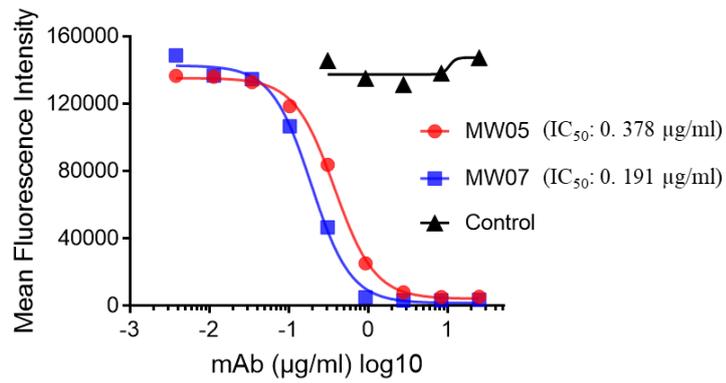


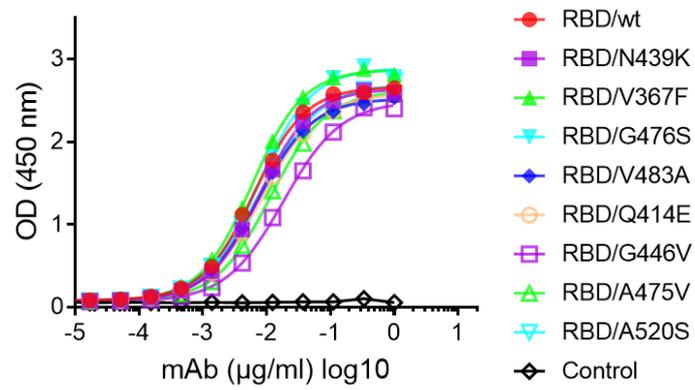
**Supplementary Information**

**Characterization of neutralizing antibody with prophylactic and therapeutic efficacy against SARS-CoV-2 in rhesus monkeys**

**Wang et al.**

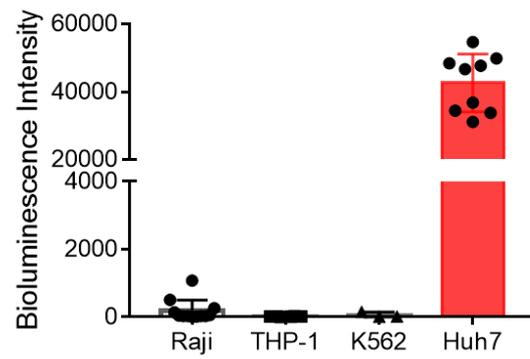


**Supplementary Fig. 1 The abilities of MW05 and MW07 to block SARS-CoV-2 RBD interaction with ACE2 overexpressing HEK293 cells was evaluated by FACS. Pre-incubated mAb and SARS-CoV-2 RBD-mFc mixtures were added to ACE2 overexpressing HEK293 cells to check the binding of RBD to ACE2. Goat anti mouse IgG Fc-FITC was used as secondary antibody. Irrelevant human IgG1 was used as control.**

