

Supplement data 1

1. SARS-CoV-2 Spike (S) ectodomain amino acid sequence

MFVFLVLLPLVSSQCVNLTTTRTQLPPAYTNSFTRGVYYPDKVFRSSVLHSTQDLFLPFFSNV
TWFHAIHVSGTNGTKRFDNPVLPFNDGVYFASTEKSNIIRGWIFGTTLDSTQSLIVNNATN
VVIKVC EFQFCNDPFLGVYYHKNNKSWMESEFRVYSSANNCTFEYVSQPFLMDLEGKQGN
FKNLREFVFKNIDGYFKIYSKHTPINLVRDLPQGFSALEPLVDLPIGINITRFQTLALHRSYLT
PGDSSSGWTAGAAAYVGYLQPRTFLLKYNENGTITDAVDCALDPLSETKCTLKSFTVEKGI
YQTSNFRVQPTESIVRFPNITNLCPFGEVFNATRFASVYAWNRKRISNCVADYSVLYNSASF
STFKCYGVSPTKLNDLCFTNVYADSFVIRGDEV RQIAPGQTGKIADYNYKLPDDFTGCVIAW
NSNNLDSKVGGNYNLYRLFRKSNLKPFERDISTEIQAGSTPCNGVEGFNCYFPLQSYGF
QPTNGVGYQPYRVVLSFELLHAPATVCGPKKSTNLVKNKCVNFNFNGLTGTGVLTESNKK
FLPFQQFGRDIADTTDAVRDPQTLEILDITPCSFGGVSVITPGTNTSNQVAVLYQDVNCTEV
PVAIHADQLTPTWRVYSTGSNVFQTRAGCLIGAEHVNNSYECDIPIGAGICASYQTQTNSPR
RARSVASQSIIAYTMSLGAENSVAYSNNISAIPTNFTISVTTEILPVSMTKTSVDCTMYICGDS
TECSNLLLQYGSFCTQLNRALTGIAVEQDKNTQEVFAQVKQIYKTPPIKDFGGFNFSQILPDP
SKPSKRSFIEDLLFNKVT LADAGFIKQYGDCLGDIAARDLICAQKFNGLTVLPPLLTDemiaQY
TSALLAGTITSGWTFGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKLIANQFN SAIGKIQ
DLSSTASALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLNDILSR LDKVEAEVQIDRLIT
GRLQSLQTYVTQQLIRAAEIRASANLAATKMSECVLGQSKRVDFCGKGYHLMSFPQSAPH
GVVFLHVTYVPAQEKNFTTAPAICH DGKAHFPREGVFVSNGTHWFVTQRNFYEPQIITTDN
TFVSGNCDVVIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPD VDLGDISGINASVVNIQKE
IDRLNEVAKNLNESLIDLQELGKYEQYI

Supplementary Table 1: Characterization of encapsulated mRNA and stability testing

Storage Time	1-month			6-month		12-month	
Storage Temperature	(-75 °C ± 10 °C)	(-20 °C ± 5 °C)	(5 °C ± 3 °C)	(-75 °C ± 10 °C)	(-20 °C ± 5 °C)	(-75 °C ± 10 °C)	(-20 °C ± 5 °C)
Tested Parameters							
mRNA encapsulation efficiency	97%	97%	95%	97%	95%	97%	95%
Particle Size (nm)	64 nm	64 nm	66 nm	65 nm	78 nm	65 nm	92 nm
Polydispersity Index (PDI)	0.05	0.06	0.07	0.08	0.10	0.06	0.14

