

FIG. 1A

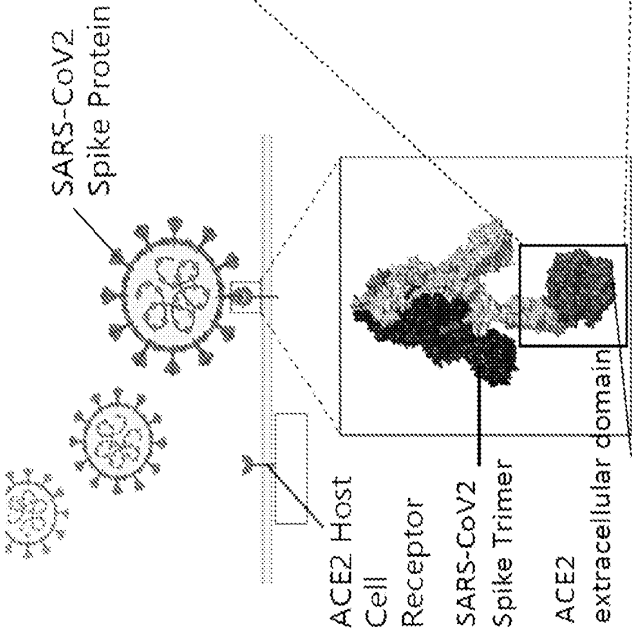


FIG. 1B

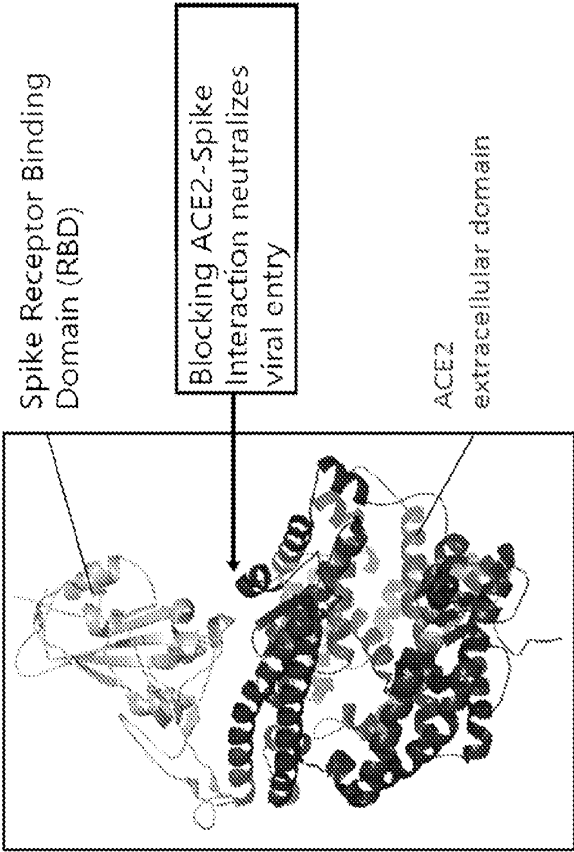


FIG. 2A

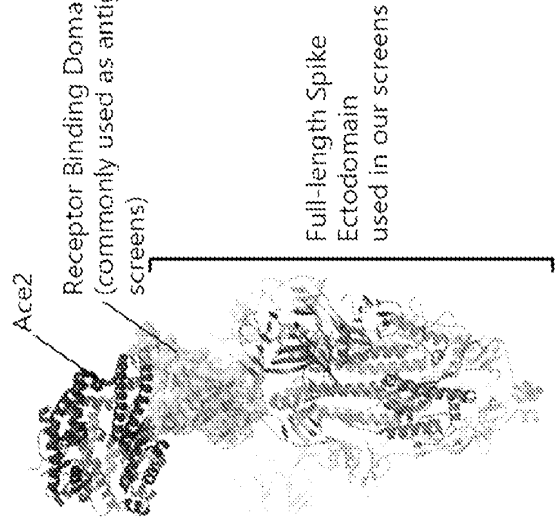


FIG. 2B



FIG. 2C

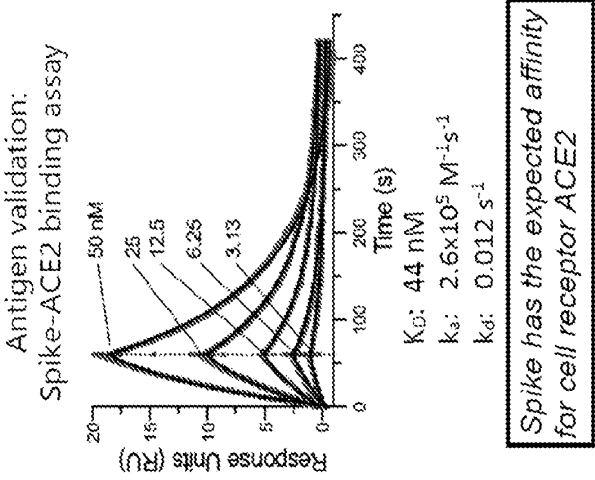


FIG. 3

Flow Cytometry of Yeast Displaying AeroNab6:

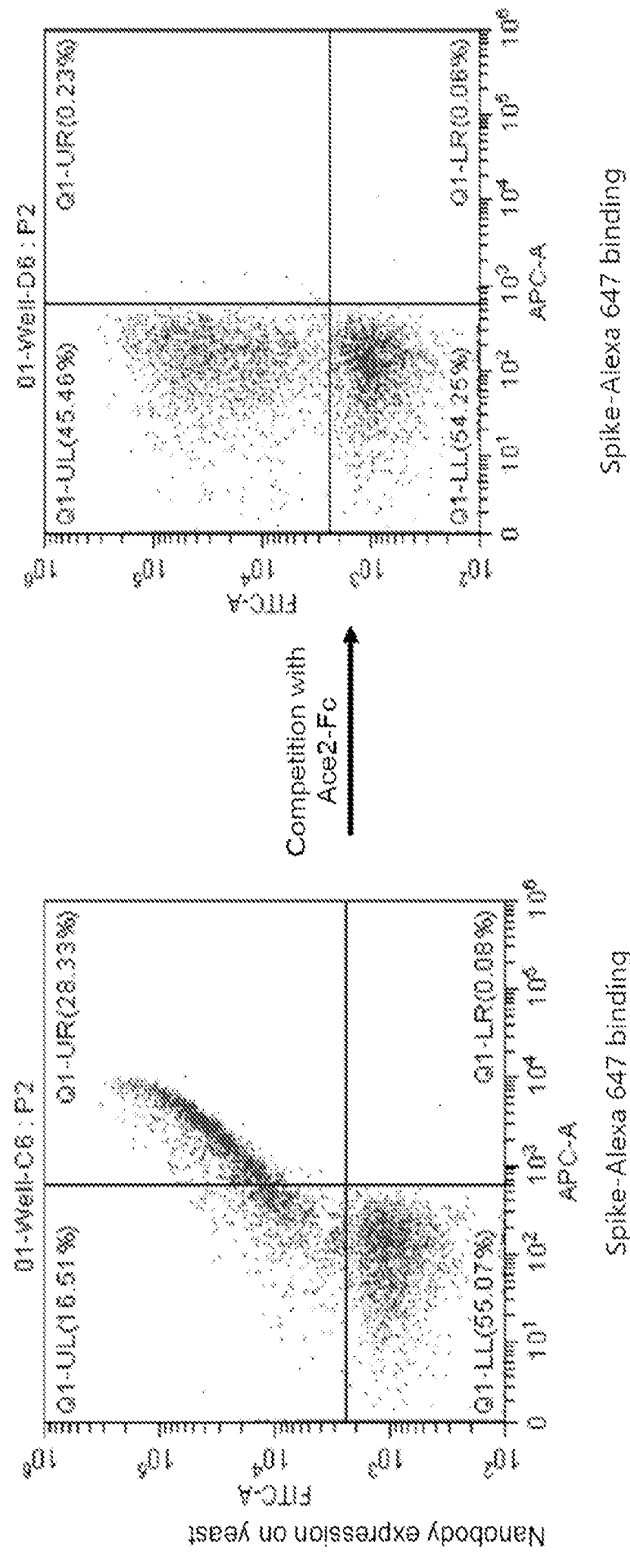
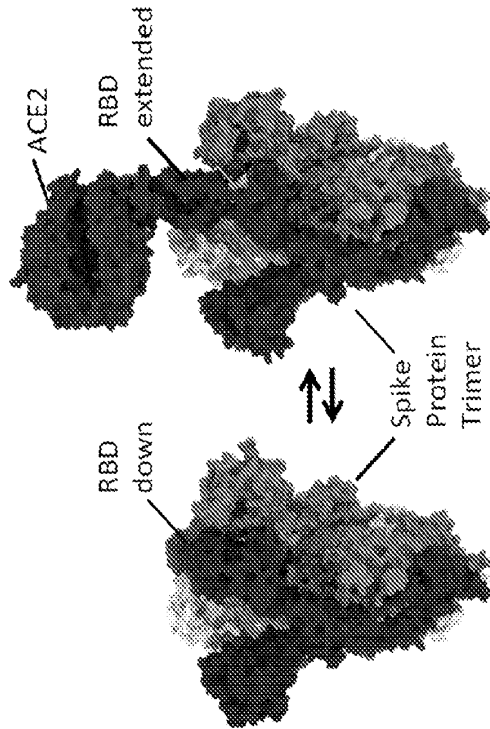
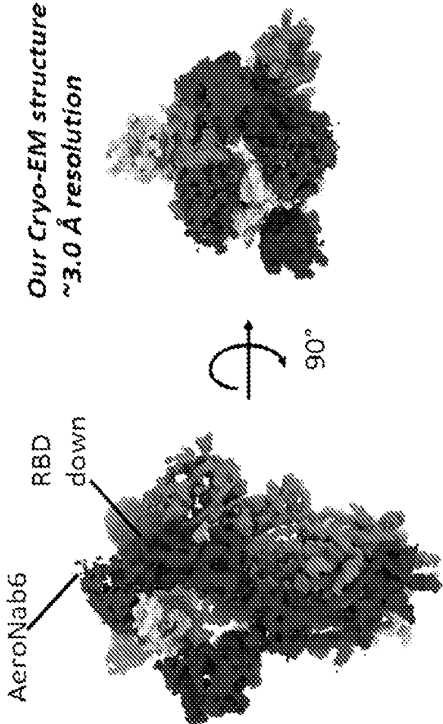


FIG. 4A



• RBD extension is required for ACE2 binding

FIG. 4B



Our Cryo-EM structure
~3.0 Å resolution

- With AeroNab6, RBDs are locked in the inactive down-conformation; they are not available to bind ACE2
- CryoEM structure defines optimal linker-length for a trimeric, multivalent AeroNab6

FIG. 5A

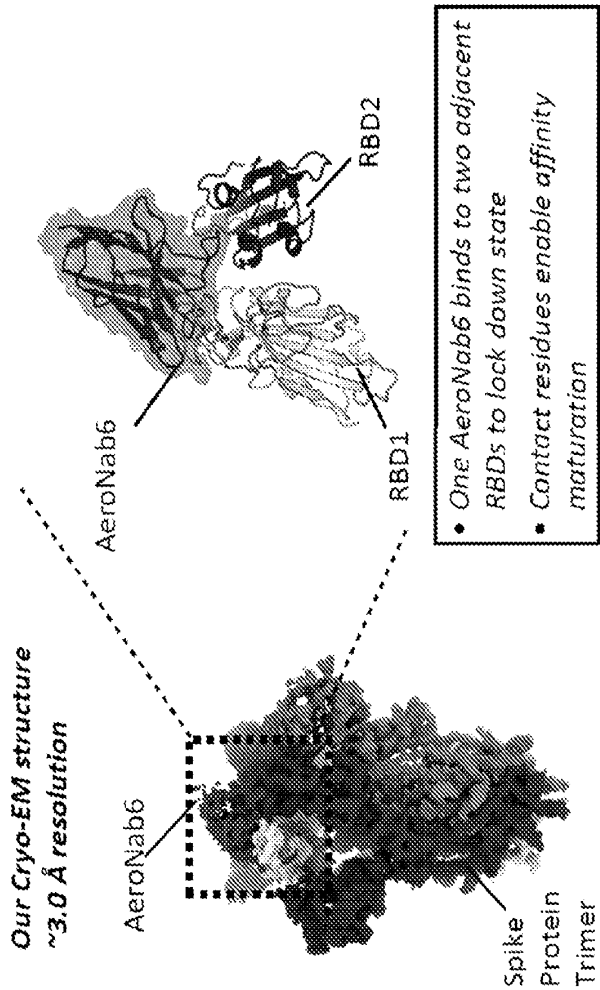


FIG. 5B

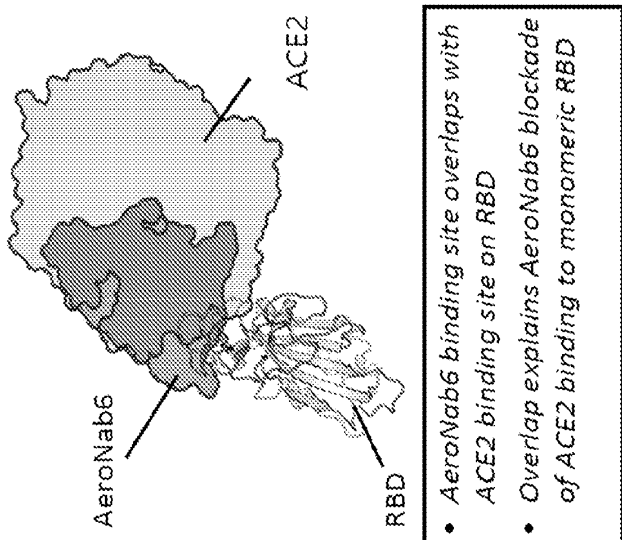


FIG. 6A

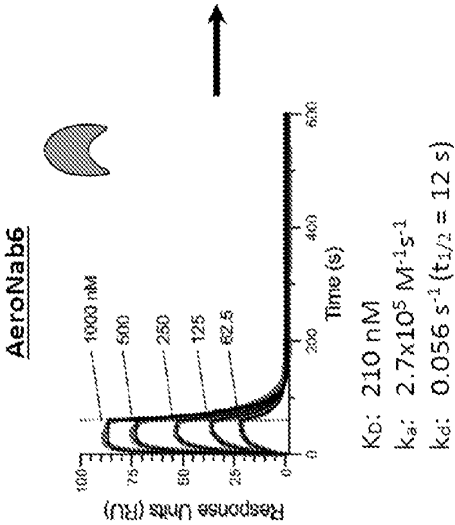


FIG. 6B

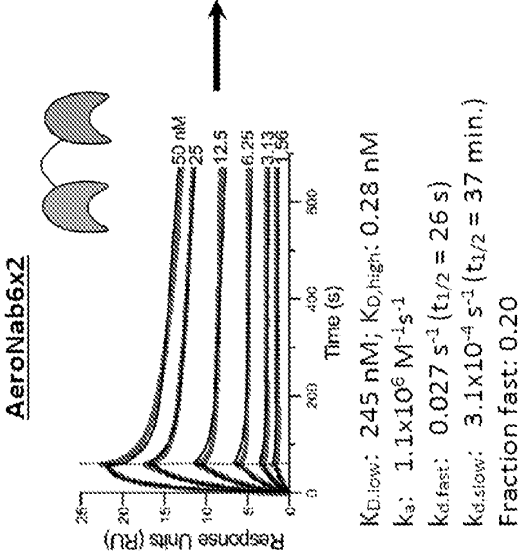
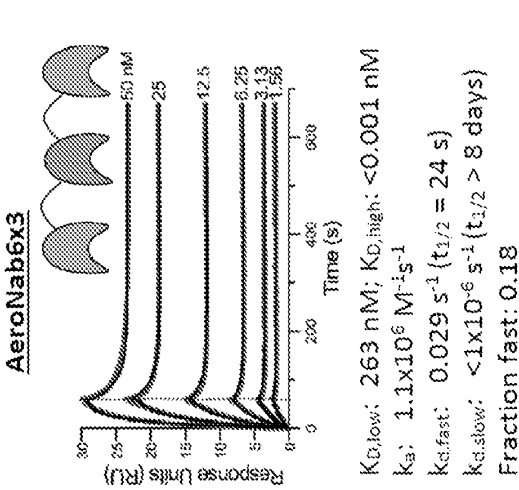


FIG. 6C



Binding to Spike measured by Surface Plasmon Resonance

FIG. 7A

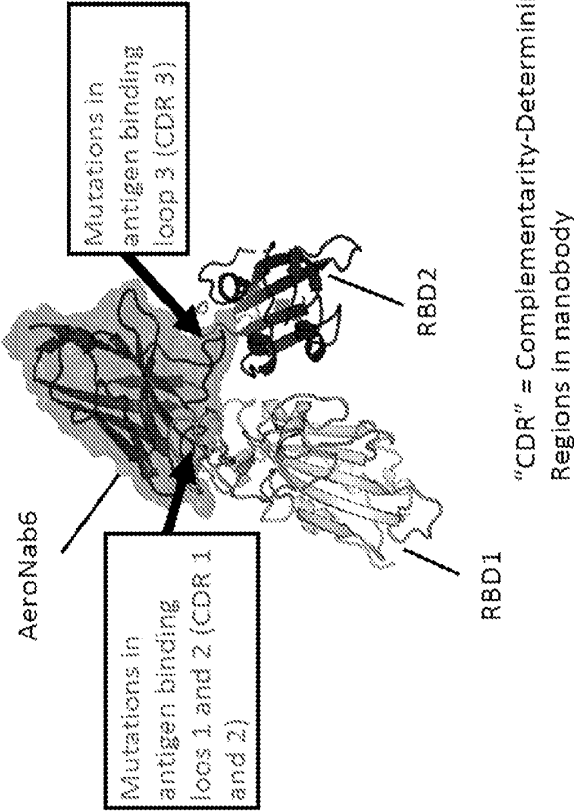


FIG. 7B

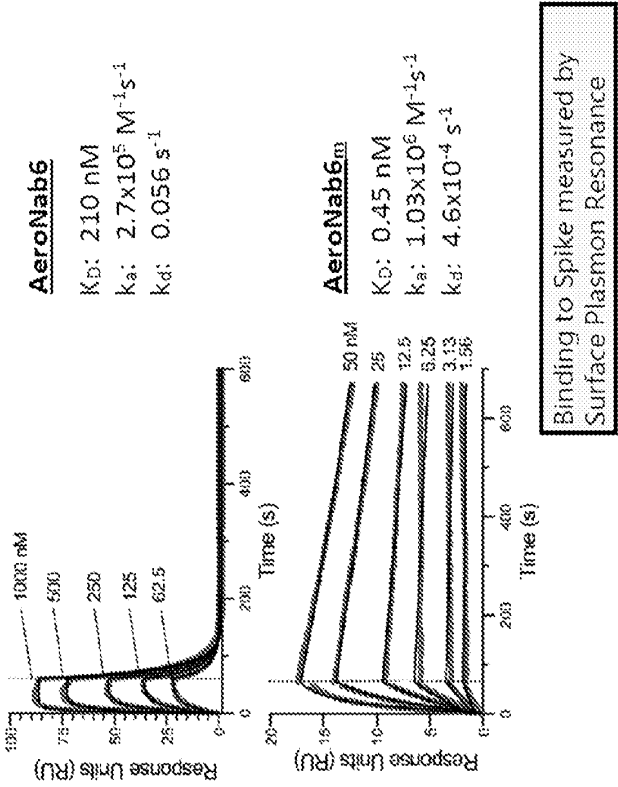


FIG. 8A

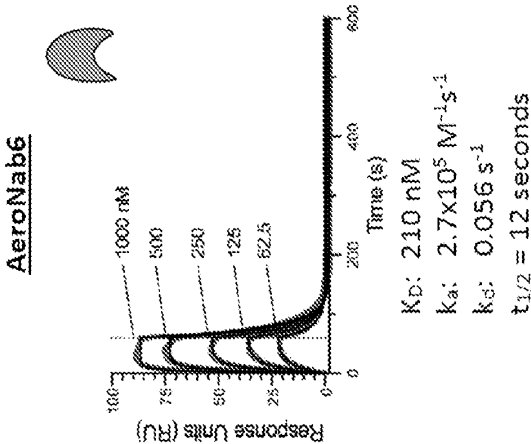


FIG. 8B

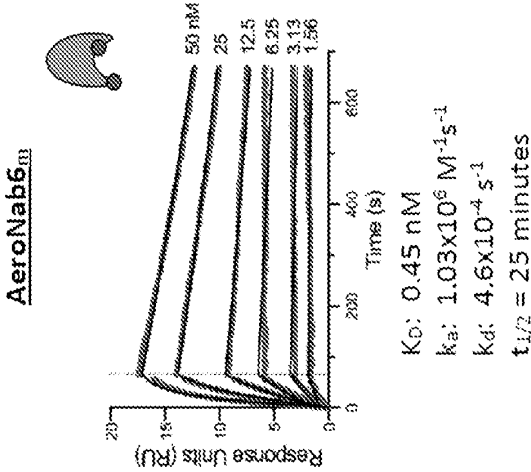
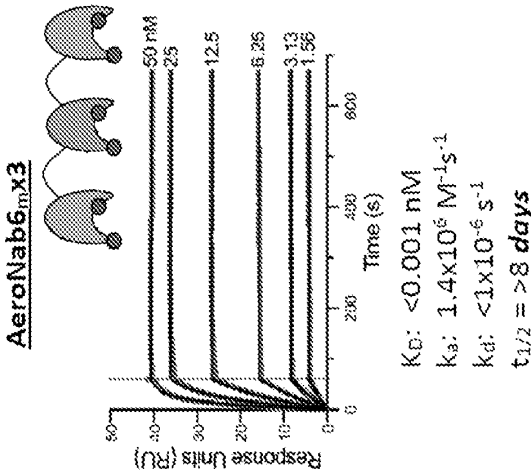