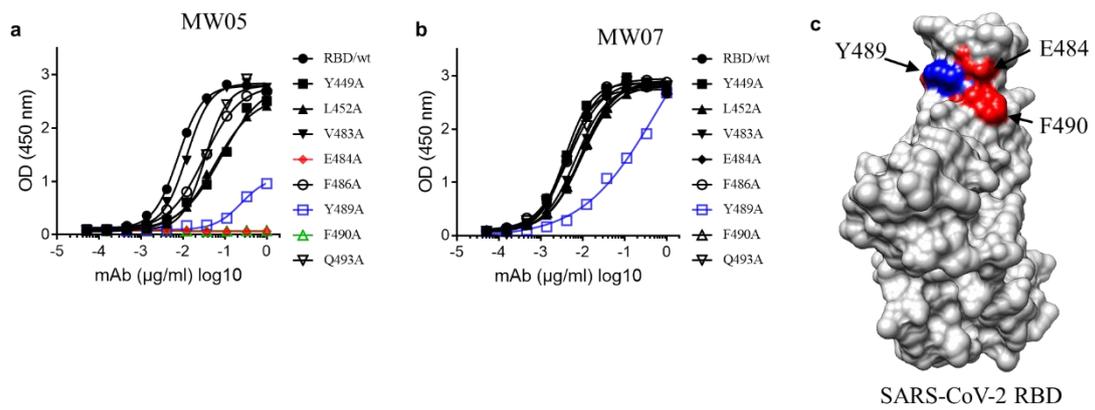


**Supplementary Fig. 2 Binding of ACE2 to different SARS-CoV-2 RBD mutants by ELISA.**

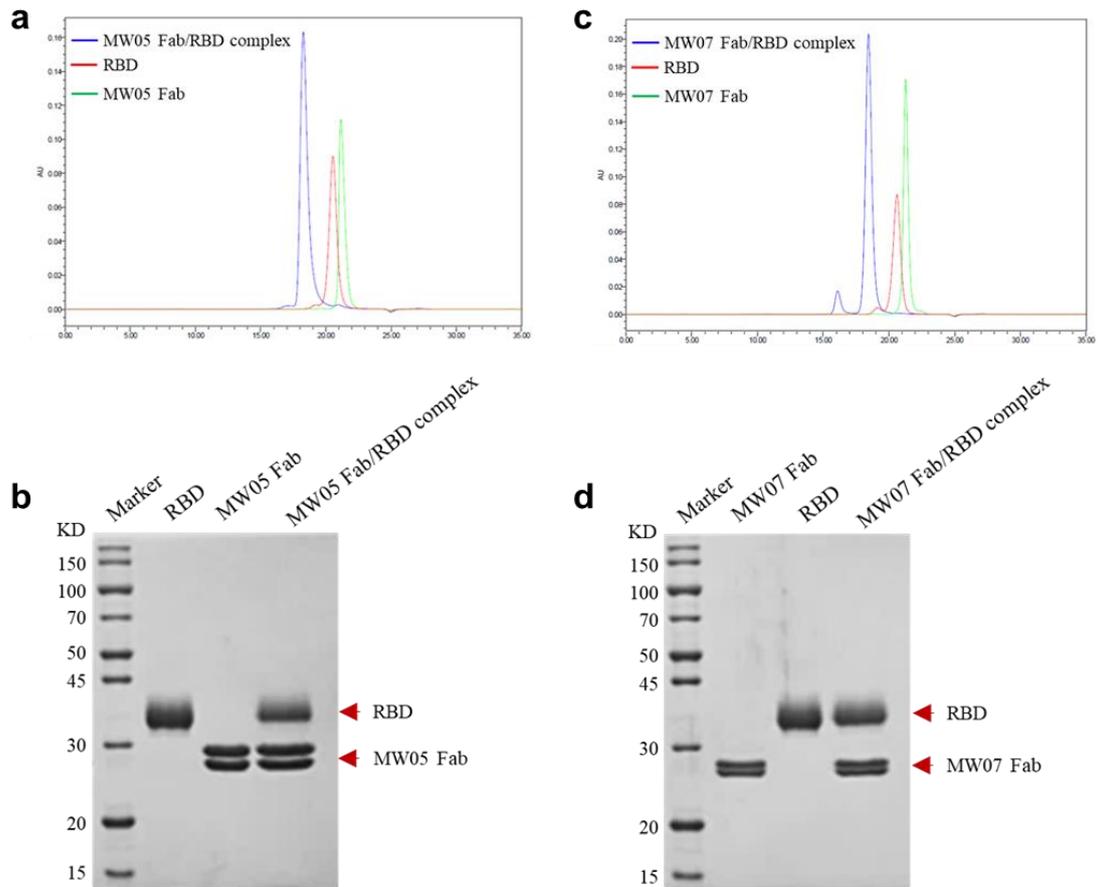
RBD recombinant proteins were coated on 96-well plates. Human ACE2-mFc was then added into plates to check the binding.



