4 | 1680120 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 10 | 1.70 |
| 4 | 1683440 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 10 | 2.20 |
| 4 | 1701220 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 10 | 1.70 |
| 4 | 1706171 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 10 | 1.70 |
| 4 | 158278 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 14 | 1.70 |
| 4 | 158282 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 14 | 1.70 |
| 4 | 1600560 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 14 | 1.70 |
| 4 | 1680120 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 14 | 1.70 |
| 4 | 1683440 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 14 | 1.70 |
| 4 | 1701220 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 14 | 1.70 |
| 4 | 1706171 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 14 | 1.70 |

sgRNA: subgenomic RNA; vp: viral particles

## Panel e

| Animal Group | Animal_ID | Study | Vaccine | Timepoint | Nose Viral Load (Log10 sgRNA copies/swab) |
|---|---|---|---|---|---|
| 5 | 158280 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | -1 | 1.70 |
| 5 | 1606520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | -1 | 1.70 |
| 5 | 1680260 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | -1 | 1.70 |
| 5 | 1682671 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | -1 | 1.70 |
| 5 | 1683140 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | -1 | 1.70 |
| 5 | 1683520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | -1 | 1.70 |
| 5 | 1683640 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | -1 | 1.70 |
| 5 | 158280 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 1 | 5.74 |
| 5 | 1606520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 1 | 1.70 |
| 5 | 1680260 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 1 | 3.78 |
| 5 | 1682671 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 1 | 1.70 |
| 5 | 1683140 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 1 | 1.70 |
| 5 | 1683520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 1 | 2.73 |
| 5 | 1683640 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 1 | 1.70 |
| 5 | 158280 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 2 | 5.72 |
| 5 | 1606520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 2 | 3.22 |
| 5 | 1680260 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 2 | 3.67 |
| 5 | 1682671 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 2 | 1.70 |
| 5 | 1683140 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 2 | 4.15 |
| 5 | 1683520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 2 | 4.62 |
| 5 | 1683640 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 2 | 3.49 |
| 5 | 158280 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 4 | 4.44 |
| 5 | 1606520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 4 | 1.70 |
| 5 | 1680260 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 4 | 2.80 |
| 5 | 1682671 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 4 | 1.70 |
| 5 | 1683140 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 4 | 4.16 |
| 5 | 1683520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 4 | 5.75 |

| Animal Group | Animal_ID | Study | Vaccine | Timepoint | Nose Viral Load (Log10 sgRNA copies/swab) |
|---|---|---|---|---|---|
| 5 | 1683640 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 4 | 1.70 |
| 5 | 158280 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 7 | 3.42 |
| 5 | 1606520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 7 | 1.70 |
| 5 | 1680260 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 7 | 1.70 |
| 5 | 1682671 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 7 | 1.70 |
| 5 | 1683140 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 7 | 1.70 |
| 5 | 1683520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 7 | 2.91 |
| 5 | 1683640 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 7 | 5.20 |
| 5 | 158280 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 10 | 1.70 |
| 5 | 1606520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 10 | 1.70 |
| 5 | 1680260 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 10 | 1.70 |
| 5 | 1682671 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 10 | 1.70 |
| 5 | 1683140 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 10 | 1.70 |
| 5 | 1683520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 10 | 1.70 |
| 5 | 1683640 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 10 | 2.90 |
| 5 | 158280 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 14 | 1.70 |
| 5 | 1606520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 14 | 1.70 |
| 5 | 1680260 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 14 | 1.70 |
| 5 | 1682671 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 14 | 1.70 |
| 5 | 1683140 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 14 | 1.70 |
| 5 | 1683520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 14 | 1.70 |
| 5 | 1683640 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 14 | 1.70 |