FIG. 8C



Binding to Spike measured by Surface Plasmon Resonance

FIG. 9A-9B

FIG. 9C-9D

AeroNab6

Humanized AeroNab6 (AeroNab6_h)

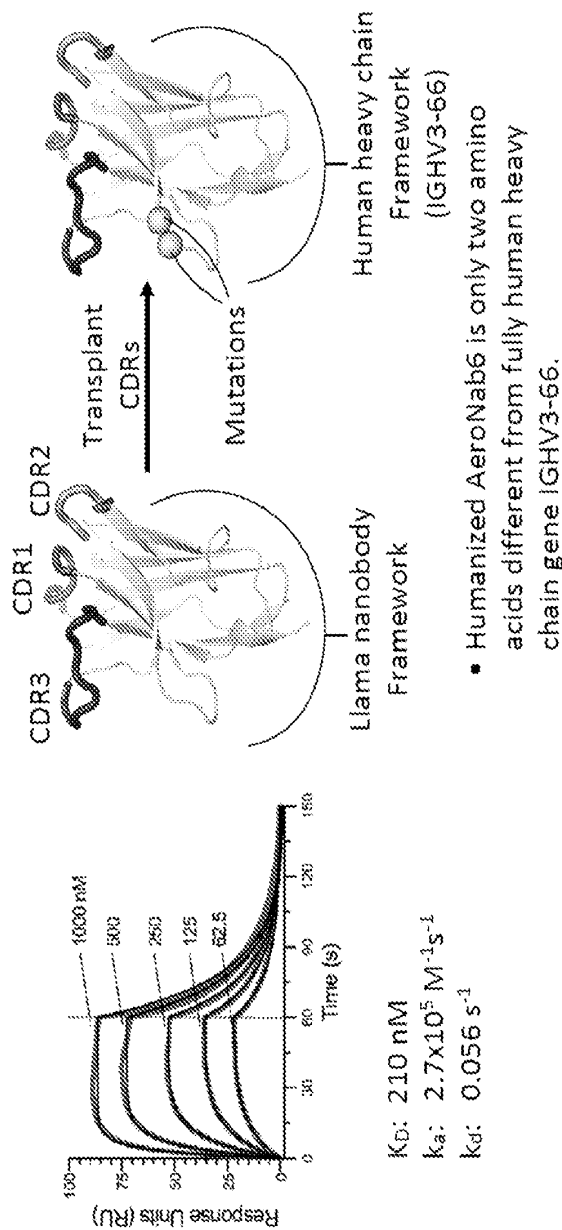


FIG.10

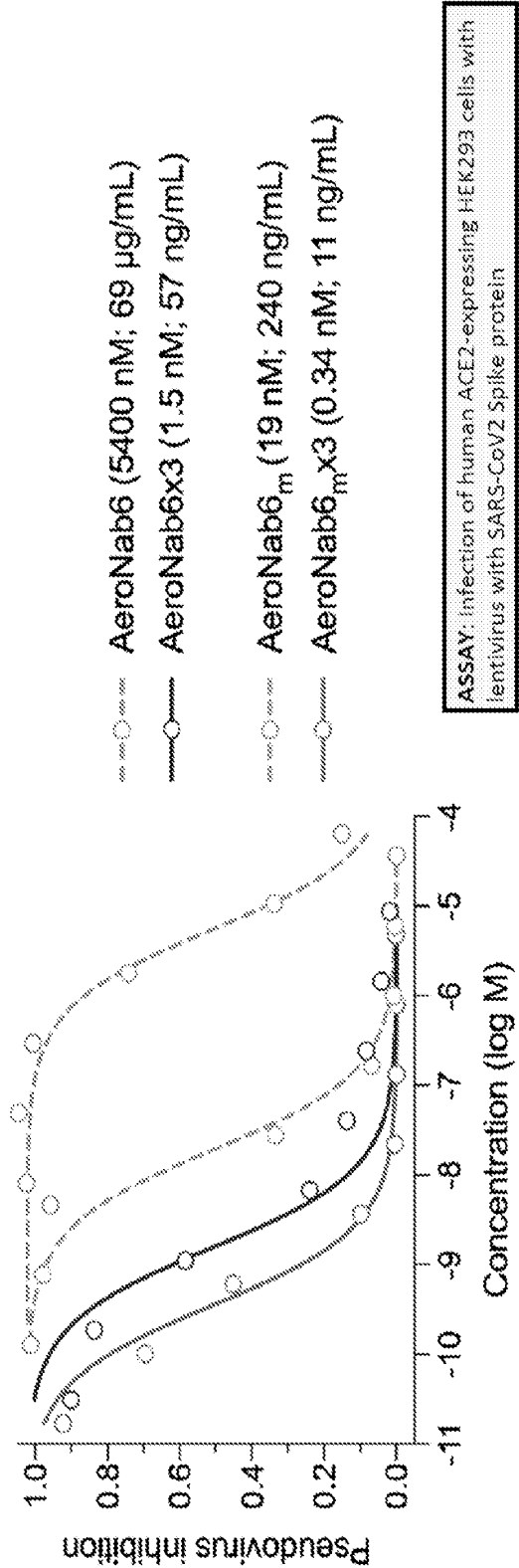


FIG. 11

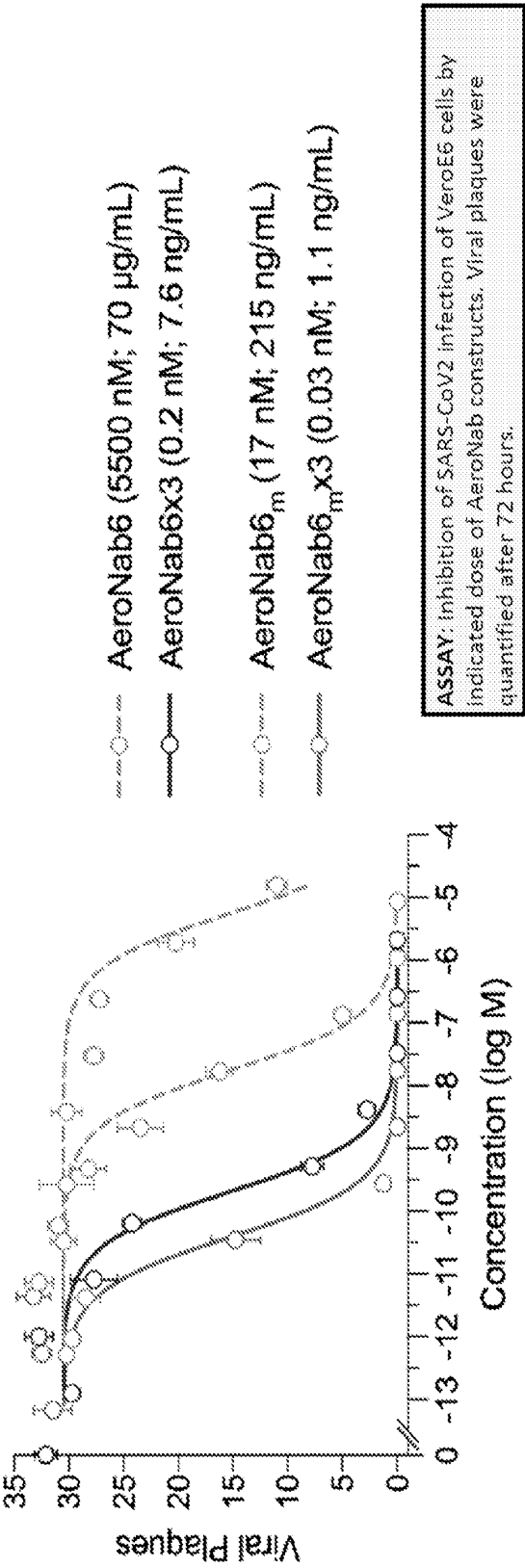


FIG. 12

AeroNab	name	SPR (Spike binding)	pseudovirus	Live SARS-CoV2	EM structure	stability
lead from screen	AeroNab6	210 nM	5400 nM	5500 nM	YES	Aerosolization Lyophilization
affinity-matured	AeroNab6 _m	0.45 nM	19 nM	17 nM	YES	PENDING
humanized	AeroNab6 _h	284 nM	N.D.	N.D.	N.D.	N.D.
trimerized	AeroNab6x3	biphasic 263 nM, <0.001 nM	1.5 nM	0.2 nM	YES	Aerosolization Lyophilization
trimerized and matured	AeroNab6 _m x3	<0.001 nM	0.34 nM	0.03 nM	YES	Aerosolization Lyophilization
trimerized, matured, and humanized	AeroNab6 _m x3	<0.001 nM	0.35 nM	0.05 nM	PENDING	Aerosolization Lyophilization

Figure 13

Single-domain antibody sequence architecture: FW1-CDR1-FW2-CDR2-FW3-CDR3-FW4
 FW1 for all below: QVQLVESGGGLVQAGSLRLSCAAS
 FW3 for all below: YADSVKGRFTISRDNAKNTVYLQMNSLKPEDTAVYYC
 FW4 for all below: WGQGTQVTVSS

Clone	CDR1	FW2	CDR2	CDR3
NbCOV001	GSILYQYA	MGWYRQAPGKERELVAI	SGSGTSTH	AAGYSWFVWTVDYDY
NbCOV002	GFTYTYA	MGWYRQAPGKERELVAI	SNGGSTY	AVTALVWYDDDDGYDY
NbCOV003	GSIFLVNA	MGWYRQAPGKERELVAI	NWSGDSTY	NAYYPIDYDY
NbCOV004	GRIFGVYA	MGWYRQAPGKERELVAI	TVDVTSTY	AALVSYWPPYSEMDY
NbCOV005	GSTFYNA	MGWYRQAPGKERELVAI	TASGGSTY	AAVYRNWLWYYY
NbCOV006	GHFGRNA	MGWYRQAPGKERELVAI	TRRGSTY	AADPASPAPGDY
NbCOV008	GTFKVNNA	MGWYRQAPGKERELVAI	TIVGNTY	NTQEAAYFYPKYGY
NbCOV010	GNTFVAYA	MGWYRQAPGKERELVAI	SSTTSTY	ATYVYDRYYGWHMDY
NbCOV011	GSTFQRYV	MGWYRQAPGKERELVAI	TNWSGGSTY	NADVYPNFGIYDY
NbCOV012D	GNIFFLYA	MGWYRQAPGKERELVAI	TWSDGNTY	NAKYVQRITYFEDFYRYYQFDY
NbCOV013	GLTFYAYA	MGWYRQAPGKERELVAI	SSGTSTY	AAVLYWYGVDSYDY
NbCOV015	GSIFYSNA	MGWYRQAPGKERELVAI	TRSGGST	NADPRWRGPFQYTFVKGDY
NbCOV016	GLIFDYA	MGWYRQAPGKERELVAI	SQTGGSTY	AVEFDYFSGVIYNY
NbCOV017	GFTIVWYV	MGWYRQAPGKERELVAI	TYSGARTY	AARTEYHPRYDY
NbCOV018	GSTFELYV	MGWYRQAPGKERELVAI	NESGTHY	AAVRWSSYHYRENY
NbCOV019	GHFGRNA	MGWYRQAPGKERELVAI	TRTGGSTY	AADPFQFEYDY
NbCOV021	GFTFWVNA	MGWYRQAPGKERELVAI	DYSGSRTY	AAERYPRNPEDY
NbCOV022	GSIFSVA	MGWYRQAPGKERELVAI	TTSGASTY	AARLWARTSYEYWFYDY
NbCOV024C	GSIFVTYA	MGWYRQAPGKERELVAI	SWSSGTTY	NAVGYGKYLFDY
NbCOV024D	GSIFVTYA	MGWYRQAPGKERELVAI	TLSGASTY	AARDSWHVHY

Figure 14A

QVQLVESGGGLVQAGGSLRLSCAASGSTLYQYAMGWYRQAPGKERELVASISGSGTSTHYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYYCAAGYSWFWTVTDYDWGGGTQVTVSS

 QVQLVESGGGLVQAGGSLRLSCAASGFTYTYAMGWYRQAPGKERELVAVISNGGSTYYADSVKGRFTISRDNAKNTVYLQ
 MNSLKPEDTAVYYCAVTALVWYDDGDYDWGGGTQVTVSS

 QVQLVESGGGLVQAGGSLRLSCAASGSIFLVNAMGWYRQAPGKERELVAAINWSGDSITYADSVKGRFTISRDNAKNTVY
 LQMNSLKPEDTAVYYCNAYYPIDYDWGGGTQVTVSS

 QVQLVESGGGLVQAGGSLRLSCAASGRIFGVYAMGWYRQAPGKERELVAITVDVTSTYYADSVKGRFTISRDNAKNTVY
 LQMNSLKPEDTAVYYCAALVSYWPYSEMDYWGQGTQVTVSS

 QVQLVESGGGLVQAGGSLRLSCAASGSTFYNAMGWYRQAPGKERELVAITASGGSTYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYYCAAVYRNLYWYYWGGGTQVTVSS

 QVQLVESGGGLVQAGGSLRLSCAASGHIFGRNAMGWYRQAPGKERELVAGITRRGSITYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYYCAADPASPAPGDYWGQGTQVTVSS

 QVQLVESGGGLVQAGGSLRLSCAASGFTFKVNAMGWYRQAPGKERELVARITIVGNITYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYYCNTQEAIFYPKYGYWGQGTQVTVSS

 QVQLVESGGGLVQAGGSLRLSCAASGSTLYQYAMGWYRQAPGKERELVASISGSGTSTHYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYYCAAGYSWFWTVTDYDWGGGTQVTVSS

 QVQLVESGGGLVQAGGSLRLSCAASGNTFVAYAMGWYRQAPGKERELVAISSTTSTYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYYCATYVYDRYYGWHMDYWGQGTQVTVSS

 QVQLVESGGGLVQAGGSLRLSCAASGSTFORVYMGWYRQAPGKERELVAITNWSGGSTYYADSVKGRFTISRDNAKNTV
 YLQMNSLKPEDTAVYYCNADVYPNFGIYDWGGGTQVTVSS

 QVQLVESGGGLVQAGGSLRLSCAASGNIFPLYAMGWYRQAPGKERELVAITWSDGNTYYADSVKGRFTISRDNAKNTVY
 LQMNSLKPEDTAVYYCNAYVQRITYFEDFYRYQFDYWGQGTQVTVSSH

Figure 14B

QVQLVESGGGLVQAGGSLRLSCAASGSIPIVYAMGWYRQAPGKERELVAVITSGSDSTYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYYCNADYVLTQYERDYWGQGTQVTVSS

 QVQLVESGGGLVQAGGSLRLSCAASGLITFYAYAMGWYRQAPGKERELVAISSGTSTYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYYCAAVLYWYGVDSEYWGQGTQVTVSS

 QVQLVESGGGLVQAGGSLRLSCAASGLITFYAYAMGWYRQAPGKERELVAISSGTSTYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYYCAAVLYWYGVDSEYWGQGTQVTVSS

 QVQLVESGGGLVQAGGSLRLSCAASGSIPIVYAMGWYRQAPGKERELVASITRSGGSTYYADSVKGRFTISRDNAKNTVYLQ
 MNSLKPEDTAVYYCNADPRWRGPFQYTFVKGDYWGQGTQVTVSS

 QVQLVESGGGLVQAGGSLRLSCAASGLIFDYYAMGWYRQAPGKERELVARISQTGGSTYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYYCAVEFDYFSGVIYNYWGQGTQVTVSS

 QVQLVESGGGLVQAGGSLRLSCAASGFTIVVYVMGWYRQAPGKERELVAITYSGARTYYADSVKGRFTISRDNAKNTVY
 LQMNSLKPEDTAVYYCAARTEYHPRDYWGQGTQVTVSS

 QVQLVESGGGLVQAGGSLRLSCAASGSTFELYVMGWYRQAPGKERELVAINESGTITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYYCAAVRWSSYHYRENYWGQGTQVTVSS

 QVQLVESGGGLVQAGGSLRLSCAASGHIIFGRNAMGWYRQAPGKERELVAITRTGGSTYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYYCAADPFQFEYEWGQGTQVTVSS

 QVQLVESGGGLVQAGGSLRLSCAASGSTFQRYVMGWYRQAPGKERELVAITNWSGGSTYYADSVKGRFTISRDNAKNTV
 YLQMNSLKPEDTAVYYCNADVYIPNFGIYDYWGQGTQVTVSS

 QVQLVESGGGLVQAGGSLRLSCAASGFTFVVMAMGWYRQAPGKERELVAIDYSGSRTYYADSVKGRFTISRDNAKNTVY
 LQMNSLKPEDTAVYYCAERRYPNPEDYWGQGTQVTVSS

 QVQLVESGGGLVQAGGSLRLSCAASGSIFSYYAMGWYRQAPGKERELVAITTSASTYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYYCAARLWARTSYEYWFEEYWGQGTQVTVSS

Figure 14C

QVQLVESGGGLVQAGGSLRLSCAASGSTLYQYAMGWYRQAPGKERELVASISGSGTSTHYADSVKGRFTISRDNAKNTVYL
QMNSLKPEDTAVYYCAAGYSWFWTVDYDYWGQGTQVTVSS

QVQLVESGGGLVQAGGSLRLSCAASGSIFVTYAMGWYRQAPGKEREFVAVISWSSGTTYADSVKGRFTISRDNAKNTVYL
QMNSLKPEDTAVYYCNAVGYGKYLFDWSWGQGTQVTVSS

QVQLVESGGGLVQAGGSLRLSCAASGSIFVTYAMGWYRQAPGKEREFVAAILSGASTYYADSVKGRFTISRDNAKNTVYL
QMNSLKPEDNAVYYCAARDSWHVHYWGQGTQVTVSS.

Figure 15A

FR1: (sequence): QVQLVESGGGLVQAGGSLRLSCAAS

FR2: (sequence): MGWYRQAPGKERELVAGI

FR3: (sequence): YADSVKGRFTISRDNAKNTVYQLQMNSLKPEDTAVYYC

FR4: (sequence): WGQGTQVTVSS

CDR1	CDR2	CDR3
GIIFGRNA	TRRGSIY	AADPASAPGDY
GIIFGRNA	TRRGSIY	AADPASPAYGDY
GIIFGRNA	TRRGSIY	AADPASPAFGDY
GIIFGRNA	TRRGSIY	AADPASPAWGDY
GIIFGRNA	TRRGSIY	AADPAVPAPGDY
GIIFGRNA	TRRGSIY	AADPAVPAYGDY
GIIFGRNA	TRRGSIY	AADPAVPAFGDY
GIIFGRNA	TRRGSIY	AADPAVPAWGDY
GIIFGRNA	TRRGSIY	AADPALPAPGDY
GIIFGRNA	TRRGSIY	AADPALPAYGDY
GIIFGRNA	TRRGSIY	AADPALPAFGDY
GIIFGRNA	TRRGSIY	AADPALPAWGDY
GIIFGRNA	TRRGSIY	AADPAIPAPGDY
GIIFGRNA	TRRGSIY	AADPAIPAYGDY
GIIFGRNA	TRRGSIY	AADPAIPAFGDY
GIIFGRNA	TRRGSIY	AADPAIPAWGDY
GIIFGRNA	TRRGSIY	AADPATPAPGDY
GIIFGRNA	TRRGSIY	AADPATPAYGDY
GIIFGRNA	TRRGSIY	AADPATPAFGDY
GIIFGRNA	TRRGSIY	AADPATPAWGDY
GIIFGRNA	TRRHSHY	AADPASAPGDY
GIIFGRNA	TRRHSHY	AADPASPAYGDY

Figure 15B

GIIFGRNA	TRRHSTY	AADPASPAFGDY
GIIFGRNA	TRRHSTY	AADPASPAWGDY
GIIFGRNA	TRRHSTY	AADPAVPAPGDY
GIIFGRNA	TRRHSTY	AADPAVPAYGDY
GIIFGRNA	TRRHSTY	AADPAVPAFGDY
GIIFGRNA	TRRHSTY	AADPAVPAWGDY
GIIFGRNA	TRRHSTY	AADPALPAPGDY
GIIFGRNA	TRRHSTY	AADPALPAYGDY
GIIFGRNA	TRRHSTY	AADPALPAFGDY
GIIFGRNA	TRRHSTY	AADPALPAWGDY
GIIFGRNA	TRRHSTY	AADPAIPAPGDY
GIIFGRNA	TRRHSTY	AADPAIPAYGDY
GIIFGRNA	TRRHSTY	AADPAIPAFGDY
GIIFGRNA	TRRHSTY	AADPAIPAWGDY
GIIFGRNA	TRRHSTY	AADPATPAPGDY
GIIFGRNA	TRRHSTY	AADPATPAYGDY
GIIFGRNA	TRRHSTY	AADPATPAFGDY
GIIFGRNA	TRRHSTY	AADPATPAWGDY
GIIFGRNA	TRRYSTY	AADPASPAPGDY
GIIFGRNA	TRRYSTY	AADPASPAYGDY
GIIFGRNA	TRRYSTY	AADPASPAFGDY
GIIFGRNA	TRRYSTY	AADPASPAWGDY
GIIFGRNA	TRRYSTY	AADPAVPAPGDY
GIIFGRNA	TRRYSTY	AADPAVPAYGDY
GIIFGRNA	TRRYSTY	AADPAVPAFGDY
GIIFGRNA	TRRYSTY	AADPAVPAWGDY
GIIFGRNA	TRRYSTY	AADPALPAPGDY
GIIFGRNA	TRRYSTY	AADPALPAYGDY