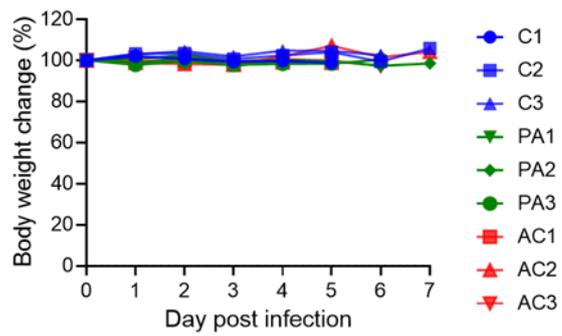
**Supplementary Fig. 3** The infection of SARS-CoV-2 pseudovirus in Raji, THP-1, K562 and Huh7 cells. The average  $\pm$  SD from n=10 of three independent experiments with technical duplicates is shown.



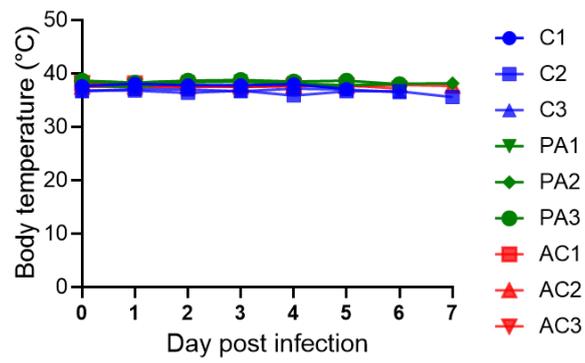
**Supplementary Fig. 4 Binding of MW05 and MW07 to SARS-CoV-2 RBD. a** Binding of MW05 to mutants was performed by ELISA. **b** Binding of MW07 to mutants was performed by ELISA. **c** Highlighting the key amino acid residues on SARS-CoV-2 RBD structure.



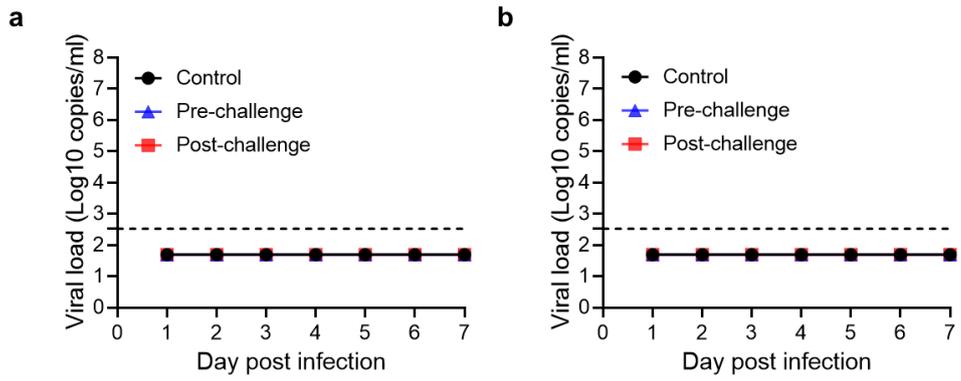
**Supplementary Fig. 5 Generation and identification of SARS-CoV-2 RBD/MW05 Fab and SARS-CoV-2 RBD/MW07 Fab complexes. a** Characterization of RBD, MW05 Fab and RBD/MW05 Fab complex by HPLC. **b** Characterization of RBD, MW05 Fab and RBD/MW05 Fab complex by SDS-PAGE. **c** Characterization of RBD, MW07 Fab and RBD/MW07 Fab complex by HPLC. **d** Characterization of RBD, MW07 Fab and RBD/MW07 Fab complex by SDS-PAGE.