sgRNA: subgenomic RNA; vp: viral particles

## Panel f

| Animal Group | Animal_ID | Study | Vaccine | No. sampling days with viral load>LOD (Nose) |
|---|---|---|---|---|
| 1 | 158274 | 6-month durability study | Sham | 4 |
| 1 | 158411 | 6-month durability study | Sham | 4 |
| 1 | 158422 | 6-month durability study | Sham | 4 |
| 1 | 1606400 | 6-month durability study | Sham | 6 |
| 1 | 1680940 | 6-month durability study | Sham | 6 |
| 1 | 1682980 | 6-month durability study | Sham | 4 |
| 1 | 1683040 | 6-month durability study | Sham | 4 |
| 2 | 158270 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 2 |
| 2 | 158272 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 0 |
| 2 | 158300 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 3 |
| 2 | 1606460 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 3 |
| 2 | 1681960 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 4 |
| 2 | 1683000 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 3 |
| 2 | 1683360 | 6-month durability study | 1-dose $1x10^{11}$ vp Ad26.COV2.S | 4 |
| 3 | 1506260 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 4 |
| 3 | 158284 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 3 |
| 3 | 158298 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 0 |
| 3 | 1680780 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 4 |
| 3 | 1682300 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 3 |
| 3 | 1683160 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 4 |
| 3 | 1801551 | 6-month durability study | 1-dose $5x10^{10}$ vp Ad26.COV2.S | 4 |
| 4 | 158278 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 4 |
| 4 | 158282 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 3 |
| 4 | 1600560 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 4 |
| 4 | 1680120 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 4 |
| 4 | 1683440 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 5 |
| 4 | 1701220 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 4 |
| 4 | 1706171 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-4) | 0 |
| 5 | 158280 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 4 |
| 5 | 1606520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 1 |

| Animal Group | Animal_ID | Study | Vaccine | No. sampling days with viral load>LOD (Nose) |
|---|---|---|---|---|
| 5 | 1680260 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 3 |
| 5 | 1682671 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 0 |
| 5 | 1683140 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 2 |
| 5 | 1683520 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 4 |
| 5 | 1683640 | 6-month durability study | 2-dose $5x10^{10}$ vp Ad26.COV2.S (0-8) | 3 |

LOD: limit of detection; vp: viral particles

**Supplementary Table 11:** Source data file for Supplementary Figure 5

| | | Lung | Lung | Lung | Nose | Nose | Nose |
|---|---|---|---|---|---|---|---|
| | | **One-dose** | **Two-dose** | **Combined** | **One-dose** | **Two-dose** | **Combined** |
| **S-ELISA** | Observed (Mean) | 92.9% | 85.7% | 89.3% | 14.3% | 14.3% | 14.3% |
| | [95% CI] | [58.0-99.2%] | [53.5-96.9%] | [70.4-96.7%] | [3.1-46.5%] | [3.1-46.5%] | [5.2-33.5%] |
| | Prediction Analysis A[1] (Mean) | 72.6% | 74.4% | 73.5% | 45.5% | 49.3% | 47.4% |
| | [95% CI] | [57.0-86.8%] | [60.8-87.4%] | [59.9-86.9%] | [27.6-62.2%] | [32.2-64.8%] | [30.6-62.7%] |
| | Prediction Analysis B[2] (Mean) | 29.0% | 30.0% | 30.0% | 0.0% | 0.0% | 0.0% |
| | [95% CI] | [0.0-83.0%] | [0.0-93.0%] | [0.0-86.0%] | [0.0-7.0%] | [0.0-7.0%] | [0.0-7.0%] |
| **psVNA** | Observed (Mean) | 92.9% | 85.7% | 89.3% | 14.3% | 14.3% | 14.3% |
| | [95% CI] | [58.0-99.2%] | [53.5-96.9%] | [70.4-96.7%] | [3.1-46.5%] | [3.1-46.5%] | [5.2-33.5%] |
| | Prediction Analysis A[1] (Mean) | 86.7% | 88.2% | 87.5% | 75.7% | 79.8% | 77.7% |
| | [95% CI] | [76.0-95.0%] | [79.3-95.9%] | [78.6-95.2%] | [58.3-90.9%] | [64.7-93.0%] | [63.5-90.2%] |
| | Prediction Analysis B[2] (Mean) | 81.0% | 90.0% | 86.0% | 53.0% | 53.0% | 53.0% |
| | [95% CI] | [57.0-93.0%] | [57.0-100.0%] | [57.0-96.0%] | [36.0-86.0%] | [14.0-86.0%] | [25.0-82.0%] |

[1]logistic models; [2]sigmoid Emax models

S-ELISA: spike protein enzyme-linked immunosorbent assay ; psVNA: pseudotyped virus neutralization assay