Figure 15C

GHFGRNA	TRRYSITY	AADPALPAFGDY
GHFGRNA	TRRYSITY	AADPALPAWGDY
GHFGRNA	TRRYSITY	AADPAIPAPGDY
GHFGRNA	TRRYSITY	AADPAIPAYGDY
GHFGRNA	TRRYSITY	AADPAIPAFGDY
GHFGRNA	TRRYSITY	AADPAIPAWGDY
GHFGRNA	TRRYSITY	AADPATPAPGDY
GHFGRNA	TRRYSITY	AADPATPAYGDY
GHFGRNA	TRRYSITY	AADPATPAFGDY
GHFGRNA	TRRYSITY	AADPATPAWGDY
GHFGRNA	TRRGSITY	AADPASPAPGDY
GHFGRNA	TRRGSITY	AADPASPAYGDY
GHFGRNA	TRRGSITY	AADPASPAPGDY
GHFGRNA	TRRGSITY	AADPASPAPGDY
GHFGRNA	TRRGSITY	AADPASPAPGDY
GHFGRNA	TRRGSITY	AADPAVPAPGDY
GHFGRNA	TRRGSITY	AADPAVPAYGDY
GHFGRNA	TRRGSITY	AADPAVPAPGDY
GHFGRNA	TRRGSITY	AADPAVPAPGDY
GHFGRNA	TRRGSITY	AADPALPAPGDY
GHFGRNA	TRRGSITY	AADPALPAYGDY
GHFGRNA	TRRGSITY	AADPALPAFGDY
GHFGRNA	TRRGSITY	AADPALPAWGDY
GHFGRNA	TRRGSITY	AADPAIPAPGDY
GHFGRNA	TRRGSITY	AADPAIPAYGDY
GHFGRNA	TRRGSITY	AADPAIPAFGDY
GHFGRNA	TRRGSITY	AADPAIPAWGDY
GHFGRNA	TRRGSITY	AADPATPAPGDY
GHFGRNA	TRRGSITY	AADPATPAYGDY

Figure 15D

GIIFGRNA	TRRGSITY	AADPATPAFGDY
GIIFGRNA	TRRGSITY	AADPATPAWGDY
GIIFGRNA	TRRQSITY	AADPASPAFGDY
GIIFGRNA	TRRQSITY	AADPASPAYGDY
GIIFGRNA	TRRQSITY	AADPASPAFGDY
GIIFGRNA	TRRQSITY	AADPASPAWGDY
GIIFGRNA	TRRQSITY	AADPAVPAPGDY
GIIFGRNA	TRRQSITY	AADPAVPAYGDY
GIIFGRNA	TRRQSITY	AADPAVPAPGDY
GIIFGRNA	TRRQSITY	AADPAVPWGDY
GIIFGRNA	TRRQSITY	AADPALPAPGDY
GIIFGRNA	TRRQSITY	AADPALPAYGDY
GIIFGRNA	TRRQSITY	AADPALPAFGDY
GIIFGRNA	TRRQSITY	AADPALPAWGDY
GIIFGRNA	TRRQSITY	AADPAIPAPGDY
GIIFGRNA	TRRQSITY	AADPAIPAYGDY
GIIFGRNA	TRRQSITY	AADPAIPAFGDY
GIIFGRNA	TRRQSITY	AADPAIPAWGDY
GIIFGRNA	TRRQSITY	AADPATPAFGDY
GIIFGRNA	TRRQSITY	AADPATPAWGDY
GIIFGRNA	TRRQSITY	AADPASPAFGDY
GIIFGRNA	TRRQSITY	AADPASPAYGDY
GIIFGRNA	TRRQSITY	AADPASPAFGDY
GIIFGRNA	TRRQSITY	AADPASPAWGDY
GIIFGRNA	TRRQSITY	AADPAVPAPGDY
GIIFGRNA	TRRQSITY	AADPAVPAYGDY

Figure 15E

GYIFGRNA	TRRGSTY	AADPAVPAFGDY
GYIFGRNA	TRRGSTY	AADPAVPAWGDY
GYIFGRNA	TRRGSTY	AADPALPAPGDY
GYIFGRNA	TRRGSTY	AADPALPAYGDY
GYIFGRNA	TRRGSTY	AADPALPAFGDY
GYIFGRNA	TRRGSTY	AADPALPAWGDY
GYIFGRNA	TRRGSTY	AADPAIPAPGDY
GYIFGRNA	TRRGSTY	AADPAIPAYGDY
GYIFGRNA	TRRGSTY	AADPAIPAFGDY
GYIFGRNA	TRRGSTY	AADPAIPAWGDY
GYIFGRNA	TRRGSTY	AADPATPAPGDY
GYIFGRNA	TRRGSTY	AADPATPAYGDY
GYIFGRNA	TRRGSTY	AADPATPAFGDY
GYIFGRNA	TRRGSTY	AADPATPAWGDY
GYIFGRNA	TRRHSTY	AADPASAPGDY
GYIFGRNA	TRRHSTY	AADPASPAYGDY
GYIFGRNA	TRRHSTY	AADPASPAFGDY
GYIFGRNA	TRRHSTY	AADPASPAWGDY
GYIFGRNA	TRRHSTY	AADPAVPAAPGDY
GYIFGRNA	TRRHSTY	AADPAVPAWGDY
GYIFGRNA	TRRHSTY	AADPALPAPGDY
GYIFGRNA	TRRHSTY	AADPALPAYGDY
GYIFGRNA	TRRHSTY	AADPALPAFGDY
GYIFGRNA	TRRHSTY	AADPALPAWGDY
GYIFGRNA	TRRHSTY	AADPAIPAPGDY
GYIFGRNA	TRRHSTY	AADPAIPAYGDY

Figure 15F

GYIFGRNA	TRRHSITY	AADPAIPAFGDY
GYIFGRNA	TRRHSITY	AADPAIPAWGDY
GYIFGRNA	TRRHSITY	AADPATPAPGDY
GYIFGRNA	TRRHSITY	AADPATPAYGDY
GYIFGRNA	TRRHSITY	AADPATPAFGDY
GYIFGRNA	TRRHSITY	AADPATPAWGDY
GYIFGRNA	TRRYSITY	AADPASAPGDY
GYIFGRNA	TRRYSITY	AADPASPAYGDY
GYIFGRNA	TRRYSITY	AADPASPAFGDY
GYIFGRNA	TRRYSITY	AADPASPAWGDY
GYIFGRNA	TRRYSITY	AADPAVPAPGDY
GYIFGRNA	TRRYSITY	AADPAVPAYGDY
GYIFGRNA	TRRYSITY	AADPAVPAPFGDY
GYIFGRNA	TRRYSITY	AADPAVPAPWGDY
GYIFGRNA	TRRYSITY	AADPALPAPGDY
GYIFGRNA	TRRYSITY	AADPALPAYGDY
GYIFGRNA	TRRYSITY	AADPALPAFGDY
GYIFGRNA	TRRYSITY	AADPALPAWGDY
GYIFGRNA	TRRYSITY	AADPAIPAPGDY
GYIFGRNA	TRRYSITY	AADPAIPAYGDY
GYIFGRNA	TRRYSITY	AADPAIPAFGDY
GYIFGRNA	TRRYSITY	AADPAIPAWGDY
GYIFGRNA	TRRYSITY	AADPATPAPGDY
GYIFGRNA	TRRYSITY	AADPATPAYGDY
GYIFGRNA	TRRYSITY	AADPATPAFGDY
GYIFGRNA	TRRYSITY	AADPATPAWGDY
GYIFGRNA	TRRGSITY	AADPASAPGDY
GYIFGRNA	TRRGSITY	AADPASPAYGDY

Figure 15G

GYIFGRNA	TRRGSTY	AADPASPAFGDY
GYIFGRNA	TRRGSTY	AADPASPAWGDY
GYIFGRNA	TRRGSTY	AADPAVPAPGDY
GYIFGRNA	TRRGSTY	AADPAVPAYGDY
GYIFGRNA	TRRGSTY	AADPAVPAFGDY
GYIFGRNA	TRRGSTY	AADPAVPAWGDY
GYIFGRNA	TRRGSTY	AADPALPAPGDY
GYIFGRNA	TRRGSTY	AADPALPAYGDY
GYIFGRNA	TRRGSTY	AADPALPAFGDY
GYIFGRNA	TRRGSTY	AADPALPAWGDY
GYIFGRNA	TRRGSTY	AADPAIPAPGDY
GYIFGRNA	TRRGSTY	AADPAIPAYGDY
GYIFGRNA	TRRGSTY	AADPAIPAFGDY
GYIFGRNA	TRRGSTY	AADPAIPAWGDY
GYIFGRNA	TRRGSTY	AADPATPAPGDY
GYIFGRNA	TRRGSTY	AADPATPAYGDY
GYIFGRNA	TRRGSTY	AADPATPAFGDY
GYIFGRNA	TRRGSTY	AADPATPAWGDY
GYIFGRNA	TRRQSTY	AADPASPAPGDY
GYIFGRNA	TRRQSTY	AADPASPAYGDY
GYIFGRNA	TRRQSTY	AADPASPAFGDY
GYIFGRNA	TRRQSTY	AADPASPAWGDY
GYIFGRNA	TRRQSTY	AADPAVPAPGDY
GYIFGRNA	TRRQSTY	AADPAVPAYGDY
GYIFGRNA	TRRQSTY	AADPAVPAFGDY
GYIFGRNA	TRRQSTY	AADPAVPAWGDY
GYIFGRNA	TRRQSTY	AADPALPAPGDY
GYIFGRNA	TRRQSTY	AADPALPAYGDY

Figure 15H

GYIFGRNA	TRRQSITY	AADPALPAFGDY
GYIFGRNA	TRRQSITY	AADPALPAWGDY
GYIFGRNA	TRRQSITY	AADPAIPAPGDY
GYIFGRNA	TRRQSITY	AADPAIPAYGDY
GYIFGRNA	TRRQSITY	AADPAIPAFGDY
GYIFGRNA	TRRQSITY	AADPAIPAWGDY
GYIFGRNA	TRRQSITY	AADPATPAPGDY
GYIFGRNA	TRRQSITY	AADPATPAYGDY
GYIFGRNA	TRRQSITY	AADPATPAFGDY
GYIFGRNA	TRRQSITY	AADPATPAWGDY
GFIFGRNA	TRRGSITY	AADPASAPGDY
GFIFGRNA	TRRGSITY	AADPASPAYGDY
GFIFGRNA	TRRGSITY	AADPASPAFGDY
GFIFGRNA	TRRGSITY	AADPASPAWGDY
GFIFGRNA	TRRGSITY	AADPAVPAPGDY
GFIFGRNA	TRRGSITY	AADPAVPAYGDY
GFIFGRNA	TRRGSITY	AADPAVPAFGDY
GFIFGRNA	TRRGSITY	AADPAVPAWGDY
GFIFGRNA	TRRGSITY	AADPALPAPGDY
GFIFGRNA	TRRGSITY	AADPALPAYGDY
GFIFGRNA	TRRGSITY	AADPALPAFGDY
GFIFGRNA	TRRGSITY	AADPALPAWGDY
GFIFGRNA	TRRGSITY	AADPAIPAPGDY
GFIFGRNA	TRRGSITY	AADPAIPAYGDY
GFIFGRNA	TRRGSITY	AADPAIPAFGDY
GFIFGRNA	TRRGSITY	AADPAIPAWGDY
GFIFGRNA	TRRGSITY	AADPATPAPGDY
GFIFGRNA	TRRGSITY	AADPATPAYGDY

Figure 15I

GFIFGRNA	TRRGSTY	AADPATPAFGDY
GFIFGRNA	TRRGSTY	AADPATPAWGDY
GFIFGRNA	TRRHSTY	AADPASAPGDY
GFIFGRNA	TRRHSTY	AADPASPAYGDY
GFIFGRNA	TRRHSTY	AADPASPAFGDY
GFIFGRNA	TRRHSTY	AADPASPAWGDY
GFIFGRNA	TRRHSTY	AADPAVPAPGDY
GFIFGRNA	TRRHSTY	AADPAVPAYGDY
GFIFGRNA	TRRHSTY	AADPAVPAFGDY
GFIFGRNA	TRRHSTY	AADPAVPAWGDY
GFIFGRNA	TRRHSTY	AADPALPAPGDY
GFIFGRNA	TRRHSTY	AADPALPAYGDY
GFIFGRNA	TRRHSTY	AADPALPAFGDY
GFIFGRNA	TRRHSTY	AADPALPAWGDY
GFIFGRNA	TRRHSTY	AADPAIPAPGDY
GFIFGRNA	TRRHSTY	AADPAIPAYGDY
GFIFGRNA	TRRHSTY	AADPAIPAFGDY
GFIFGRNA	TRRHSTY	AADPAIPAWGDY
GFIFGRNA	TRRHSTY	AADPATPAPGDY
GFIFGRNA	TRRHSTY	AADPATPAYGDY
GFIFGRNA	TRRHSTY	AADPATPAFGDY
GFIFGRNA	TRRHSTY	AADPATPAWGDY
GFIFGRNA	TRRYSTY	AADPASAPGDY
GFIFGRNA	TRRYSTY	AADPASPAYGDY
GFIFGRNA	TRRYSTY	AADPASPAFGDY
GFIFGRNA	TRRYSTY	AADPASPAWGDY
GFIFGRNA	TRRYSTY	AADPAVPAPGDY
GFIFGRNA	TRRYSTY	AADPAVPAYGDY

Figure 15J

GFIFGRNA	TRRYSITY	AADPAVPAFGDY
GFIFGRNA	TRRYSITY	AADPAVPAWGDY
GFIFGRNA	TRRYSITY	AADPALPAPGDY
GFIFGRNA	TRRYSITY	AADPALPAYGDY
GFIFGRNA	TRRYSITY	AADPALPAFGDY
GFIFGRNA	TRRYSITY	AADPALPAWGDY
GFIFGRNA	TRRYSITY	AADPAIPAPGDY
GFIFGRNA	TRRYSITY	AADPAIPAYGDY
GFIFGRNA	TRRYSITY	AADPAIPAFGDY
GFIFGRNA	TRRYSITY	AADPAIPAWGDY
GFIFGRNA	TRRYSITY	AADPATPAPGDY
GFIFGRNA	TRRYSITY	AADPATPAYGDY
GFIFGRNA	TRRYSITY	AADPATPAFGDY
GFIFGRNA	TRRYSITY	AADPATPAWGDY
GFIFGRNA	TRRGSITY	AADPASAPGDY
GFIFGRNA	TRRGSITY	AADPASPAYGDY
GFIFGRNA	TRRGSITY	AADPASPAFGDY
GFIFGRNA	TRRGSITY	AADPASPAWGDY
GFIFGRNA	TRRGSITY	AADPAVPAPGDY
GFIFGRNA	TRRGSITY	AADPAVPAWGDY
GFIFGRNA	TRRGSITY	AADPALPAPGDY
GFIFGRNA	TRRGSITY	AADPALPAYGDY
GFIFGRNA	TRRGSITY	AADPALPAFGDY
GFIFGRNA	TRRGSITY	AADPALPAWGDY
GFIFGRNA	TRRGSITY	AADPAIPAPGDY
GFIFGRNA	TRRGSITY	AADPAIPAYGDY

Figure 15K

GFIFGRNA	TRRGSTY	AADPAIPAFGDY
GFIFGRNA	TRRGSTY	AADPAIPAWGDY
GFIFGRNA	TRRGSTY	AADPATPAPGDY
GFIFGRNA	TRRGSTY	AADPATPAYGDY
GFIFGRNA	TRRGSTY	AADPATPAFGDY
GFIFGRNA	TRRGSTY	AADPATPAWGDY
GFIFGRNA	TRRGSTY	AADPASAPGDY
GFIFGRNA	TRRGSTY	AADPASPAYGDY
GFIFGRNA	TRRGSTY	AADPASPAFGDY
GFIFGRNA	TRRGSTY	AADPASPAWGDY
GFIFGRNA	TRRGSTY	AADPAVPAPGDY
GFIFGRNA	TRRGSTY	AADPAVPAYGDY
GFIFGRNA	TRRGSTY	AADPAVPAFGDY
GFIFGRNA	TRRGSTY	AADPAVPAWGDY
GFIFGRNA	TRRGSTY	AADPALPAPGDY
GFIFGRNA	TRRGSTY	AADPALPAYGDY
GFIFGRNA	TRRGSTY	AADPALPAFGDY
GFIFGRNA	TRRGSTY	AADPALPAWGDY
GFIFGRNA	TRRGSTY	AADPAIPAPGDY
GFIFGRNA	TRRGSTY	AADPAIPAYGDY
GFIFGRNA	TRRGSTY	AADPAIPAFGDY
GFIFGRNA	TRRGSTY	AADPAIPAWGDY
GFIFGRNA	TRRGSTY	AADPATPAPGDY
GFIFGRNA	TRRGSTY	AADPATPAYGDY
GFIFGRNA	TRRGSTY	AADPATPAFGDY
GFIFGRNA	TRRGSTY	AADPATPAWGDY
GLIFGRNA	TRRGSTY	AADPASAPGDY
GLIFGRNA	TRRGSTY	AADPASPAYGDY

Figure 15L

GLIFGRNA	TRRGSTY	AADPASPAFGDY
GLIFGRNA	TRRGSTY	AADPASPAWGDY
GLIFGRNA	TRRGSTY	AADPAVPAPGDY
GLIFGRNA	TRRGSTY	AADPAVPAYGDY
GLIFGRNA	TRRGSTY	AADPAVPAFGDY
GLIFGRNA	TRRGSTY	AADPAVPWGDY
GLIFGRNA	TRRGSTY	AADPALPAPGDY
GLIFGRNA	TRRGSTY	AADPALPAYGDY
GLIFGRNA	TRRGSTY	AADPALPAFGDY
GLIFGRNA	TRRGSTY	AADPALPAWGDY
GLIFGRNA	TRRGSTY	AADPAIPAPGDY
GLIFGRNA	TRRGSTY	AADPAIPAYGDY
GLIFGRNA	TRRGSTY	AADPAIPAFGDY
GLIFGRNA	TRRGSTY	AADPAIPAWGDY
GLIFGRNA	TRRGSTY	AADPATPAPGDY
GLIFGRNA	TRRGSTY	AADPATPAYGDY
GLIFGRNA	TRRGSTY	AADPATPAFGDY
GLIFGRNA	TRRGSTY	AADPATPAWGDY
GLIFGRNA	TRRHSTY	AADPASPAPGDY
GLIFGRNA	TRRHSTY	AADPASPAYGDY
GLIFGRNA	TRRHSTY	AADPASPAFGDY
GLIFGRNA	TRRHSTY	AADPASPAWGDY
GLIFGRNA	TRRHSTY	AADPAVPAPGDY
GLIFGRNA	TRRHSTY	AADPAVPAYGDY
GLIFGRNA	TRRHSTY	AADPAVPAFGDY
GLIFGRNA	TRRHSTY	AADPAVPWGDY
GLIFGRNA	TRRHSTY	AADPALPAPGDY
GLIFGRNA	TRRHSTY	AADPALPAYGDY

Figure 15M

GLIFGRNA	TRRHSTY	AADPALPAFGDY
GLIFGRNA	TRRHSTY	AADPALPAWGDY
GLIFGRNA	TRRHSTY	AADPAIPAPGDY
GLIFGRNA	TRRHSTY	AADPAIPAYGDY
GLIFGRNA	TRRHSTY	AADPAIPAFGDY
GLIFGRNA	TRRHSTY	AADPAIPAWGDY
GLIFGRNA	TRRHSTY	AADPATPAPGDY
GLIFGRNA	TRRHSTY	AADPATPAYGDY
GLIFGRNA	TRRHSTY	AADPATPAFGDY
GLIFGRNA	TRRHSTY	AADPATPAWGDY
GLIFGRNA	TRRYSITY	AADPASAPGDY
GLIFGRNA	TRRYSITY	AADPASPAYGDY
GLIFGRNA	TRRYSITY	AADPASPAFGDY
GLIFGRNA	TRRYSITY	AADPASPAWGDY
GLIFGRNA	TRRYSITY	AADPAVPAPGDY
GLIFGRNA	TRRYSITY	AADPAVPAYGDY
GLIFGRNA	TRRYSITY	AADPAVPAFGDY
GLIFGRNA	TRRYSITY	AADPAVPAWGDY
GLIFGRNA	TRRYSITY	AADPALPAPGDY
GLIFGRNA	TRRYSITY	AADPALPAYGDY
GLIFGRNA	TRRYSITY	AADPALPAFGDY
GLIFGRNA	TRRYSITY	AADPALPAWGDY
GLIFGRNA	TRRYSITY	AADPAIPAPGDY
GLIFGRNA	TRRYSITY	AADPAIPAYGDY
GLIFGRNA	TRRYSITY	AADPAIPAFGDY
GLIFGRNA	TRRYSITY	AADPAIPAWGDY
GLIFGRNA	TRRYSITY	AADPATPAPGDY
GLIFGRNA	TRRYSITY	AADPATPAYGDY

Figure 15N

GLIFGRNA	TRRYSITY	AADPATPAFGDY
GLIFGRNA	TRRYSITY	AADPATPAWGDY
GLIFGRNA	TRRGSITY	AADPASAPGDY
GLIFGRNA	TRRGSITY	AADPASPAYGDY
GLIFGRNA	TRRGSITY	AADPASPAFGDY
GLIFGRNA	TRRGSITY	AADPASPAWGDY
GLIFGRNA	TRRGSITY	AADPAVPAPGDY
GLIFGRNA	TRRGSITY	AADPAVPAYGDY
GLIFGRNA	TRRGSITY	AADPAVPAFGDY
GLIFGRNA	TRRGSITY	AADPAVPAWGDY
GLIFGRNA	TRRGSITY	AADPALPAPGDY
GLIFGRNA	TRRGSITY	AADPALPAYGDY
GLIFGRNA	TRRGSITY	AADPALPAFGDY
GLIFGRNA	TRRGSITY	AADPALPAWGDY
GLIFGRNA	TRRGSITY	AADPAIPAPGDY
GLIFGRNA	TRRGSITY	AADPAIPAYGDY
GLIFGRNA	TRRGSITY	AADPAIPAFGDY
GLIFGRNA	TRRGSITY	AADPAIPAWGDY
GLIFGRNA	TRRGSITY	AADPATPAPGDY
GLIFGRNA	TRRGSITY	AADPATPAYGDY
GLIFGRNA	TRRGSITY	AADPATPAFGDY
GLIFGRNA	TRRGSITY	AADPATPAWGDY
GLIFGRNA	TRRQSITE	AADPASAPGDY
GLIFGRNA	TRRQSITE	AADPASPAYGDY
GLIFGRNA	TRRQSITE	AADPASPAFGDY
GLIFGRNA	TRRQSITE	AADPASPAWGDY
GLIFGRNA	TRRQSITE	AADPAVPAPGDY
GLIFGRNA	TRRQSITE	AADPAVPAYGDY