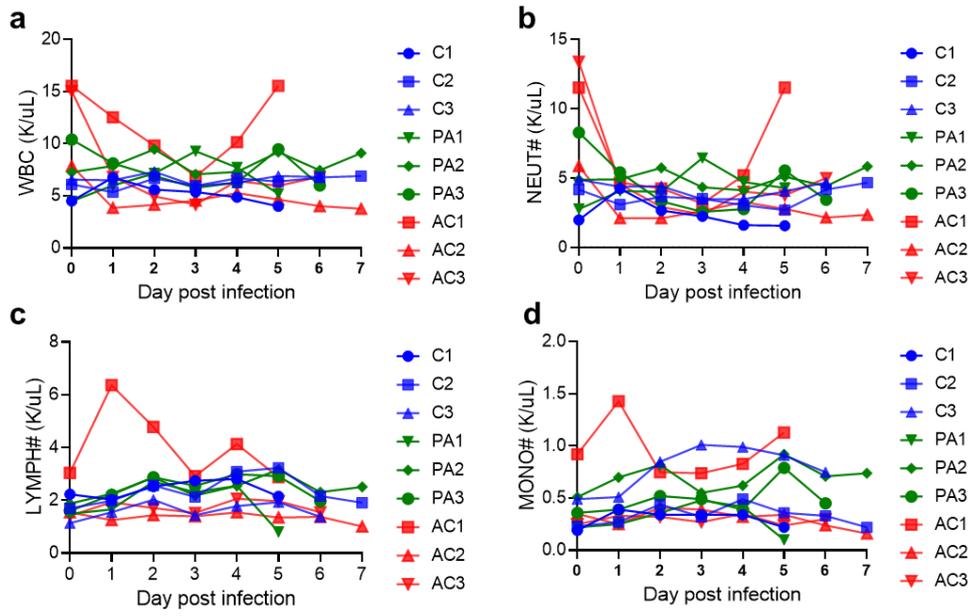
**Supplementary Fig. 6** The body weight of each monkey was checked every day. C indicates the control group, PA indicates the pre-challenge group and AC indicates the post-challenge group.



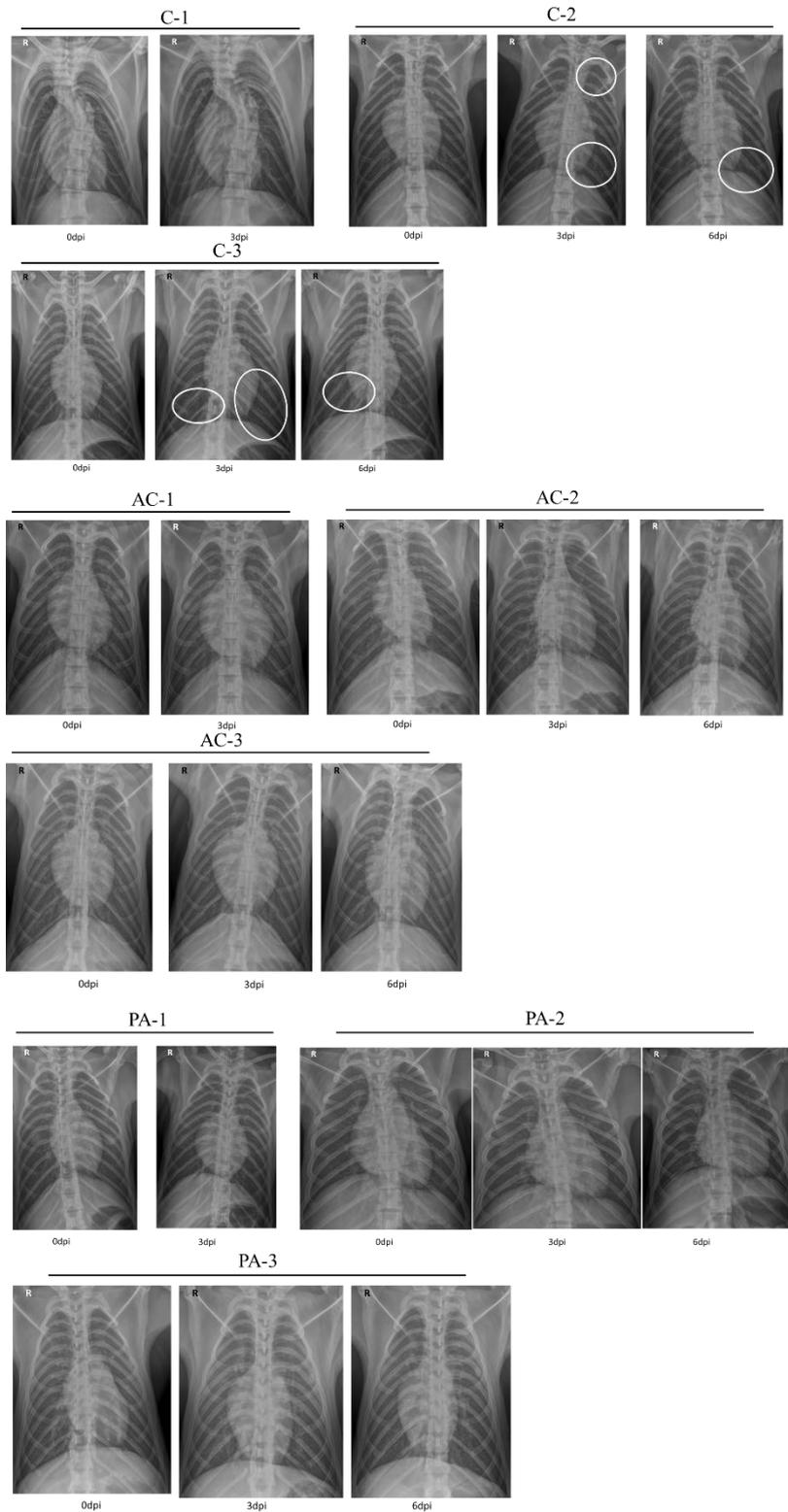
**Supplementary Fig. 7** The body temperature of each monkey was checked every day. C indicates the control group, PA indicates the pre-challenge group and AC indicates the post-challenge group.



