**Supplementary file 4**. Model parameters for viral dynamics in both the nasopharynx and the trachea estimated by the model with the viral infectivity adjusted for ACE2-RBD binding inhibition and the loss rate of infected cells adjusted for the group of treatment.

|  |  |  |  |
| --- | --- | --- | --- |
| **Param.** | **Meaning** | **Value [95% CI]** | **Unit** |
| **β** | Infection rate with ECLRBD=0 AU **(x10-8)** | 0.80 [0.21 ; 3.01]  | (copies/ml)-1 day-1 |
|  | Fold $ΔECLRBD=10^{3} AU$ | 1.018 [1.012 ; 1.023] |  |
| **δ** | Loss rate of infected cells  | 1.00 [0.76 ; 1.33] | day-1 |
|  | Fold change in the convalescent group | 1.78 [1.21 ; 2.61]\*\* |  |
|  | Fold change in the Conv-CD40 group | 2.18 [1.24 ; 3.84]\*\* |  |
| **PN** | Viral production rate in the naso. (x103) | 9.87 [2.86 ; 34.06]  | virions.(cell.day)-1 |
| **PT** | Viral production rate in the trachea (x103) | 0.71 [0.16 ; 3.18]  | virions.(cell.day)-1 |
| **αvlsg** | Infected cells and sgRNA viral load ratio | 1.33 [1.02 ; 1.74] | Virions.cell-1 |
| **k** | Eclipse rate | 3 | day-1 |
| **c** | Clearance of *de novo* produced viruses | 3 | day-1 |
| **cI** | Clearance of inoculum | 20 | day-1 |
| **µ** | Percentage of infectious viruses | 10-3 |  |
| $T\_{0}^{X,nbc}$ | Initial number of target cells | 1.25x105 (Naso.)2.25x104 (Trachea) | cells |
| $Inoc\_{0}$ | Number of virions inoculated  | 2.19x1010 | virions |
| **ωβ** | SD of random effect on log10 β | 0.223 [-0.059 ; 0.505] |  |
| **ωδ** | SD of random effect on δ | 0.196 [-0.090 ; 0.482] |  |
| **σVLn** | SD of error model gRNA in naso. | 1.13 [0.91 ; 1.34] |  |
| **σVLt** | SD of error model gRNA in trachea | 1.25 [1.02 ; 1.48] |  |
| **σsgVLn** | SD of error model sgRNA in naso | 1.57 [1.09 ; 2.04] |  |
| **σsgVLt** | SD of error model sgRNA in trachea | 1.33 [0.96 ; 1.70] |  |