Figure 150

GLIFGRNA	TRRQSITY	AADPAVPAFGDY
GLIFGRNA	TRRQSITY	AADPAVPAWGDY
GLIFGRNA	TRRQSITY	AADPALPAPGDY
GLIFGRNA	TRRQSITY	AADPALPAYGDY
GLIFGRNA	TRRQSITY	AADPALPAFGDY
GLIFGRNA	TRRQSITY	AADPALPAWGDY
GLIFGRNA	TRRQSITY	AADPAIPAPGDY
GLIFGRNA	TRRQSITY	AADPAIPAYGDY
GLIFGRNA	TRRQSITY	AADPAIPAFGDY
GLIFGRNA	TRRQSITY	AADPAIPAWGDY
GLIFGRNA	TRRQSITY	AADPATPAPGDY
GLIFGRNA	TRRQSITY	AADPATPAYGDY
GLIFGRNA	TRRQSITY	AADPATPAFGDY
GLIFGRNA	TRRQSITY	AADPATPAWGDY

Figure 16B

QVQLVESGGGLVQAGSLRLSCAASGIIHFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYCAADPAIPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGIIHFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYCAADPATPAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGIIHFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYCAADPATPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGIIHFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYCAADPATPAFGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGIIHFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYCAADPATPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGIIHFGRNAMGWYRQAPGKERELVAGITRRHSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYCAADPASAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGIIHFGRNAMGWYRQAPGKERELVAGITRRHSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYCAADPASPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGIIHFGRNAMGWYRQAPGKERELVAGITRRHSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYCAADPASPAFGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGIIHFGRNAMGWYRQAPGKERELVAGITRRHSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYCAADPASPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGIIHFGRNAMGWYRQAPGKERELVAGITRRHSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYCAADPAVPAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGIIHFGRNAMGWYRQAPGKERELVAGITRRHSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYCAADPAVPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGIIHFGRNAMGWYRQAPGKERELVAGITRRHSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYCAADPAVPAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGIIHFGRNAMGWYRQAPGKERELVAGITRRHSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYCAADPAVPAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGIIHFGRNAMGWYRQAPGKERELVAGITRRHSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYCAADPAVPAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGIIHFGRNAMGWYRQAPGKERELVAGITRRHSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYCAADPALPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGIIHFGRNAMGWYRQAPGKERELVAGITRRHSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYCAADPALPAFGDYWGQGTQVTVSS

Figure 16D

QVQLVESGGGLVQAGSLRLSCAASGHHFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVVYCAADPAVPAGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGHHFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVVYCAADPALPAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGHHFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVVYCAADPALPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGHHFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVVYCAADPALPAFGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGHHFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVVYCAADPALPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGHHFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVVYCAADPAIAPAGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGHHFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVVYCAADPAIAPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGHHFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVVYCAADPAIAPAFGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGHHFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVVYCAADPAIAPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGHHFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVVYCAADPAIAPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGHHFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVVYCAADPATPAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGHHFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVVYCAADPATPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGHHFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVVYCAADPATPAFGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGHHFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVVYCAADPATPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGHHFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVVYCAADPASAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGHHFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVVYCAADPASPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGHHFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVVYCAADPASPAFGDYWGQGTQVTVSS

Figure 16G

QVQLVESGGGLVQAGSLRLSCAASGHHFGRNAMGWYRQAPGKERELVAGITRRQSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYYCAADPAIPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGHHFGRNAMGWYRQAPGKERELVAGITRRQSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYYCAADPAIPAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGHHFGRNAMGWYRQAPGKERELVAGITRRQSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYYCAADPAIPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGHHFGRNAMGWYRQAPGKERELVAGITRRQSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYYCAADPAIPAFGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGHHFGRNAMGWYRQAPGKERELVAGITRRQSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYYCAADPAIPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYYCAADPASAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYYCAADPASPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYYCAADPASPAFGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYYCAADPASPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYYCAADPASPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYYCAADPAVPAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYYCAADPAVPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYYCAADPAVPAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYYCAADPAVPAGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYYCAADPALPAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYYCAADPALPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYYCAADPALPAGDYWGQGTQVTVSS

Figure 16H

QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAAPALPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAIPAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAIPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAIPAFGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAIPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPATPAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPATPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPATPAFGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPATPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRHSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPASAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRHSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPASPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRHSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPASPAFGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRHSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPASPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRHSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAVPAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRHSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAVPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRHSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAVPAPFGDYWGQGTQVTVSS

Figure 16L

QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPAIPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPAIPAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPAIPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPAIPAFGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPAIPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRQSIITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPASAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRQSIITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPASPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRQSIITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPASPAFGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRQSIITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPASPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRQSIITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPASPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRQSIITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPAVPAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRQSIITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPAVPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRQSIITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPAVPAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRQSIITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPAVPAGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRQSIITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPALPAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRQSIITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPALPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRQSIITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPALPAPGDYWGQGTQVTVSS

Figure 16M

QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRQSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYYCAADPAALPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRQSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYYCAADPAIPAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRQSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYYCAADPAIPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRQSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYYCAADPAIPAFGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRQSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYYCAADPAIPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRQSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYYCAADPATPAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRQSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYYCAADPATPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRQSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYYCAADPATPAFGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGYIFGRNAMGWYRQAPGKERELVAGITRRQSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYYCAADPATPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYYCAADPASAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYYCAADPASPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYYCAADPASPAFGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYYCAADPASPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYYCAADPAVPAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYYCAADPAVPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYYCAADPAVPAPFGDYWGQGTQVTVSS

Figure 16N

QVQLVESGGGLVQAGSLRLSCAASGFIIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAVPWAGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPALPAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPALPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPALPAFGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPALPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAIAPAGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAIAPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAIAPAFGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAIAPAGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAIAPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAIAPAGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAIATPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAIATPAFGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIIFGRNAMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAIATPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIIFGRNAMGWYRQAPGKERELVAGITRRHSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAIATPAFGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIIFGRNAMGWYRQAPGKERELVAGITRRHSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAIATPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIIFGRNAMGWYRQAPGKERELVAGITRRHSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAIATPAFGDYWGQGTQVTVSS

Figure 16S

QVQLVESGGGLVQAGSLRLSCAASGFIIGRNAMGWYRQAPGKERELVAGITRRQSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAVPWAGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIIGRNAMGWYRQAPGKERELVAGITRRQSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPALPAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIIGRNAMGWYRQAPGKERELVAGITRRQSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPALPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIIGRNAMGWYRQAPGKERELVAGITRRQSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPALPAFGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIIGRNAMGWYRQAPGKERELVAGITRRQSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPALPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIIGRNAMGWYRQAPGKERELVAGITRRQSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAIAPAGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIIGRNAMGWYRQAPGKERELVAGITRRQSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAIAPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIIGRNAMGWYRQAPGKERELVAGITRRQSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAIAPAFGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIIGRNAMGWYRQAPGKERELVAGITRRQSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAIATPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIIGRNAMGWYRQAPGKERELVAGITRRQSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAIATPAFGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIIGRNAMGWYRQAPGKERELVAGITRRQSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAIATPAFGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIIGRNAMGWYRQAPGKERELVAGITRRQSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAIATPAFGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIIGRNAMGWYRQAPGKERELVAGITRRQSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAIATPAFGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIIGRNAMGWYRQAPGKERELVAGITRRQSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAIATPAFGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGFIIGRNAMGWYRQAPGKERELVAGITRRQSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVYCAADPAIATPAFGDYWGQGTQVTVSS

Figure 16V

QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRHSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPAIPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRHSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPATPAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRHSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPATPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRHSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPATPAFGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRHSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPATPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPASPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPASPAFGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPASPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPAVPAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPAVPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPAVPAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPAVPAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPALPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPALPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPALPAFGDYWGQGTQVTVSS

Figure 16W

QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPAALPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPAIPAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPAIPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPAIPAFGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPAIPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPATPAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPATPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPATPAFGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPATPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPATPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPASAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPASPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPASPAFGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPASPAWGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPAVPAPGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPAVPAYGDYWGQGTQVTVSS
 QVQLVESGGGLVQAGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRYSITYYADSVKGRFTISRDNAKNTVYL
 QMNSLKPEDTAVVYCAADPAVPAPGDYWGQGTQVTVSS

Figure 16Z

QVQLVESGGGLVQAGGSLRLSCAASGLIFGRNAMGWYRQAPGKERELVAGITRRQSITYYADSVKGRFTISRDNAKNTVYL
QMNSLKPEDTAVYYCAADPATPAWGDYWGQGTQVTVSS.

Figure 17A (sequence of Spike antigen)

MFVFLVLLPLVSSQCVNLTTTRTQLPPAYTNSFTRGVYYPDKVFRSSVLHSTQDLFLPEFSNVTWFHAIHVSGTNGTKRFDNPV
 LPFNDGVYFASTEKSNIRGWIFGTTLDSTQSLIVNNATNVVVKVCEFCNDPFLGVYYHKNNKSWMESEFRVYSSANNC
 TFEYVSPFLMDLEGKQGNFKNLREFVFNIDGYFKIYSKHTPINLVRDLPGFSALEPLVDLPIGINITRFQITLLALHRSYLT
 GDSSSGWTAGAAAYYVGYLQPRTFLLKYNENGTITDAVDCALDPLSEKCTLKSTVEKGYQTSNFRVQPTESIVRFPNITN
 LCPFGEVFNATRFASVYAWNRRKRISNCVADYSVLNSASFTEKCYGVSPTKLNDLCFTNVYADSFVIRGDEVRIAPGQTG
 KIADYNKYKLPDDFTGCVIAWNSNNLDSKVGNGNYNYLYRLFRKSNLKPFERDISTEYQAGSTPCNGVEGFNCYFPLQSYGFQ
 PTNGVGYQPYRVVVLSEFLLHAPATVCGPKKSTNLVKNKCVNFNFNGLTGTGVLTESNKKFLPFQFGRDIADITDAVRDP
 QTLLELDITPCSEGGVSVITPGTNTSNQVAVLYQDVNCTEVPVAIHADQLTPTWRVYSTGNSNVFQTRAGCLIGAEHVNNSYEC
 DIPIGAGICASYQTQTNPSGSAVSSQSIHAYTMSLGAENSVAYSNNNSIAIPTNFTISVTTEILPVSMTKTSVDCTMYICGDS
 CSNLLQYGSFCTQLNRALTGIAVEQDKNTQEVFAQVKQIYKTPPIKDFGGFNFSQILPDPSKPSKRSFIEDLLFNKVTADAG
 FIKQYGDCLGDIAARDLCAQKFNGLTVLPPLLTDEMIAQYTSALLAGTITSGWTFGAGAAALQIPFAMQMAYRFRNGIGVTQN
 VLYENQKLIANQFNSAIGKIQDSLSSTASALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLNDILSRLDPPPEAEVQIDRLIT
 GRLQSLQTYVTQQLIRAAEIRASANLAATKMSECVLGQSKRVDFCGKGYHLMSPQSAAPHGVVFLHVTYVPAQEKNFITTAP
 AICHDKGAHFPREGVFSNGTHTWFTVQRNFYEPQIITDNTFVSGNCDVVIGIVNNTVYDPLQPELDSFKBELDKYFKNHTSP
 DVDLGDISGINASVVNIQKEIDRLNEVAKNLNESLIDLQELGKVEQGGYIPEAPRDGQAYVRKDGGEVWLLSTFLGRSLEVL
 QGPGHHHHHHHSAWSHPQFEKGGGGGGGGGSAWSHPQFEK

Figure 17B (sequence of ACE2 ECD)

QSTIEEQAKTFLDKFNHEAEDLFYQSSLASWNYNTNITEENVQNMNAGDKWSAFLKEQSTLAQMYPLQEIQNLTVKLQLQ
ALQQNGSSVLSSEDKSKRLNTILNTMSTIYSTGKVCNPDNPQECLLLEPGLNEIMANSLDYNERLWAWESWRSEVGVKQLRPLY
EEYVVLLKNEMARANHYEDYGDYWRGDYEVNGVDGYDYSRGQLIEDVEHTFEEIKPLYEHLHAYVRAKLMNAYPSYISPIG
CLPAHLLGDMWGRFWTNLYSLTVPEGQKPNIDVTDAMVDQAWDAQRIKFAEKFFVSVGLPNMTQGFWENSMLTDPGNV
QKAVCHPTAWDLGKGDFRILMCTKVTMDDFLTAHHEMGHIQYDMAYAAQPFLLRNGANEGFHEAVGEIMSLSAATPKHL
KSGLLSPDFQEDNETEINFLLKQALTIVGTLPTTYMLEKWRWVMVFKGEIPKQWMMKKWWEMKREIVGVVEPVPHDETYCD
PASLFHVSNDYSFIRYYTRILYQFQFQEAALCQAAKHEGPLHKCDISNSTEAGQKLFNMLRLGKSEPWTALENNVVGAKNMN
VRPLLNVFEPLFTWLKDQNKNSFVGWSTDWSPYA

Figure 18A (sequences of highlighted MASC proteins)

AeroNab6

QVQLVESGGGLVQAGSLRLSCAASGHHFGRNAMGWYRQAPGKERELVAGHTRRGSIITYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYYCAADPASPAPGDYWGQGTQVTVSS

AeroNab6X2 n=3 linker

QVQLVESGGGLVQAGSLRLSCAASGHHFGRNAMGWYRQAPGKERELVAGHTRRGSIITYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYYCAADPASPAPGDYWGQGTQVTVSS/GGGSGGGSGGGG/QVQLVESGGGLVQAGSLRLSCAAS
 GHHFGRNAMGWYRQAPGKERELVAGHTRRGSIITYADSVKGRFTISRDNAKNTVYILQMNSLKPEDTAVYYCAADPASPAPG
 DYWGQGTQVTVSS

AeroNab6X2 n=4 linker

QVQLVESGGGLVQAGSLRLSCAASGHHFGRNAMGWYRQAPGKERELVAGHTRRGSIITYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYYCAADPASPAPGDYWGQGTQVTVSS/GGGSGGGSGGGG/QVQLVESGGGLVQAGSLRL
 SCASGHHFGRNAMGWYRQAPGKERELVAGHTRRGSIITYADSVKGRFTISRDNAKNTVYILQMNSLKPEDTAVYYCAADPA
 SPAPGDYWGQGTQVTVSS

AeroNab6X3 n=3 linker

QVQLVESGGGLVQAGSLRLSCAASGHHFGRNAMGWYRQAPGKERELVAGHTRRGSIITYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYYCAADPASPAPGDYWGQGTQVTVSS/GGGSGGGSGGGG/QVQLVESGGGLVQAGSLRLSCAAS
 GHHFGRNAMGWYRQAPGKERELVAGHTRRGSIITYADSVKGRFTISRDNAKNTVYILQMNSLKPEDTAVYYCAADPASPAPG
 DYWGQGTQVTVSS/GGGSGGGSGGGG/QVQLVESGGGLVQAGSLRLSCAASGHHFGRNAMGWYRQAPGKERELVAGI
 TRRGSIITYADSVKGRFTISRDNAKNTVYILQMNSLKPEDTAVYYCAADPASPAPGDYWGQGTQVTVSS

AeroNab6X3 n=4 linker

QVQLVESGGGLVQAGSLRLSCAASGHHFGRNAMGWYRQAPGKERELVAGHTRRGSIITYADSVKGRFTISRDNAKNTVYIL
 QMNSLKPEDTAVYYCAADPASPAPGDYWGQGTQVTVSS/GGGSGGGSGGGG/QVQLVESGGGLVQAGSLRL
 SCASGHHFGRNAMGWYRQAPGKERELVAGHTRRGSIITYADSVKGRFTISRDNAKNTVYILQMNSLKPEDTAVYYCAADPA
 SPAPGDYWGQGTQVTVSS/GGGSGGGSGGGG/QVQLVESGGGLVQAGSLRLSCAASGHHFGRNAMGWYRQAP
 GKERELVAGHTRRGSIITYADSVKGRFTISRDNAKNTVYILQMNSLKPEDTAVYYCAADPASPAPGDYWGQGTQVTVSS

Figure 18B AeroNab6m (affinity matured)

QVQLVESGGGLVQAGGSLRLSCAASGYIFGRNMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVY LQMNS
LKPEDTAVYYCAADPASPAYGDIWGQGTQVTVSS

AeroNab6mX2 n=3 linker

QVQLVESGGGLVQAGGSLRLSCAASGYIFGRNMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVY LQMNS
LKPEDTAVYYCAADPASPAYGDIWGQGTQVTVSS/GGGSGGGGGGGS/QVQLVESGGGLVQAGGSLRLSCAASGYIFGRNA
GWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVY LQMNSLKPEDTAVYYCAADPASPAYGDIWGQGTQVTVS
S

AeroNab6mX2 n=4 linker

QVQLVESGGGLVQAGGSLRLSCAASGYIFGRNMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVY LQMNS
LKPEDTAVYYCAADPASPAYGDIWGQGTQVTVSS/GGGSGGGGGGGS/QVQLVESGGGLVQAGGSLRLSCAASGYIF
GRNMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVY LQMNSLKPEDTAVYYCAADPASPAYGDIWGQGT
QVTVSS

AeroNab6mX3 n=3 linker

QVQLVESGGGLVQAGGSLRLSCAASGYIFGRNMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVY LQMNS
LKPEDTAVYYCAADPASPAYGDIWGQGTQVTVSS/GGGSGGGGGGGS/QVQLVESGGGLVQAGGSLRLSCAASGYIFGRNAN
GWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVY LQMNSLKPEDTAVYYCAADPASPAYGDIWGQGTQVTVS
S/GGGSGGGGGGGS/QVQLVESGGGLVQAGGSLRLSCAASGYIFGRNMGWYRQAPGKERELVAGITRRGSITYYADSVKGRF
TISRDNAKNTVY LQMNSLKPEDTAVYYCAADPASPAYGDIWGQGTQVTVSS

AeroNab6mX3 n=4 linker

QVQLVESGGGLVQAGGSLRLSCAASGYIFGRNMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVY LQMNS
LKPEDTAVYYCAADPASPAYGDIWGQGTQVTVSS/GGGSGGGGGGGS/QVQLVESGGGLVQAGGSLRLSCAASGYIF
GRNMGWYRQAPGKERELVAGITRRGSITYYADSVKGRFTISRDNAKNTVY LQMNSLKPEDTAVYYCAADPASPAYGDIWGQGT
QVTVSS/GGGSGGGGGGGS/QVQLVESGGGLVQAGGSLRLSCAASGYIFGRNMGWYRQAPGKERELVAGITRRGSIT
YYADSVKGRFTISRDNAKNTVY LQMNSLKPEDTAVYYCAADPASPAYGDIWGQGTQVTVSS

AeroNab6h

EVQLVESGGGLVQPGGSLRLSCAASGHIIFGRNMGWYRQAPGKGLVAGITRRGSITYYADSVKGRFTISRDNASKNTLY LQ
MNSLRAEDTAVYYCAADPASPAPGDIWGQGTQVTVSS

Figure 18C AeroNab6hX2 n=3 linker

EVQLVESGGGLVQPGGSLRLSCAASGHIIEGRNAMGWYRQAPGKGLELVAGITRRGSITYYADSVKGRFTISRDNSKNTLYLQ
MNSLRAEDTAVYYCAADPASPAPGDYWGQGTQVTVSS/GGGSGGGSGGGGSEVQLVESGGGLVQPGGSLRLSCAASGI
IFGRNAMGWYRQAPGKGLELVAGITRRGSITYYADSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAADPASPAPGDY
WGQGTQVTVSS

AeroNab6hX2 n= 4 linker

EVQLVESGGGLVQPGGSLRLSCAASGHIIEGRNAMGWYRQAPGKGLELVAGITRRGSITYYADSVKGRFTISRDNSKNTLYLQ
MNSLRAEDTAVYYCAADPASPAPGDYWGQGTQVTVSS/GGGSGGGSGGGGSEVQLVESGGGLVQPGGSLRLS
CAASGHIIEGRNAMGWYRQAPGKGLELVAGITRRGSITYYADSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAADPAS
PAPGDYWGQGTQVTVSS

AeroNab6hX3 n=3 linker

EVQLVESGGGLVQPGGSLRLSCAASGHIIEGRNAMGWYRQAPGKGLELVAGITRRGSITYYADSVKGRFTISRDNSKNTLYLQ
MNSLRAEDTAVYYCAADPASPAPGDYWGQGTQVTVSS/GGGSGGGSGGGGSEVQLVESGGGLVQPGGSLRLSCAASGI
IFGRNAMGWYRQAPGKGLELVAGITRRGSITYYADSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAADPASPAPGDY
WGQGTQVTVSS/GGGSGGGSGGGGSEVQLVESGGGLVQPGGSLRLSCAASGHIIEGRNAMGWYRQAPGKGLELVAGITR
RGSITYYADSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAADPASPAPGDYWGQGTQVTVSS

AeroNab6hX3 n= 4 linker

EVQLVESGGGLVQPGGSLRLSCAASGHIIEGRNAMGWYRQAPGKGLELVAGITRRGSITYYADSVKGRFTISRDNSKNTLYLQ
MNSLRAEDTAVYYCAADPASPAPGDYWGQGTQVTVSS/GGGSGGGSGGGGSEVQLVESGGGLVQPGGSLRLS
CAASGHIIEGRNAMGWYRQAPGKGLELVAGITRRGSITYYADSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAADPAS
PAPGDYWGQGTQVTVSS/GGGSGGGSGGGGSEVQLVESGGGLVQPGGSLRLSCAASGHIIEGRNAMGWYRQAPG
KGLELVAGITRRGSITYYADSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAADPASPAPGDYWGQGTQVTVSS