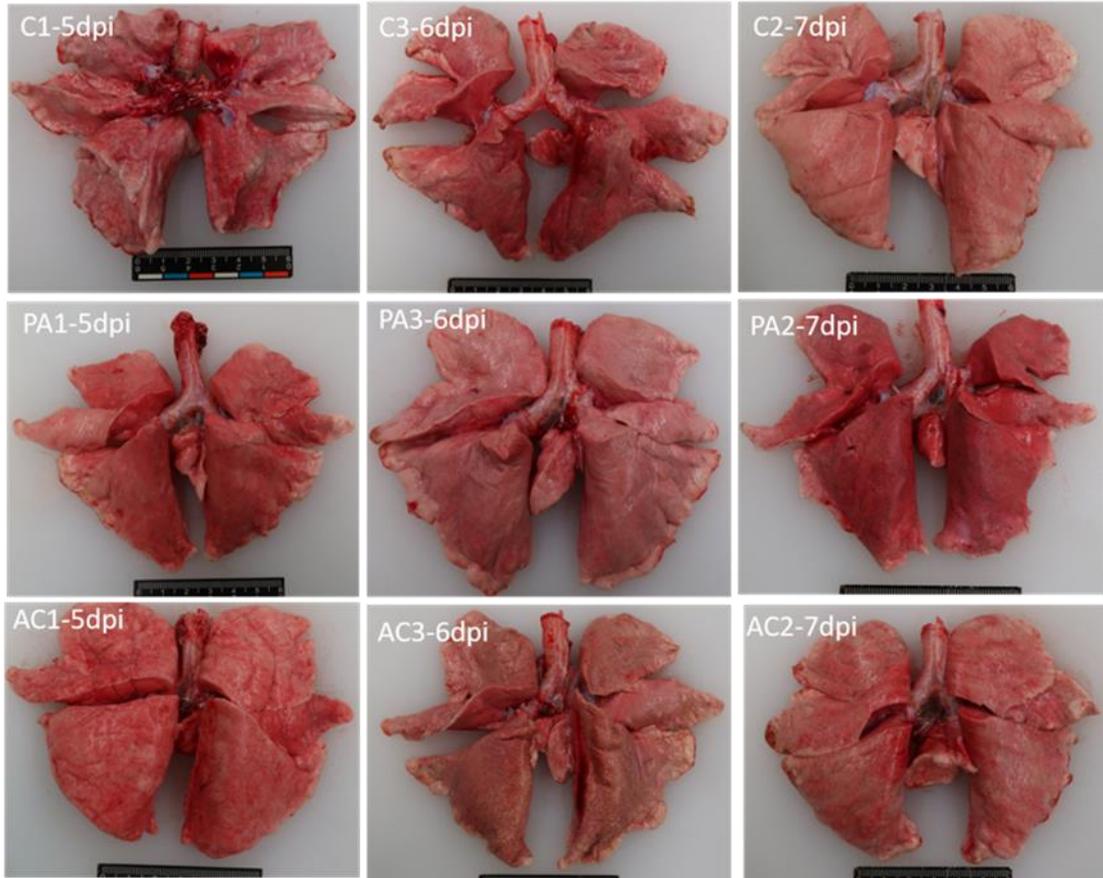
**Supplementary Fig. 8 Viral titer of nasal swabs (a) or blood samples (b) of all monkeys were evaluated by qRT-PCR.**