Supplementary Figure 1

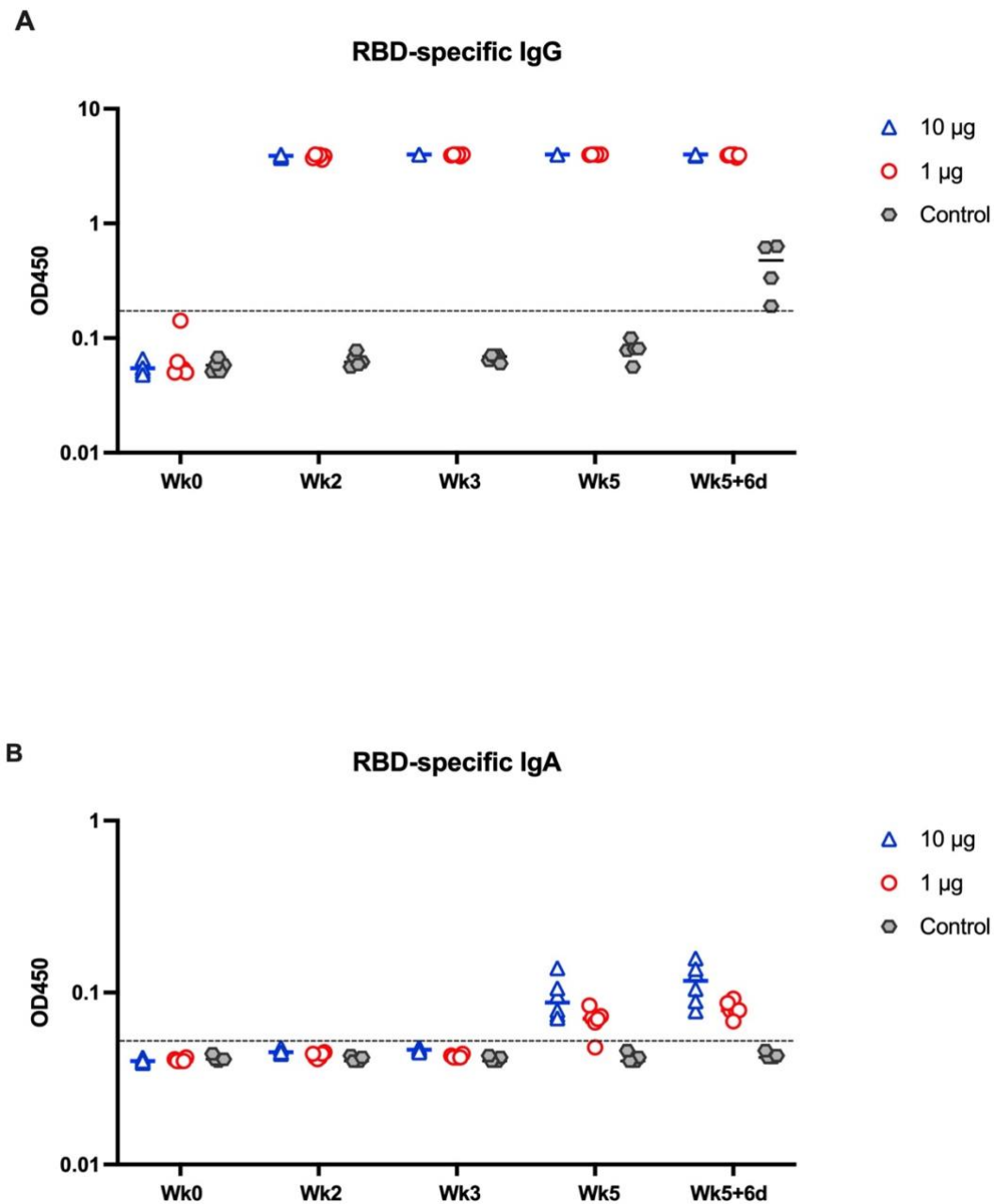


Figure S1: RBD-specific-IgG and -IgA from K18-hACE2 mice sera in the challenge experiment analyzed by ELISA at various timepoints. Sera were diluted 1:100 and measured for RBD-specific-IgG (A) and -IgA (B). OD450 results of individual mice immunized with 10 µg ($n = 6$, blue triangle), 1 µg ($n = 6$, red circle) and PBS control ($n = 5$, grey hexagonal) were shown. Horizontal lines represent a positive cut-off.