AeroNab6mh

EVQLVESGGGLVQPGGSLRLSCAASGYIEGRNAMGWYRQAPGKGLELVAGITRRGSITYYADSVKGRFTISRDNSKNTLYLQ
MNSLRAEDTAVYYCAADPASPAPGDYWGQGTQVTVSS

Figure 18D

AeroNab6mhX2 n=3 linker

EVQLVESGGGLVQPGGSLRLSCAASGYIEGRNAMGWYRQAPGKGLELVAGITRRGSITYYADSVKGRFTISRDN SKNTLYLQ
 MNSLRAEDTAVYYCAADPASPAYGDYWGQGTQVTVSS/GGGSGGGSGGGGS/EVQLVESGGGLVQPGGSLRLSCAASG
YIEGRNAMGWYRQAPGKGLELVAGITRRGSITYYADSVKGRFTISRDN SKNTLYLQMNSLRAEDTAVYYCAADPASPAYGD
YWGQGTQVTVSS

AeroNab6mhX2 n= 4 linker

EVQLVESGGGLVQPGGSLRLSCAASGYIEGRNAMGWYRQAPGKGLELVAGITRRGSITYYADSVKGRFTISRDN SKNTLYLQ
 MNSLRAEDTAVYYCAADPASPAYGDYWGQGTQVTVSS/GGGSGGGSGGGGS/EVQLVESGGGLVQPGGSLRLS
CAASGYIEGRNAMGWYRQAPGKGLELVAGITRRGSITYYADSVKGRFTISRDN SKNTLYLQMNSLRAEDTAVYYCAADPAS
PAYGDYWGQGTQVTVSS

AeroNab6mhX3 n=3 linker

EVQLVESGGGLVQPGGSLRLSCAASGYIEGRNAMGWYRQAPGKGLELVAGITRRGSITYYADSVKGRFTISRDN SKNTLYLQ
 MNSLRAEDTAVYYCAADPASPAYGDYWGQGTQVTVSS/GGGSGGGSGGGGS/EVQLVESGGGLVQPGGSLRLSCAASG
 YIEGRNAMGWYRQAPGKGLELVAGITRRGSITYYADSVKGRFTISRDN SKNTLYLQMNSLRAEDTAVYYCAADPASPAYGD
YWGQGTQVTVSS/GGGSGGGSGGGGS/EVQLVESGGGLVQPGGSLRLSCAASGYIEGRNAMGWYRQAPGKGLELVAGIT
RRGSITYYADSVKGRFTISRDN SKNTLYLQMNSLRAEDTAVYYCAADPASPAYGDYWGQGTQVTVSS

AeroNab6mhX3 n= 4 linker

EVQLVESGGGLVQPGGSLRLSCAASGYIEGRNAMGWYRQAPGKGLELVAGITRRGSITYYADSVKGRFTISRDN SKNTLYLQ
 MNSLRAEDTAVYYCAADPASPAYGDYWGQGTQVTVSS/GGGSGGGSGGGGS/EVQLVESGGGLVQPGGSLRLS
 CAASGYIEGRNAMGWYRQAPGKGLELVAGITRRGSITYYADSVKGRFTISRDN SKNTLYLQMNSLRAEDTAVYYCAADPAS
PAYGDYWGQGTQVTVSS/GGGSGGGSGGGGS/EVQLVESGGGLVQPGGSLRLSCAASGYIEGRNAMGWYRQAP
GKGLELVAGITRRGSITYYADSVKGRFTISRDN SKNTLYLQMNSLRAEDTAVYYCAADPASPAYGDYWGQGTQVTVSS

FIG. 19

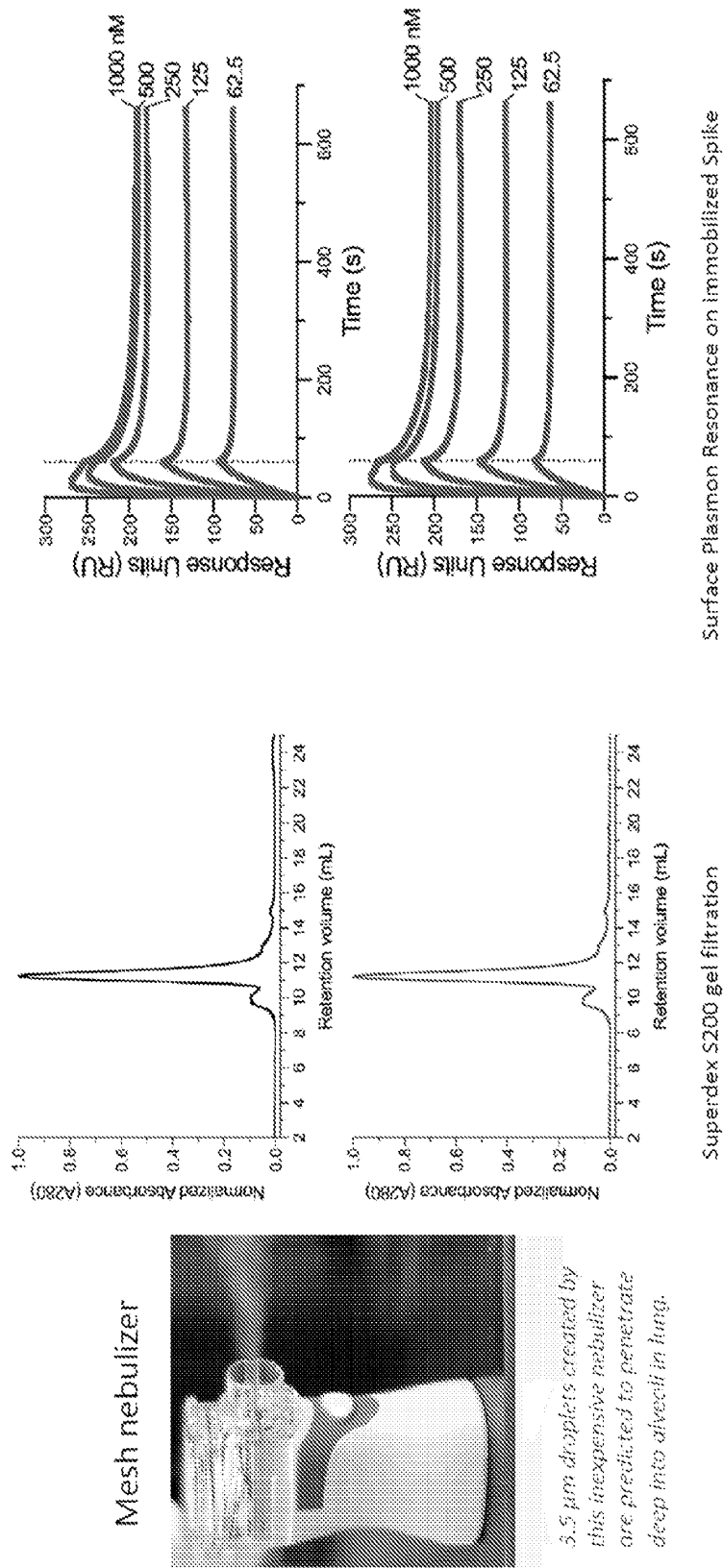
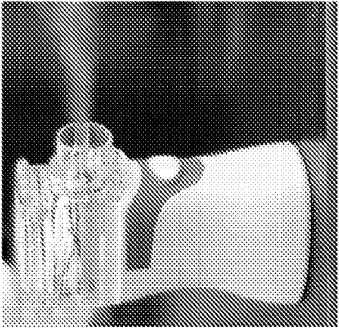


FIG. 20A

Mesh nebulizer



3.5 μ m droplets created by this inexpensive nebulizer are predicted to penetrate deep into alveoli in lung.

FIG. 20B

Pre-aerosolization

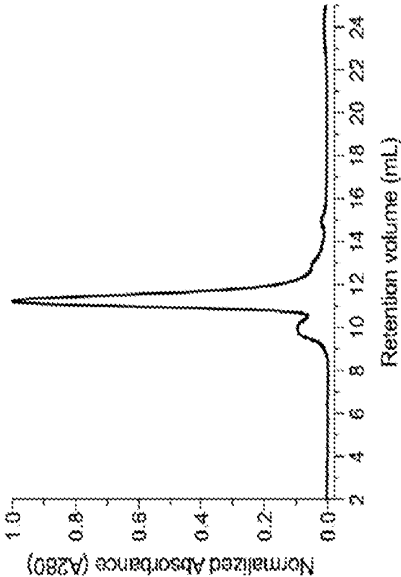
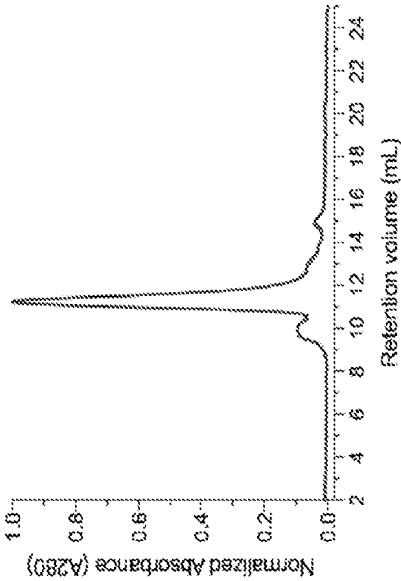


FIG. 20C

Post-aerosolization



Analysis by Superdex S200 gel filtration

FIG. 21

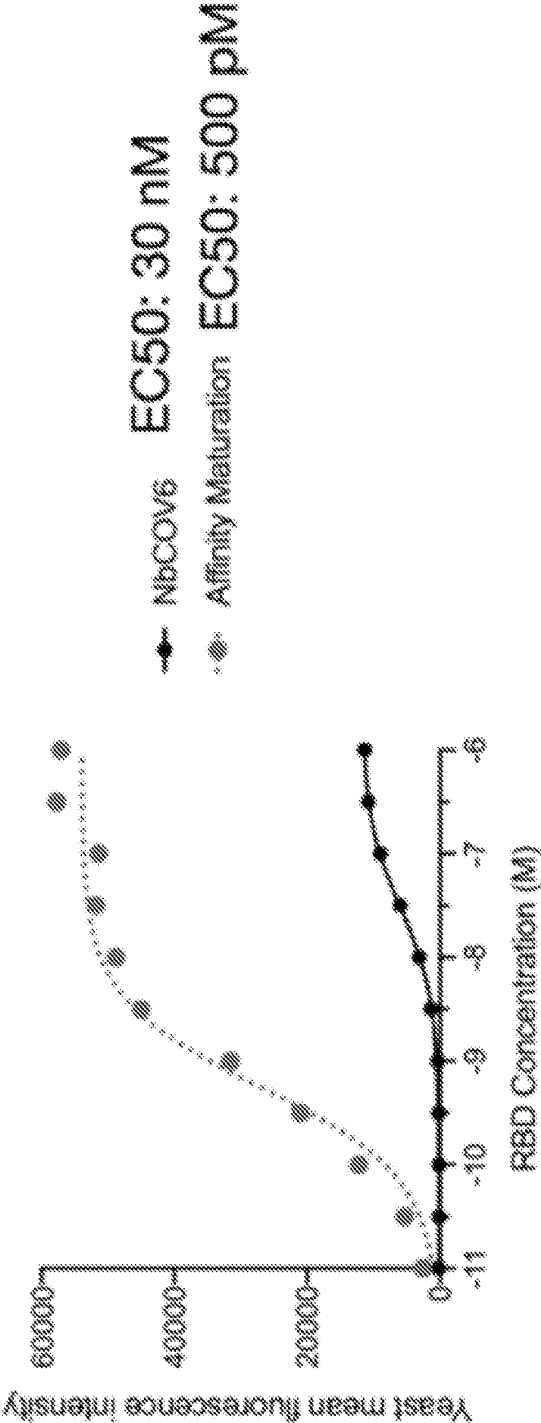


Figure 22 (other clones). Surface plasmon resonance affinities for anti-Spike nanobodies measured using immobilized SC2 spike ECD.

	ka (1/Ms)	kd (1/s)	KD (M)
NbCOV2	9.00E+05	0.528	5.86E-07
NbCOV3	4.42E+05	0.0448	1.01E-07
NbCOV8	1.40E+05	0.8138	5.85E-06
NbCOV10	1140	0.048	4.28E-05
NbCOV11	1.16E+06	0.163	1.41E-07
NbCOV12	121.5	1.99E-04	1.64E-06
NbCOV15	1.70E+05	0.2275	1.34E-06
NbCOV16	1.07E+05	0.1343	1.25E-06
NbCOV17	7.28E+05	0.1966	2.70E-07
NbCOV18	1.42E+05	0.0064	4.48E-08
NbCOV19	1.23E+04	0.077	6.27E-06
NbCOV24	9.27E+05	0.2698	2.91E-07

Figure 23 (other clones). Surface plasmon resonance affinities for anti-Spike nanobodies measured using immobilized SC2 spike ECD.

Neutralizer construct	Pseudovirus IC50 (nM)
Mono ACE2	1104
ACE2-FC	59.81
NbCOV3	5926
NbCOV6 (AeroNab6)	3149
NbCOV11	5996
NbCOV15	19220
NbCOV19	31390
AeroNab6X2	188.2
AeroNab6X3 n=3 linker	2.358
AeroNab6X3 n=4 linker	1.373
AeroNab6mX3 n=3 linker	0.3363
AeroNab6mX3 n=4 linker	0.1527
NbCOV3x2 n=3 linker	868.3
NbCOV3x3 n=3 linker	803.9
NbCOV11x3 n=3 linker	1.077
NbCOV15x3 n=3 linker	176.7
NbCOV19x3 n=3 linker	4584

Figure 24. Humanization strategy for AeroNab6

Human IGHV3-66 sequence:

EVQLVESGGGLVQPGGSLRLSCAASGFTVSSNYMSWVRQAPGKLEWVSVIYSGGSTYYADSVKGRFTISRDN SKNTLYLQ
MNSLRAEDTAVYYCAR

AeroNab6_h sequence (underlined indicate residues that differ in framework regions from human IGHV3-66):

EVQLVESGGGLVQPGGSLRLSCAASGIIIFGRNAMGWYRQAPGKLELVAGIIRRGSIYYADSVKGRFTISRDN SKNTLYLQ
MNSLRAEDTAVYYCAADPASPAGDYWGQGTQVTVSS

Figure 25A: Useful CDR sets

FR1: (sequence): QVQLVESGGGLVQAGGSLRLSCAAS (SEQ ID NO:1)
 FR2: (sequence): MGWYRQAPGKERELVAGI (SEQ ID NO:2)
 FR3: (sequence): YADSVKGRFTISRDNAKNTVYLQMNSLKPEDTAVYYC (SEQ ID NO:3)
 FR4: (sequence): WGQGTQVTVSS (SEQ ID NO:4)

Source	CDR1	CDR2	CDR3
AeroNab6	GIHGRNA (SEQ ID NO:5)	TRRGSTY (SEQ ID NO:6)	AADPASAPGDIY (SEQ ID NO:7)
AeroNab6m	GYIFGRNA (SEQ ID NO:8)	TRRGSTY (SEQ ID NO:9)	AADPASPAYGDIY (SEQ ID NO:10)
AeroNab6h	GIHGRNA (SEQ ID NO:11)	TRRGSTY (SEQ ID NO:12)	AADPASAPGDIY (SEQ ID NO:13)
AeroNab6mh	GYIFGRNA (SEQ ID NO:14)	TRRGSTY (SEQ ID NO:15)	AADPASPAYGDIY (SEQ ID NO:16)
NbCOV001	GSTLYQYA (SEQ ID NO:17)	SGSGTSTH (SEQ ID NO:18)	AAGYSWFWWTVDYDY (SEQ ID NO:19)
NbCOV002	GFTYTYA (SEQ ID NO:20)	SNGGSTY (SEQ ID NO:21)	AVTALVWYDDDDGYDY (SEQ ID NO:22)
NbCOV003	GSIELVNA (SEQ ID NO:23)	NWSGDSTY (SEQ ID NO:24)	NAYYPIDYDY (SEQ ID NO:25)
NbCOV004	GRIFGVYA (SEQ ID NO:26)	TVDVTSTY (SEQ ID NO:27)	AALVSYWVPYSEMDY (SEQ ID NO:28)
NbCOV005	GSTFYNA (SEQ ID NO:29)	TASGGSTY (SEQ ID NO:30)	AAVYYRNLWYYY (SEQ ID NO:31)
NbCOV006	GIHGRNA (SEQ ID NO:32)	TRRGSTY (SEQ ID NO:33)	AADPASAPGDIY (SEQ ID NO:34)
NbCOV008	GTTFKVNA (SEQ ID NO:35)	TIVGNTY (SEQ ID NO:36)	NTQEAIFYPKYGY (SEQ ID NO:37)
NbCOV010	GNTFVAYA (SEQ ID NO:38)	SSTTSTY (SEQ ID NO:39)	ATYVYDRYVGWHMDY (SEQ ID NO:40)
NbCOV011	GSTFQRYV (SEQ ID NO:41)	TNWSGGSTY (SEQ ID NO:402)	NADVYIPNFGIYDY (SEQ ID NO:43)
NbCOV012D	GNIFFLYA (SEQ ID NO:44)	TWSDGNTY (SEQ ID NO:45)	NAKYVQRTYFEDFYRYQFDY (SEQ ID NO:46)
NbCOV013	GLITYAYA (SEQ ID NO:47)	SSGTSTY (SEQ ID NO:48)	AAVLWYVGVDSEY (SEQ ID NO:49)
NbCOV015	GSIFYSNA (SEQ ID NO:50)	TRSGGST (SEQ ID NO:51)	NADPRWRGPQYTFVKGDY (SEQ ID NO:52)
NbCOV016	GLIFDYA (SEQ ID NO:53)	SQTGGSTY (SEQ ID NO:54)	AVEFDYFSGVIYNY (SEQ ID NO:55)

Figure 25B

NbCOV017	GFTIVWYV (SEQ ID NO:56)	TYSGARTY (SEQ ID NO:57)	AA RTEYHPRYDY (SEQ ID NO:58)
NbCOV018	GSTFELYV (SEQ ID NO:59)	NESGTTY (SEQ ID NO:60)	AA VRWSSYHYRENY (SEQ ID NO:61)
NbCOV019	GHFGRNA (SEQ ID NO:62)	TRTGGSTY (SEQ ID NO:63)	AA DPFFQFEY (SEQ ID NO:64)
NbCOV021	GFTFWVNA (SEQ ID NO:65)	DYSGSRTY (SEQ ID NO:66)	AA ERRYP RNPEDY (SEQ ID NO:67)
NbCOV022	GSIFS VYA (SEQ ID NO:68)	TTSGASTY (SEQ ID NO:69)	AA RLWARTSYEYWFEEY (SEQ ID NO:70)
NbCOV024C	GSIFV TYA (SEQ ID NO:71)	SWSSGTTY (SEQ ID NO:72)	NA VGYGKYL FDS (SEQ ID NO:73)
NbCOV024D	GSIFV TYA (SEQ ID NO:74)	TLSGASTY (SEQ ID NO:75)	AA RDSWHVHY (SEQ ID NO:76)

Figure 26: Dimeric MASC constructs

AeroNab6mhxNbCOV3 n =3
 EVQLVESGGGLVQPGGSLRLSCAASGYIFGRNAMGWYRQAPGKGLELVAGITRRGSITYYADSVKGRFTISRDN SKNTLYLQ
 MNSLRAEDTAVYYCAADPASPAYGDYWGQGTQVTVSS/GGGSGGGSGGGSGGGGS/EVQLVESGGGLVQPGGSLRLSCAASG
 SIFLVNAMGWYRQAPGKGLELVAAINWSGDSITYYADSVKGRFTISRDN SKNTLYLQMNLSLRAEDTAVYYCNAYYPIDYDY
 WGQGTQVTVSS

AeroNab6mhxNbCOV3 n =4
 EVQLVESGGGLVQPGGSLRLSCAASGYIFGRNAMGWYRQAPGKGLELVAGITRRGSITYYADSVKGRFTISRDN SKNTLYLQ
 MNSLRAEDTAVYYCAADPASPAYGDYWGQGTQVTVSS/GGGSGGGSGGGSGGGGS/EVQLVESGGGLVQPGGSLRLS
 CAASGSIFLVNAMGWYRQAPGKGLELVAAINWSGDSITYYADSVKGRFTISRDN SKNTLYLQMNLSLRAEDTAVYYCNAYYP
 IDYDYWGQGTQVTVSS