**Supplementary Fig. 9** White blood cells (a), neutrophils (b), lymphocytes (c) and monocytes (d) in each monkey were monitored every day. C indicates the control group, PA indicates the pre-challenge group and AC indicates the post-challenge group.



**Supplementary Fig. 10 X-ray imaging of all animals in this study.** C indicates the control group, PA indicates the pre-challenge (prophylactic) group and AC indicates the post-challenge (therapeutic) group.



**Extended Data Fig. 11 Whole Lung Photograph of Experimental Animals.**

**Supplementary Table. 1 Summary of histopathology analysis of animals in control, prophylactic and therapeutic Groups**

Experimental group	Animal #	5 dpi						6 dpi						7 dpi						
		Inflammatory cells in alveolar wall	Alveolar wall thickening	Inflammatory exudate in alveolar cavity	Alveolar cavity fibrosis	Peribronchiolar inflammation	Perivascular (small vessels) inflammatory cells	Inflammatory cells in alveolar wall	Alveolar wall thickening	Inflammatory exudate in alveolar cavity	Alveolar cavity fibrosis	Peribronchiolar inflammation	Perivascular (small vessels) inflammatory cells	Inflammatory cells in alveolar wall	Alveolar wall thickening	Inflammatory exudate in alveolar cavity	Alveolar cavity fibrosis	Peribronchiolar inflammation	Perivascular (small vessels) inflammatory cells	
Control group	C1	++	++	++	+++	+	-	/	/	/	/	/	/	/	/	/	/	/	/	/
	C2	/	/	/	/	/	/	/	/	/	/	/	/	+	++	+	+	+	+	+
	C3	/	/	/	/	/	/	++	+++	+	+	+	+	+	/	/	/	/	/	/
	Overall grading	++/+++ (moderate-severe)						++/+++ (moderate-severe)						++ (moderate)						
Therapeutic group	AC1	++	++	+	++	+	-	/	/	/	/	/	/	/	/	/	/	/	/	/
	AC2	/	/	/	/	/	/	/	/	/	/	/	/	+++	+++	++	++	+	+	+
	AC3	/	/	/	/	/	/	++	++	++	++	+	+	/	/	/	/	/	/	/
	Overall grading	+/++ (mild-moderate)						+/++ (mild-moderate)						++/+++ moderate-severe						
Prophylactic group	PA1	++	++	+	+	+	+	/	/	/	/	/	/	/	/	/	/	/	/	/
	PA2	/	/	/	/	/	/	/	/	/	/	/	/	++	++	+	+	+	+	+
	PA3	/	/	/	/	/	/	+	+	+	+	+	-	/	/	/	/	/	/	/
	Overall grading	+/++ (mild-moderate)						+ /- (no lesions/mild)						+/++ (mild-moderate)						

**Supplementary Table. 2 qPCR primers targeting SARS-CoV-2 S gene**

Primer name	Primer sequence
SARS-CoV-2 RBD-qF1	5'-CAATGGTTTAACAGGCACAGG-3'
SARS-CoV-2 RBD-qR1	5'-CTCAAGTGTCTGTGGATCACG-3'