FIG. 27

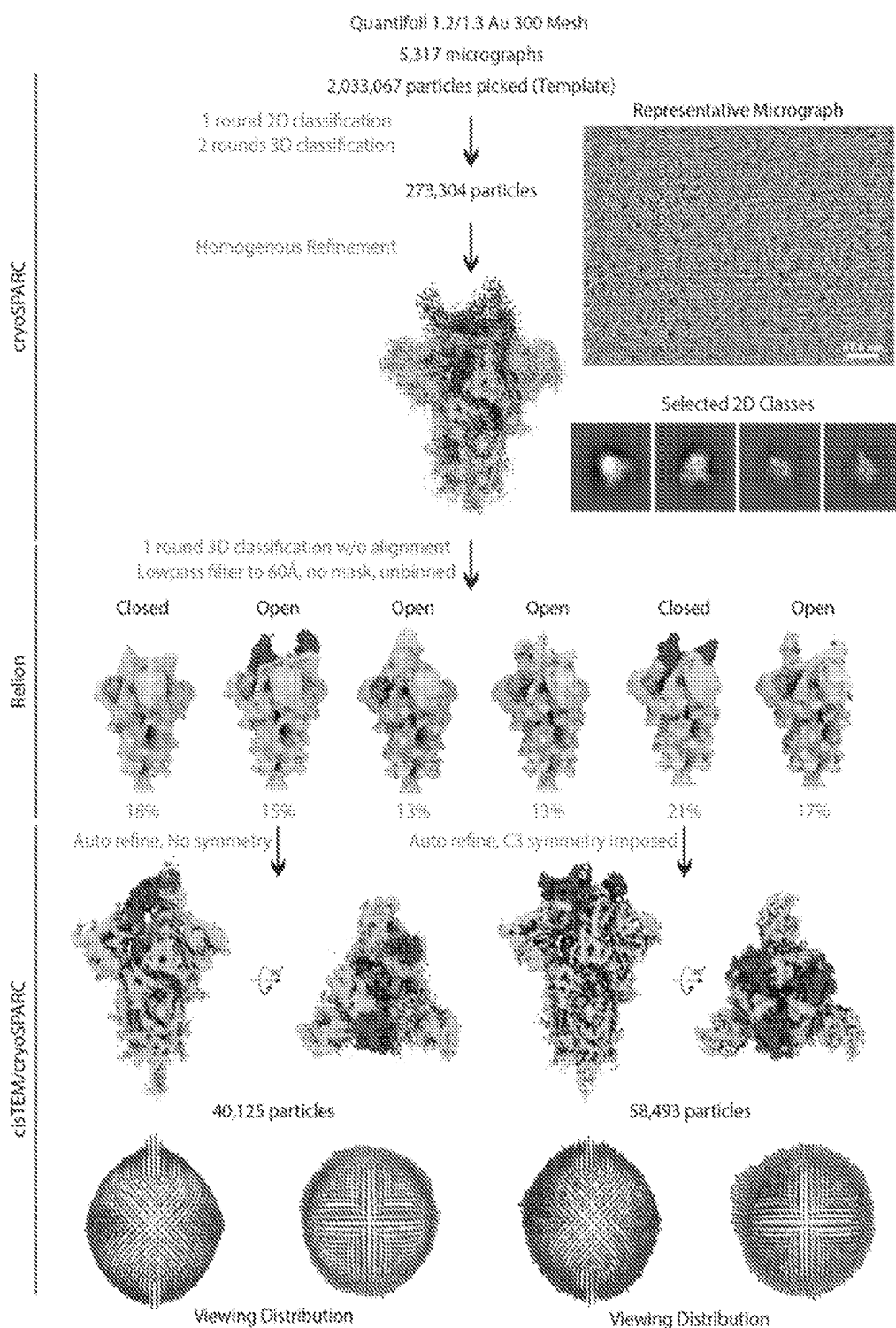


FIG. 28

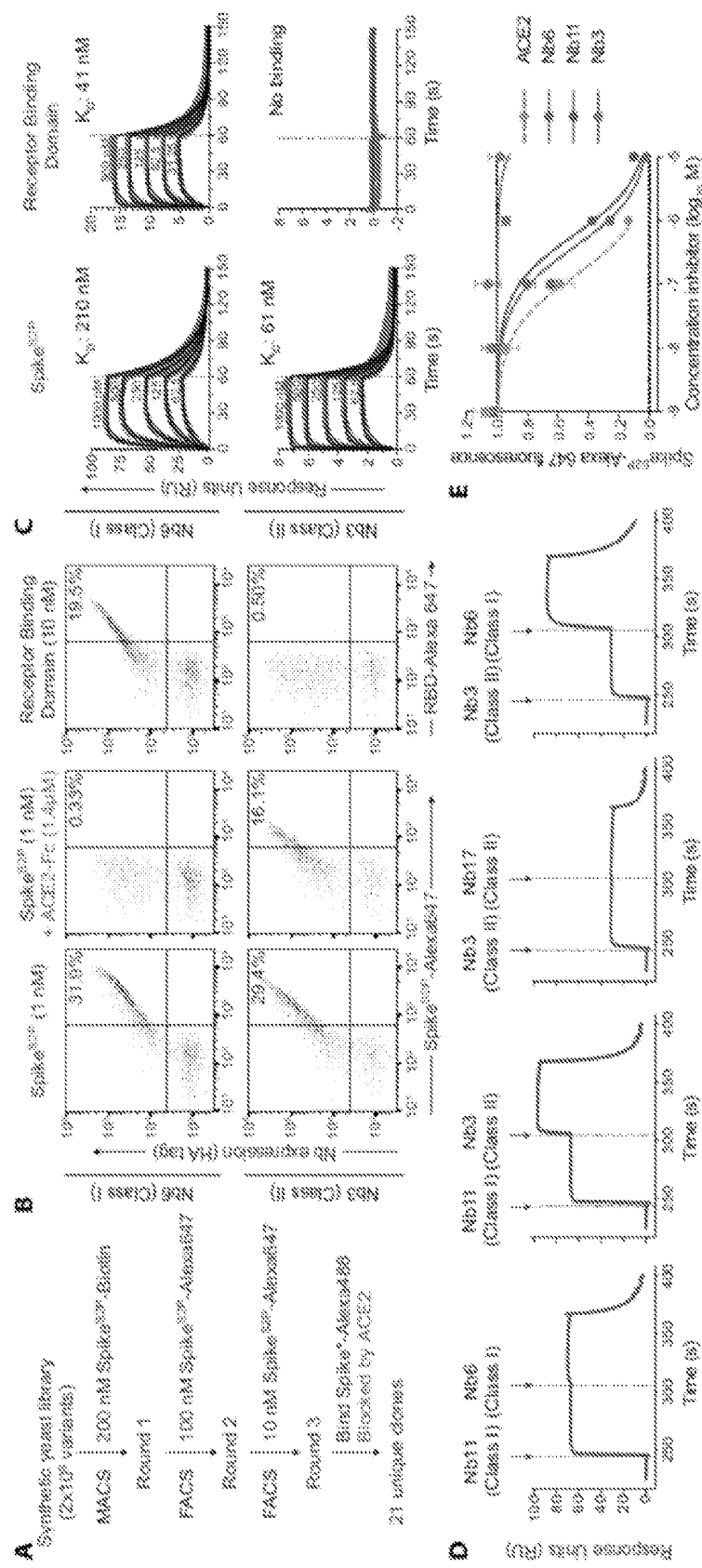


Fig. 29

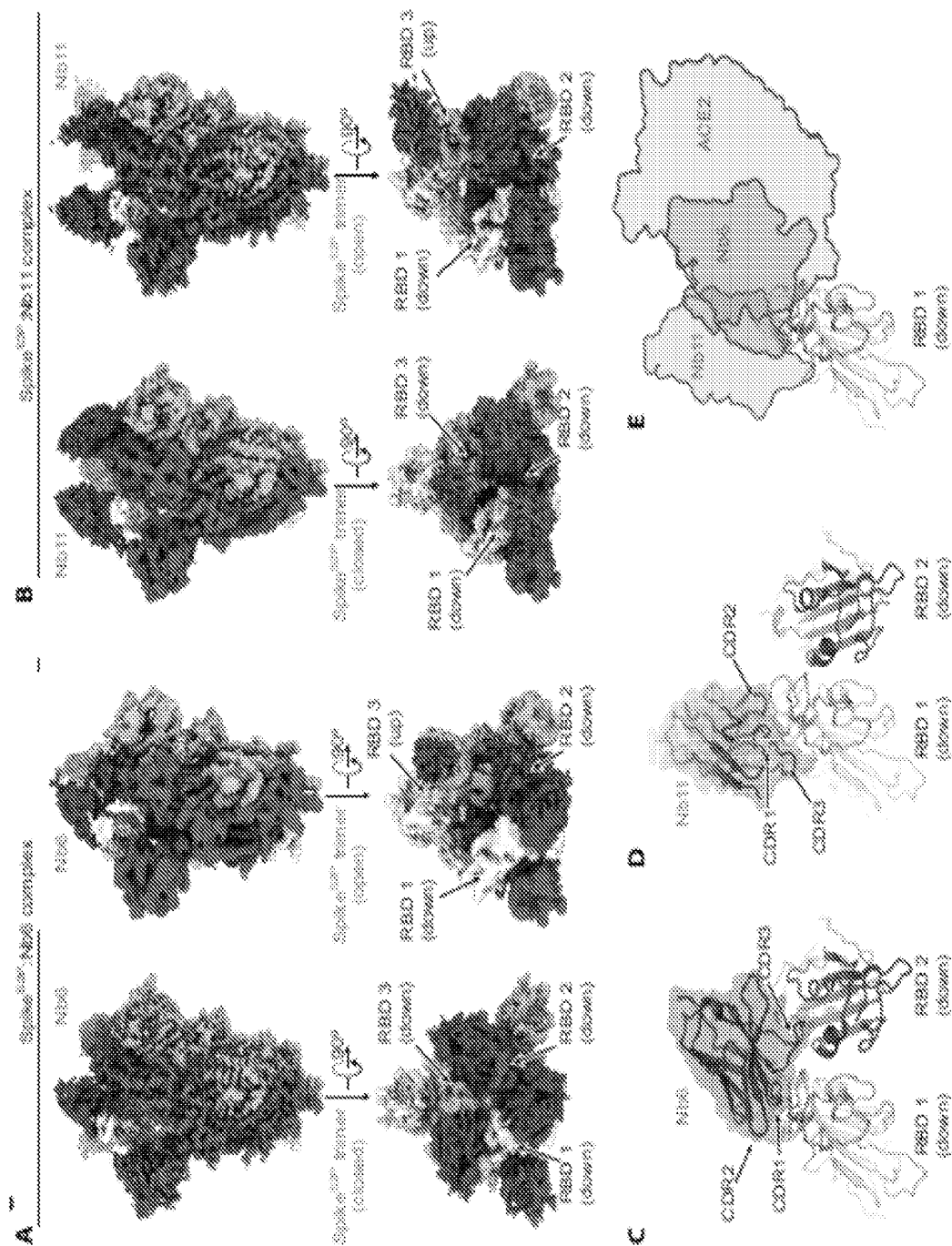


FIG. 31

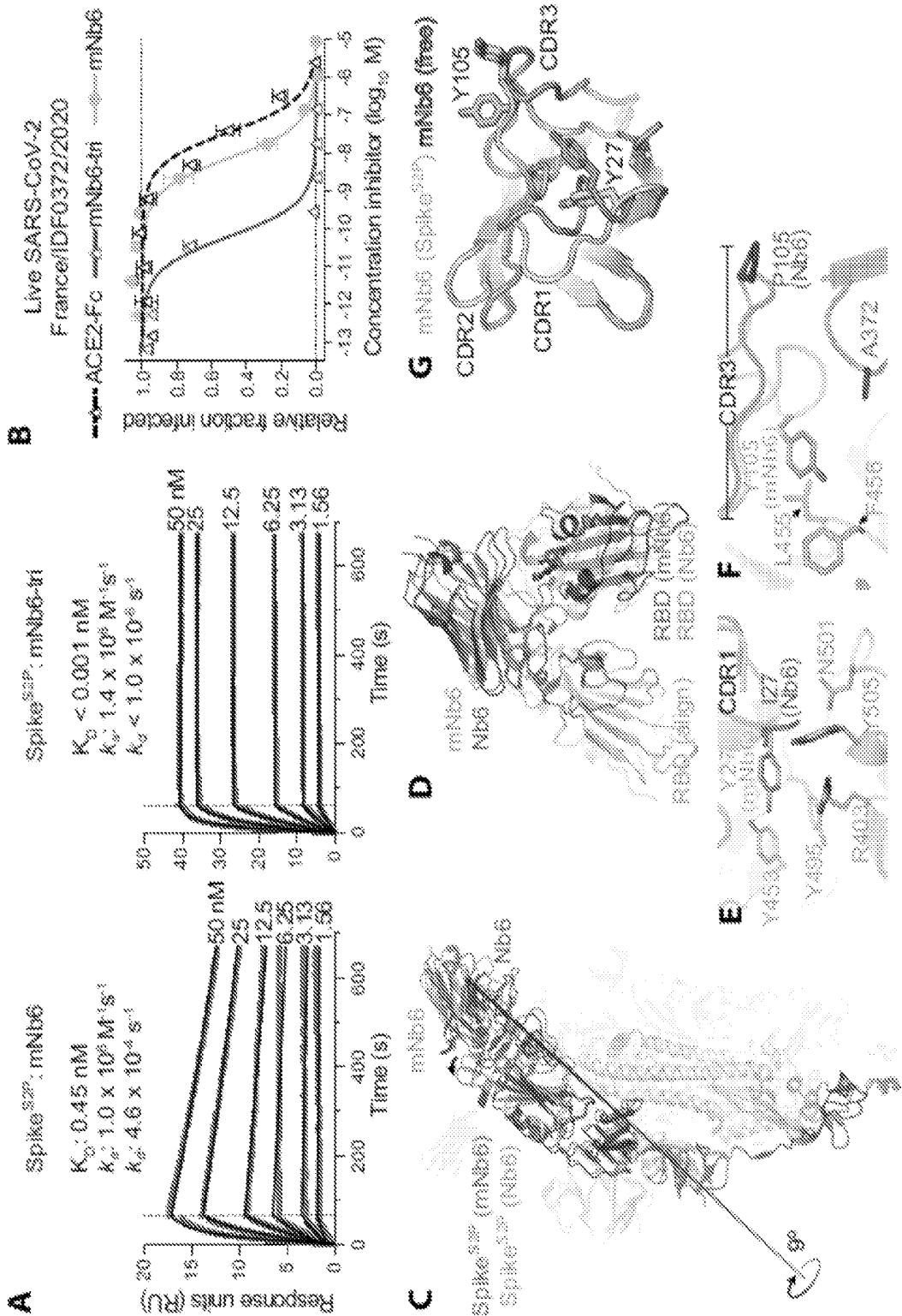


FIG. 32

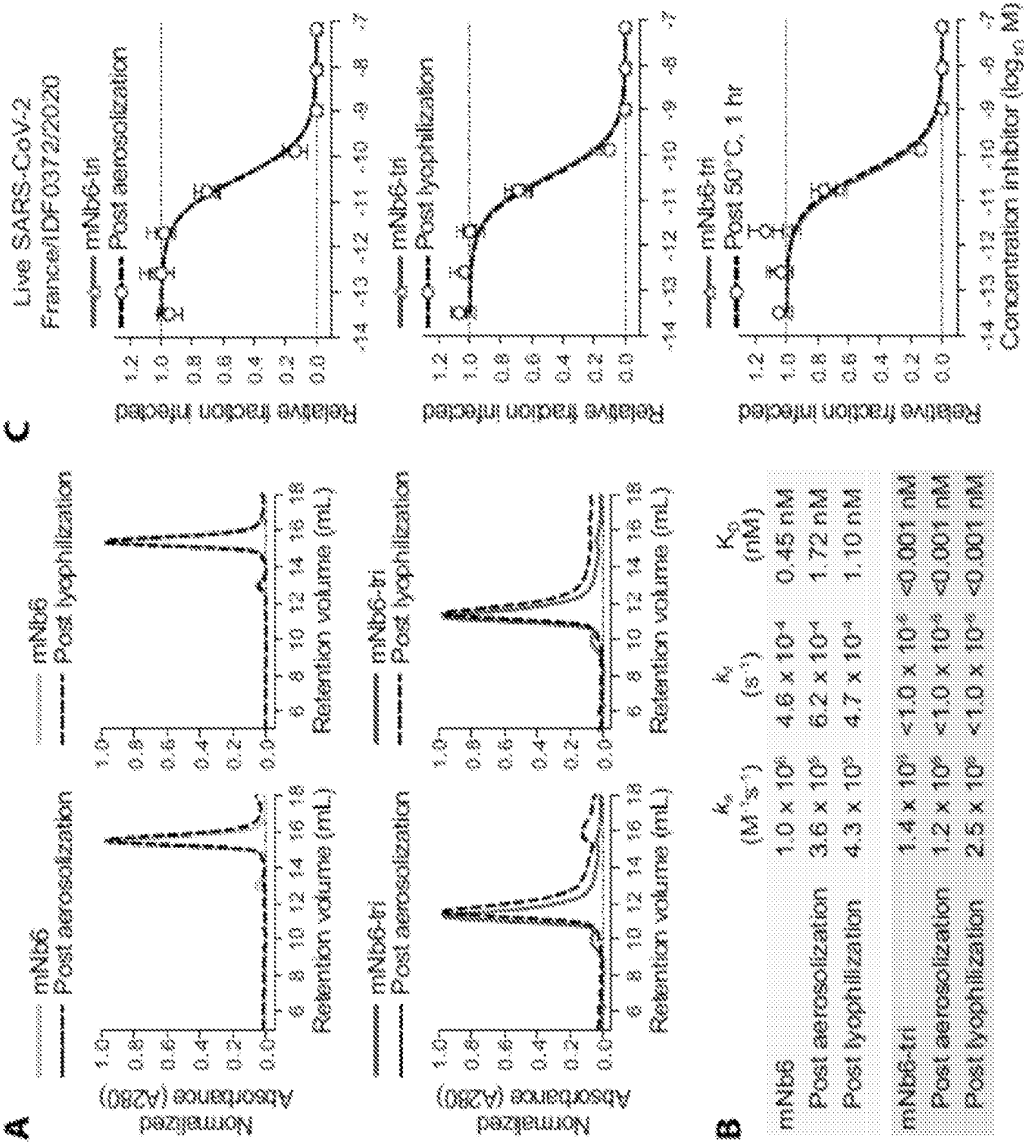


FIG. 33

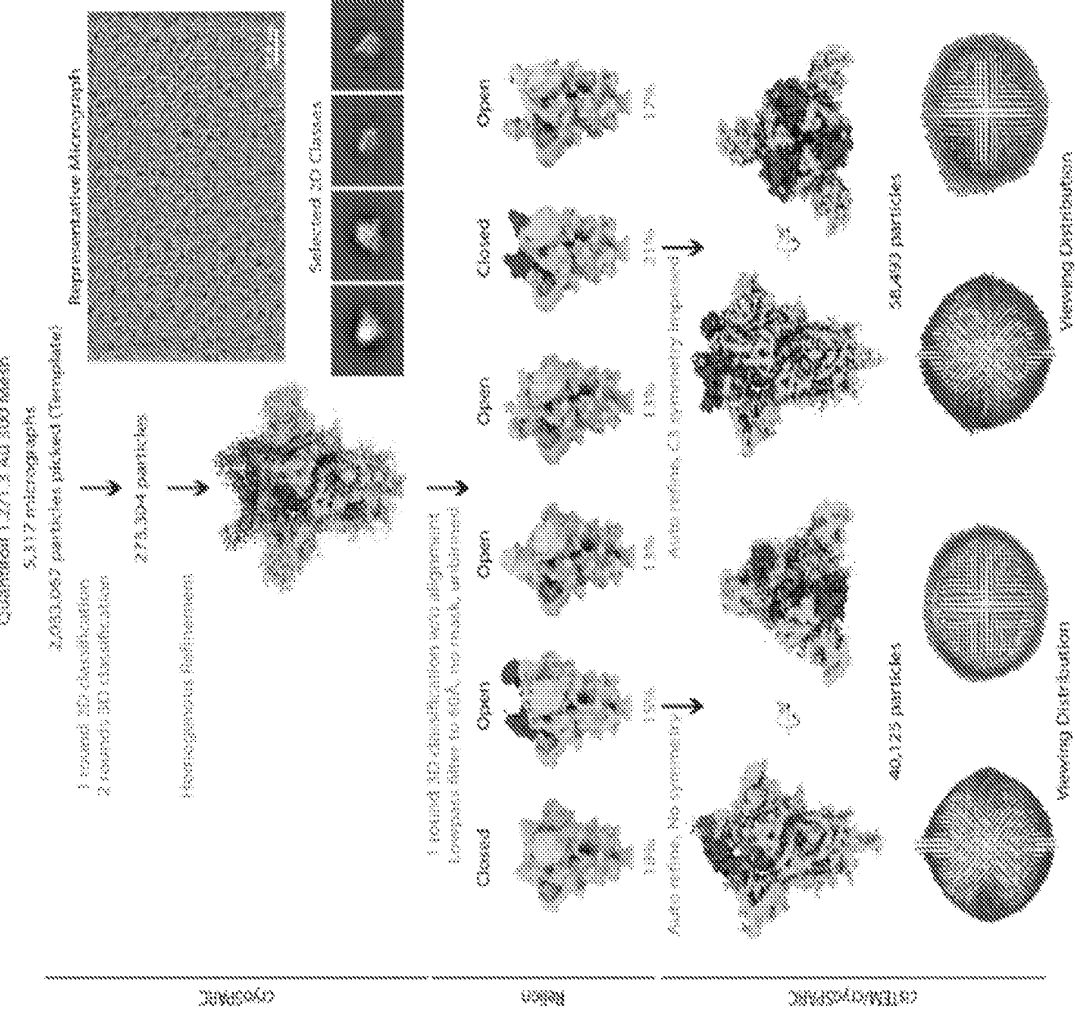


FIG. 34

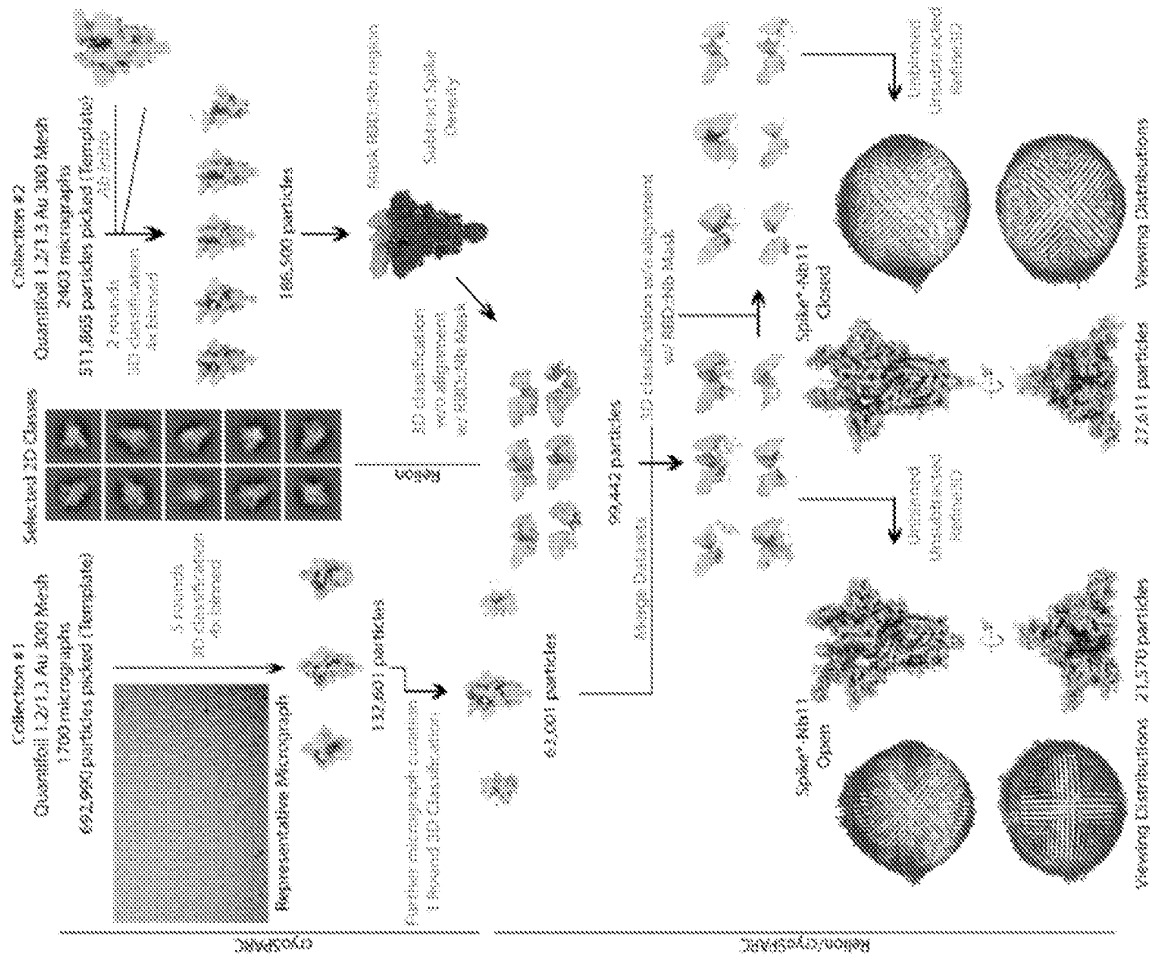


FIG. 36

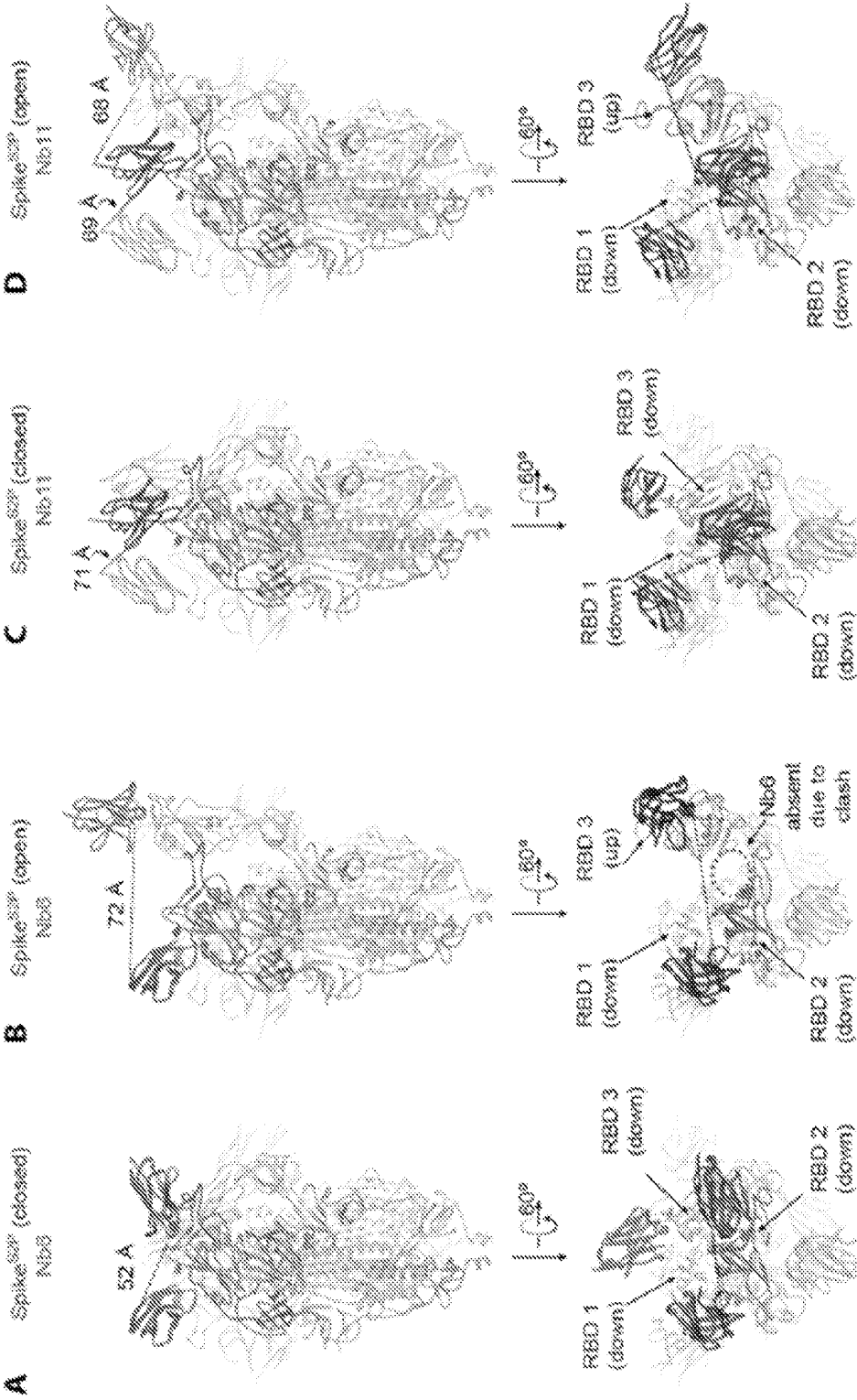


FIG. 37

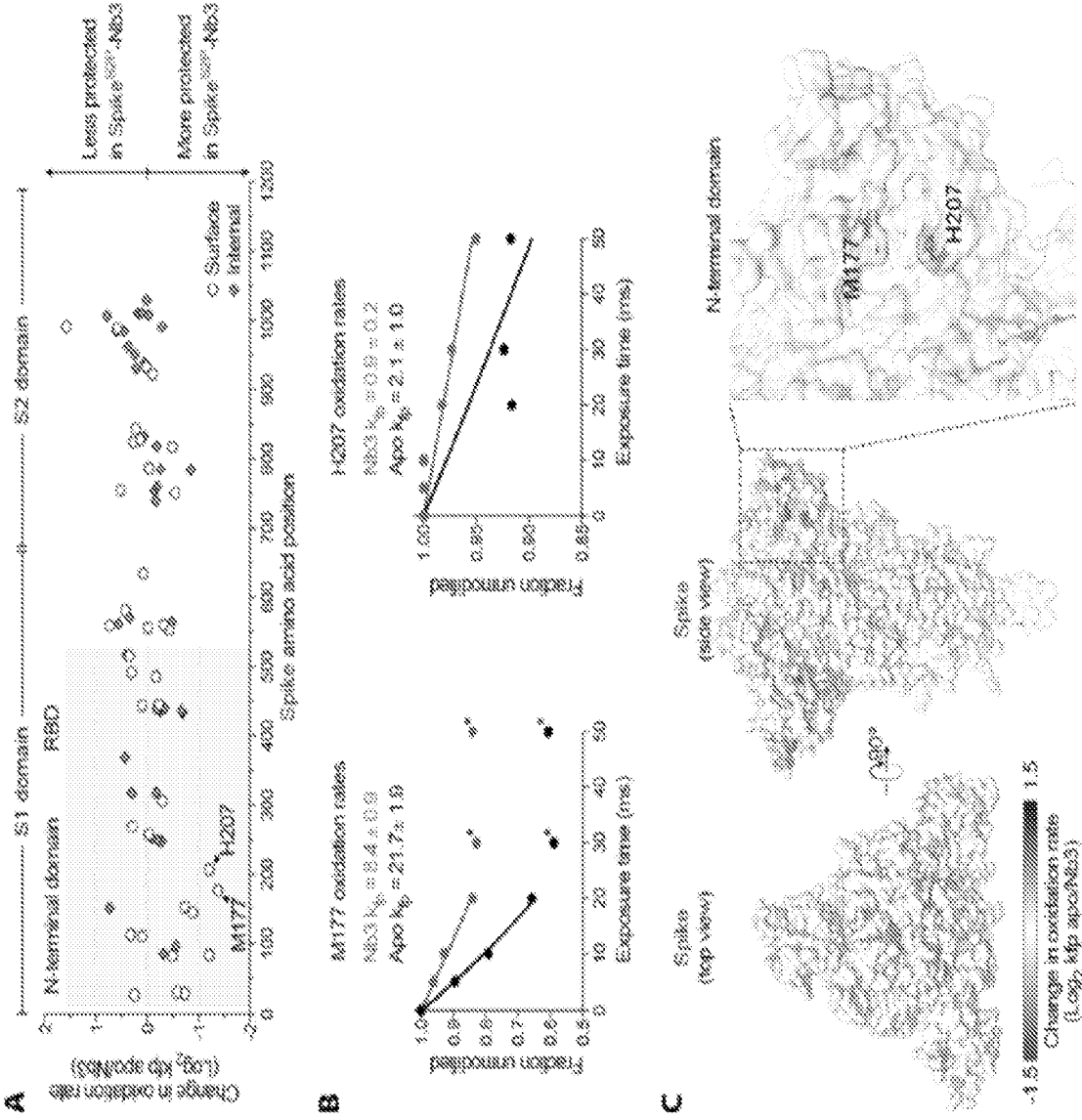


FIG. 38

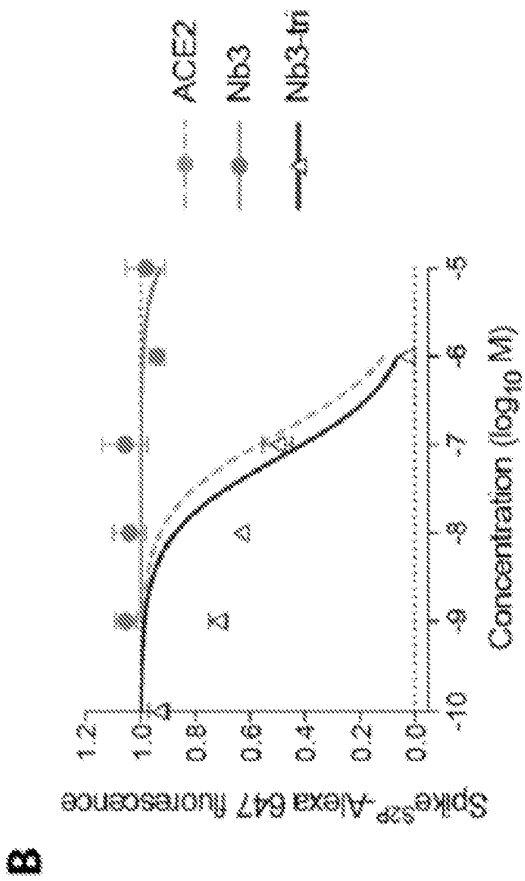
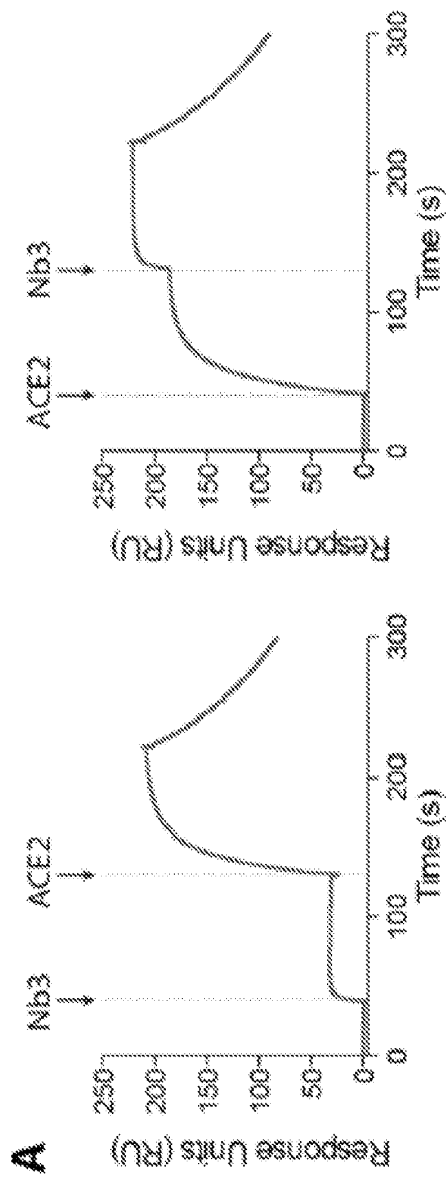


FIG. 39

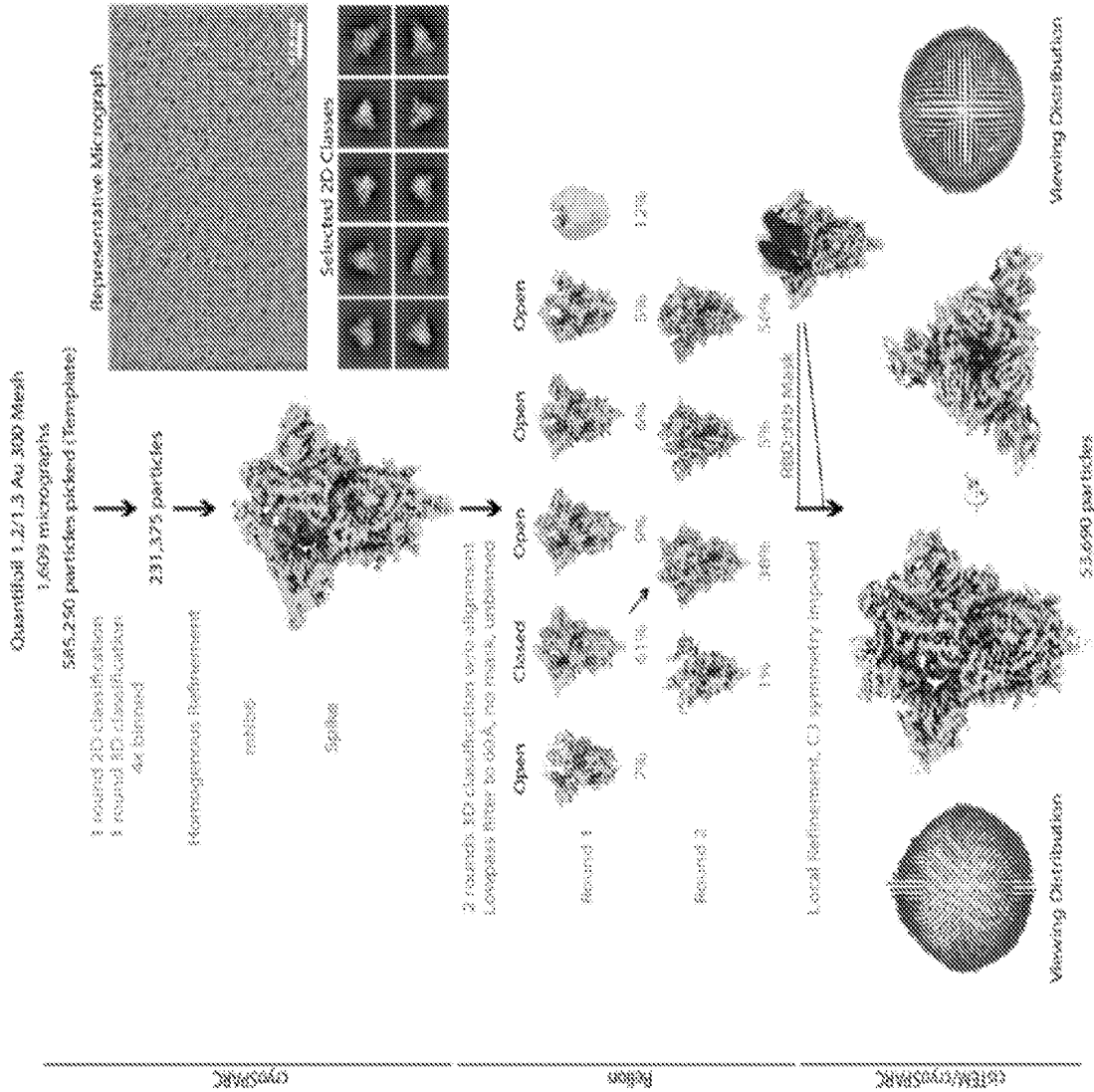


FIG. 40

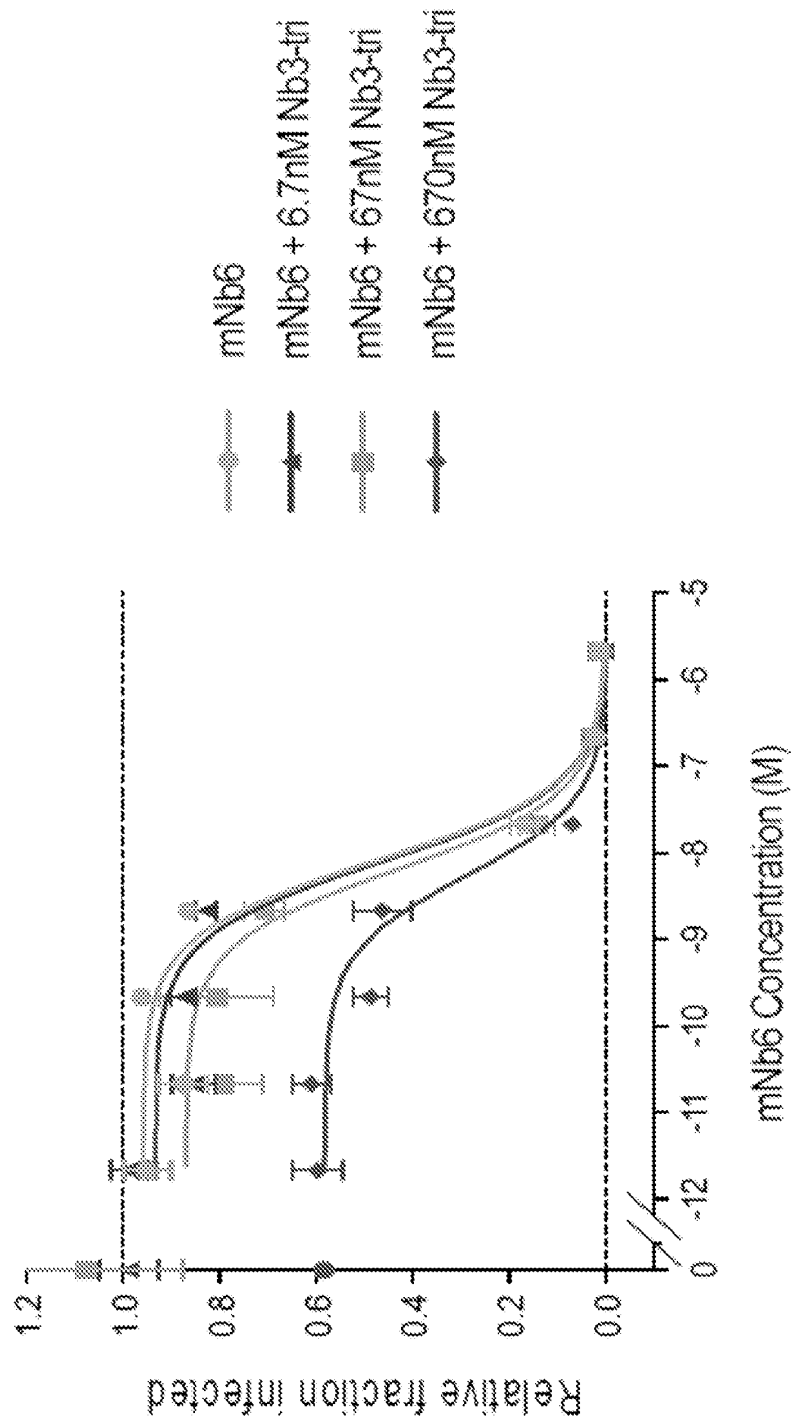


FIG. 42

Nanobody	Class	Spike ^{22E} Binding (SPR)			RBD Binding (SPR)			Spike ^{22E} Competition IC ₅₀ (s.e.m.) (nM) ^a	SARS-CoV-2 Pseudovirus IC ₅₀ (s.e.m.) (nM) ^b	Live SARS-CoV-2 IC ₅₀ (s.e.m.) (nM) ^c
		K _d (M) ^d	K _d (nM) ^e	K _d (nM)	K _d (M) ^d	K _d (nM) ^e	K _d (nM)			
Nb2	I	9.6x10 ⁻⁷	5.3x10 ⁻⁷	5.9x10 ⁻⁷	1.0x10 ⁻⁶	9.9x10 ⁻⁷	9.7x10 ⁻⁷	8.3x10 ⁻⁶ (1.7x10 ⁻⁶)	NP	NP
Nb3 ⁶	II	1.8x10 ⁻⁶	1.1x10 ⁻⁶	6.1x10 ⁻⁶	NB			NC	3.9x10 ⁻⁶ (7.9x10 ⁻⁷)	3.0x10 ⁻⁶ (3.2x10 ⁻⁷)
Nb6	I	2.7x10 ⁻⁵	5.6x10 ⁻⁷	2.1x10 ⁻⁷	2.1x10 ⁻⁶	8.7x10 ⁻⁷	4.1x10 ⁻⁶	3.7x10 ⁻⁷ (4.9x10 ⁻⁸)	2.0x10 ⁻⁶ (3.5x10 ⁻⁷)	3.3x10 ⁻⁶ (7.2x10 ⁻⁷)
Nb8	I	1.4x10 ⁻⁵	8.1x10 ⁻⁷	5.8x10 ⁻⁶	6.6x10 ⁻⁶	3.3x10 ⁻⁶	5.1x10 ⁻⁷	4.8x10 ⁻⁶ (4.9x10 ⁻⁷)	NP	NP
Nb11	I	1.2x10 ⁻⁶	1.6x10 ⁻⁶	1.4x10 ⁻⁷	3.2x10 ⁻⁶	2.4x10 ⁻⁶	7.6x10 ⁻⁶	4.4x10 ⁻⁷ (1.2x10 ⁻⁷)	2.4x10 ⁻⁶ (5.4x10 ⁻⁷)	NP
Nb12	I	1.2x10 ⁻⁶	2.0x10 ⁻⁶	1.6x10 ⁻⁶	Biphasic	Biphasic	Biphasic	2.4x10 ⁻⁷ (5.5x10 ⁻⁸)	1.2x10 ⁻⁶ (9.6x10 ⁻⁷)	NP
Nb15	I	1.7x10 ⁻⁶	2.3x10 ⁻⁷	1.3x10 ⁻⁶	6.0x10 ⁻⁷	1.2x10 ⁻⁶	3.6x10 ⁻⁷	2.2x10 ⁻⁶ (2.5x10 ⁻⁷)	8.7x10 ⁻⁶ (3.6x10 ⁻⁶)	NP
Nb16	I	1.1x10 ⁻⁶	1.3x10 ⁻⁷	1.3x10 ⁻⁶	NP			9.5x10 ⁻⁷ (1.1x10 ⁻⁷)	NP	NP
Nb17 ⁶	II	7.3x10 ⁻⁶	2.0x10 ⁻⁷	2.7x10 ⁻⁷	NB			NC	7.6x10 ⁻⁶ (1.6x10 ⁻⁶)	NP
Nb18 ⁶	II	1.4x10 ⁻⁶	6.4x10 ⁻⁷	4.5x10 ⁻⁶	NB			5.2x10 ⁻⁷ (1.5x10 ⁻⁷)	NP	NP
Nb19	I	2.4x10 ⁻⁶	1.1x10 ⁻⁷	4.5x10 ⁻⁶	1.0x10 ⁻⁶	8.9x10 ⁻⁷	8.8x10 ⁻⁷	4.1x10 ⁻⁶ (4.9x10 ⁻⁷)	2.4x10 ⁻⁶ (7.7x10 ⁻⁷)	NP
Nb24	I	9.3x10 ⁻⁵	2.7x10 ⁻⁷	2.9x10 ⁻⁷	2.4x10 ⁻⁶	3.5x10 ⁻⁷	1.5x10 ⁻⁷	7.5x10 ⁻⁷ (1.0x10 ⁻⁷)	NP	NP
ACE3	N/A	2.7x10 ⁻⁵	1.2x10 ⁻⁷	4.4x10 ⁻⁸	NP	NP	NP	1.7x10 ⁻⁷ (6.6x10 ⁻⁸)	6.2x10 ⁻⁷ (1.7x10 ⁻⁷)	NP
mNb6	I	1.0x10 ⁻⁶	4.5x10 ⁻⁶	4.5x10 ⁻¹⁰	1.1x10 ⁻⁶	6.4x10 ⁻⁶	5.6x10 ⁻¹⁰	1.3x10 ⁻⁶ (4.1x10 ⁻⁷)	6.3x10 ⁻⁶ (1.6x10 ⁻⁶)	1.2x10 ⁻⁶ (2.5x10 ⁻⁶)
Nb3-4a	II	NP	NP	NP	NP	NP	NP	NP	3.6x10 ⁻⁷ (1.5x10 ⁻⁷)	1.8x10 ⁻⁷ (1.2x10 ⁻⁶)
Nb3-mi	II	Biphasic	Biphasic	Biphasic	NP	NP	NP	4.1x10 ⁻⁶ (1.6x10 ⁻⁶)	4.6x10 ⁻⁷ (1.6x10 ⁻⁶)	1.4x10 ⁻⁷ (4.9x10 ⁻⁶)
Nb6-4a	I	1.1x10 ⁻⁶	2.7x10 ⁻⁷	2.5x10 ⁻⁸	NP	NP	NP	NP	6.3x10 ⁻⁶ (3.5x10 ⁻⁶)	NP
Nb6-mi (15 aa)	I	1.2x10 ⁻⁶	2.1x10 ⁻⁷	1.6x10 ⁻⁸	NP	NP	NP	8.6x10 ⁻⁶ (1.8x10 ⁻⁶)	1.0x10 ⁻⁶ (1.9x10 ⁻⁶)	NP
Nb6-mi (20 aa)	I	1.1x10 ⁻⁶	2.9x10 ⁻⁷	2.6x10 ⁻⁸	NP	NP	NP	1.5x10 ⁻⁶ (5.2x10 ⁻⁷)	1.2x10 ⁻⁶ (2.5x10 ⁻⁶)	1.6x10 ⁻⁶ (2.6x10 ⁻⁷)
Nb11-4a	I	Biphasic	Biphasic	Biphasic	NP	NP	NP	NP	5.1x10 ⁻⁶ (1.6x10 ⁻⁶)	NP
ACE2-Fc	N/A	NP	NP	NP	NP	NP	NP	5.3x10 ⁻⁶ (2.5x10 ⁻⁶)	4.0x10 ⁻⁶ (8.8x10 ⁻⁶)	2.6x10 ⁻⁶ (8.5x10 ⁻⁶)
mNb6-mi (15 aa)	I	1.6x10 ⁻⁶	<1.0x10 ⁻⁶	<1.0x10 ⁻¹²	NP	NP	NP	4.3x10 ⁻¹⁰ (1.4x10 ⁻¹⁰)	2.9x10 ⁻⁶ (4.2x10 ⁻⁶)	NP
mNb6-mi (20 aa)	I	1.4x10 ⁻⁶	<1.0x10 ⁻⁶	<1.0x10 ⁻¹²	NP	NP	NP	4.0x10 ⁻¹⁰ (1.7x10 ⁻¹⁰)	1.2x10 ⁻⁶ (2.8x10 ⁻⁶)	5.4x10 ⁻⁷ (1.6x10 ⁻⁶)

FIG. 43

Sample Spike ^{SP} confirmation EMDB/ PDB	Open EMD-22908	Closed EMD-22907 75.5 K	Open EMD-22911	Closed EMD-22909	Spike ^{SP} -on-Nb6 Closed EMD-22910 75.5 K
Data collection and processing					
Microscope/Detector					
Imaging software and collection					
Magnification					
Voltage (kV)					
Electron exposure (e ⁻ /Å ²)					
Dose rate (e ⁻ /pix/sec)					
Frame exposure (e ⁻ /Å ²)					
Defocus range (µm)					
Pixel size (Å)					
Micrographs	5,317		4,103		1,609
Reconstruction					
Automated particles					
Template-based in cryospace					
Particles in final refinement					
Symmetry imposed					
Map sharpening <i>B</i> factor (Å ²)					
Map resolution, global FSC (Å)					
FSC 0.5, unmasked/masked					
FSC 0.143, unmasked/masked					
Refinement					
Initial model used (PDB code)					
Model resolution (Å)					
FSC 0.5, unmasked/masked					
Model composition					
Non-hydrogen atoms					
Protein residues					
Glycans (NAG)					
<i>B</i> factors (Å ²)					
Protein					
Ligand					
R.m.s. deviations					
Bond lengths (Å)					
Bond angles (°)					
Validation					
MolProbity score					
Clashscore					
Poor rotamers (%)					
EMRinger score					
CaBLAM score					
Ramachandran plot					
Favored (%)					
Allowed (%)					
Disallowed (%)					

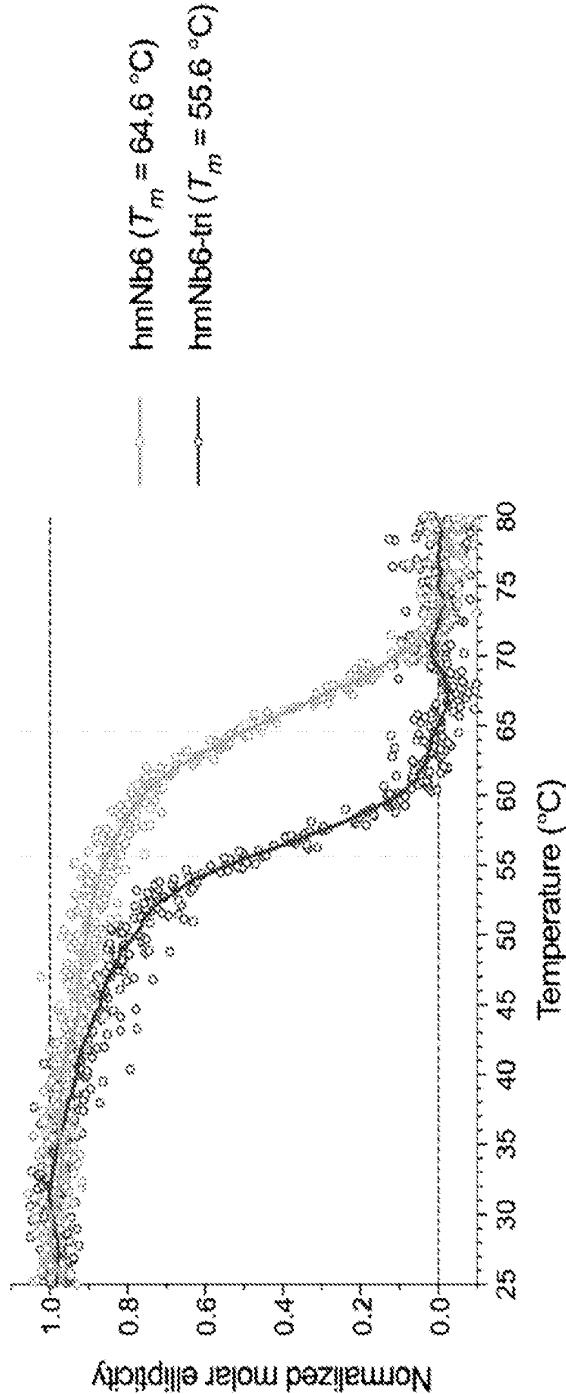
FIG. 44

mNls6 (PDB: 7KKJ)	
Data collection	
Space group	$P2_1$
Cell dimensions	
a, b, c (Å)	44.56, 71.25, 46.43
α, β, γ (°)	90, 114.93, 90
Total Reflections	104,195
Unique Reflections	16,204 (1582)
Molecules in asymmetric unit	2
Resolution (Å)	71.25 - 2.05 (2.09 - 2.05) ^a
R_{sym} or R_{merge}	0.13 (0.94) ^b
R_{free}	0.055 (0.396)
$I / \sigma I$	7.2 (0.9)
Completeness (%)	97.8 (96.6)
Redundancy	6.4 (5.7)
CC (1/2) (%)	99.8 (64.4)
Refinement	
Resolution (Å)	42.1 - 2.05
No. reflections	16,204
$R_{\text{work}} / R_{\text{free}}$ (%)	21.2 / 24.8
No. atoms	
Protein	1880
Ligand/ion	21
Water	131
B -factors	
Protein	33
Ligand/ion	58
Water	39
R.m.s. deviations	
Bond lengths (Å)	0.007
Bond angles (°)	1.14
Ramachandran plot	
Allowed (%)	97.85
Generous (%)	2.15
Disallowed (%)	0

FIG. 45

Plasmid	Nanobody	Plasmid backbone	Resistance Marker
pPW3544	Nb2	pet-26b(+)	kanamycin
pPW3545	Nb3	pet-26b(+)	kanamycin
pPW3546	Nb6	pet-26b(+)	kanamycin
pPW3547	Nb8	pet-26b(+)	kanamycin
pPW3548	Nb11	pet-26b(+)	kanamycin
pPW3549	Nb12	pet-26b(+)	kanamycin
pPW3550	Nb15	pet-26b(+)	kanamycin
pPW3551	Nb16	pet-26b(+)	kanamycin
pPW3552	Nb17	pet-26b(+)	kanamycin
pPW3553	Nb18	pet-26b(+)	kanamycin
pPW3554	Nb19	pet-26b(+)	kanamycin
pPW3555	Nb24	pet-26b(+)	kanamycin
pPW3557	Trivalent Nb6, 20 AA length GS linker	pet-26b(+)	kanamycin
pPW3558	Trivalent Nb3, 15 AA length GS linker	pet-26b(+)	kanamycin
pPW3559	Trivalent Nb11, 15 AA length GS linker	pet-26b(+)	kanamycin
pPW3560	Bivalent Nb3, 15 AA length GS linker	pet-26b(+)	kanamycin
pPW3561	Bivalent Nb6, 15 AA length GS linker	pet-26b(+)	kanamycin
pPW3563	Trivalent mNb6, 20 AA length GS linker	pet-26b(+)	kanamycin
pPW3564	mNb6	pet-26b(+)	kanamycin

FIG. 46



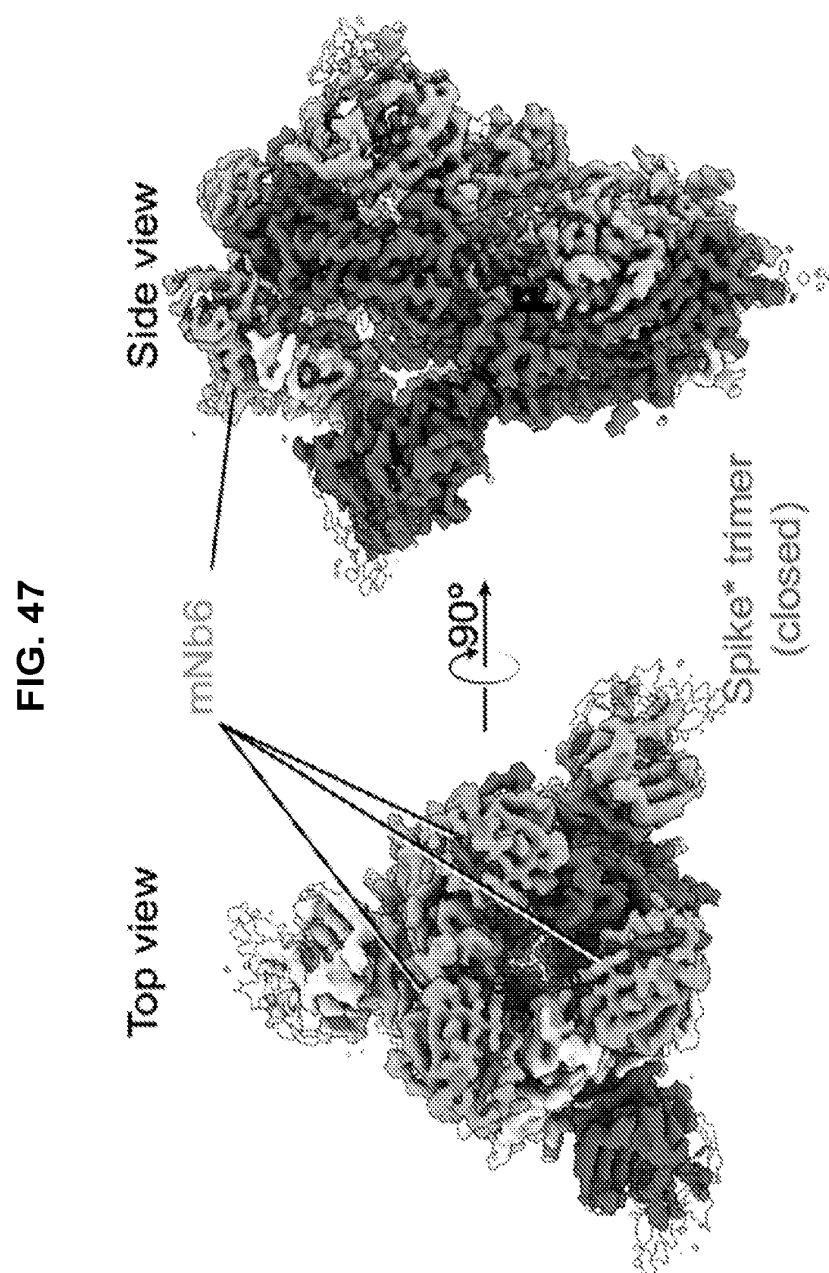


FIG. 48

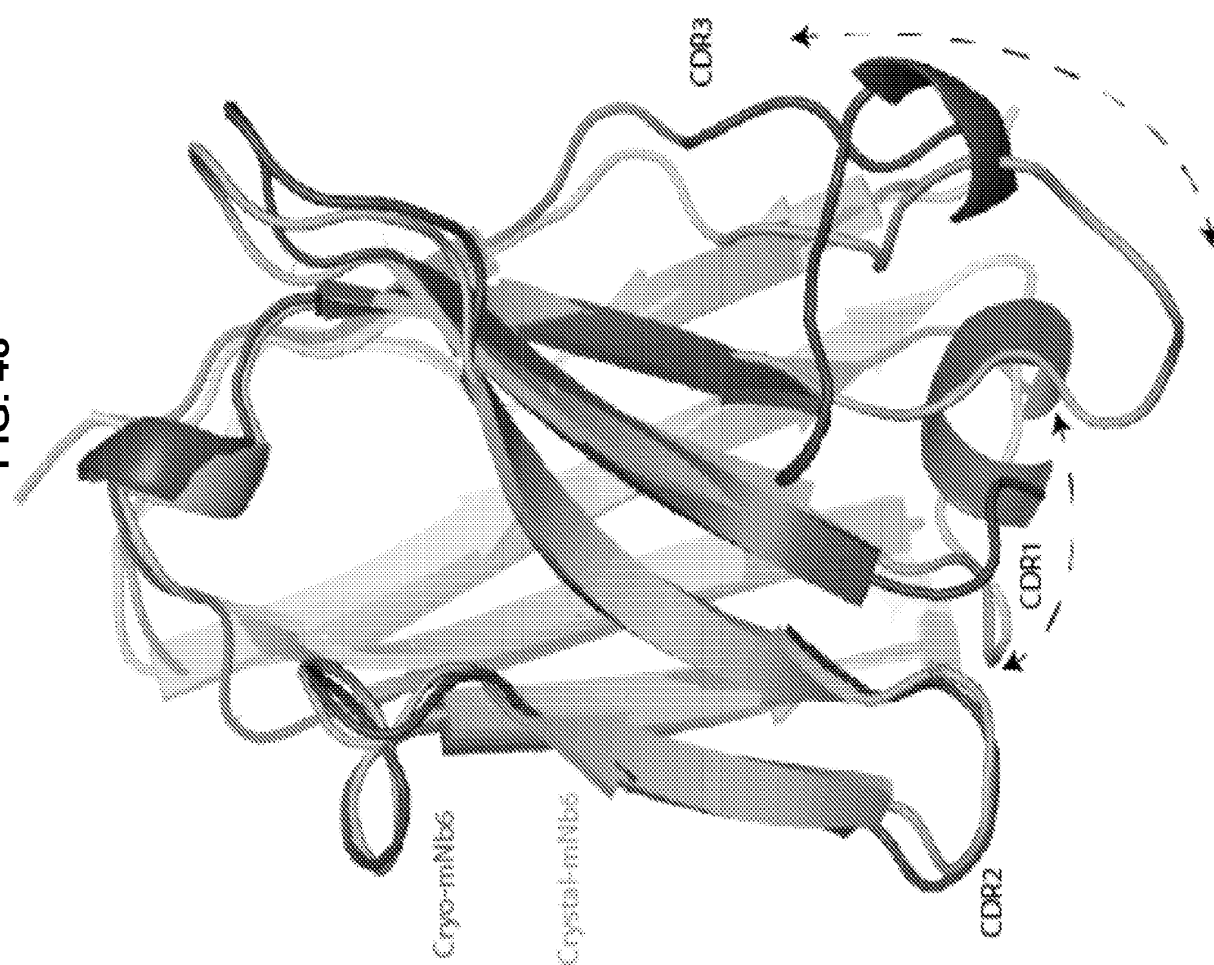


FIG. 49

Nanobody	Class	Spike* Binding			RBD Binding			Spike* competition (% inhibition)	SARS-CoV-2 Neutralization (100% ID ₅₀)	Neutralization Index (100% ID ₅₀)
		K _d (nM)	K _i (s ⁻¹)	K _o (nM)	K _d (nM)	K _i (s ⁻¹)	K _o (nM)			
2	IgG	9.98e+05	0.33	989	4.08e+09	0.98	973	8323	ND	ND
3	H	1.88e+06	0.13	83	ND	ND	ND	***	2853	2969
6	I	2.78e+05	0.056	210	2.1E+06	0.067	43	969	3395	3785
8	F	1.98e+05	0.83	5850	6.6E+05	0.33	509	4880	ND	ND
11	E	1.3E+08	0.69	144	3.3E+06	0.28	76	525	2263	ND
13	E	1.1E+5	2.0E-04	16e+0	8.9e+06	8.9e+06	8.9e+06	235	1768	ND
15	F	1.7E+05	0.21	1340	8.6E+05	0.22	185	7117	6096	ND
16	F	1.3E+09	0.13	1259	ND	ND	ND	966	ND	ND
17	H	7.5E+05	0.28	270	ND	ND	ND	***	7668	ND
18	H	1.4E+05	6.9E-03	45	ND	ND	ND	***	ND	ND
19	I	2.9E+08	0.13	4499	1.0E+05	8.9E-02	983	4091	22790	ND
24	E	9.3E+03	0.27	291	2.4E+06	0.35	346	731	ND	ND
ACE2	N/A	3.2E+05	2.5E-02	89	ND	ND	ND	359	583	ND
mAb85	I	1.1E+06	4.3E-04	0.38	3.1E+06	2.6E-04	0.56	1.2	6.2	1.2

FIG. 50

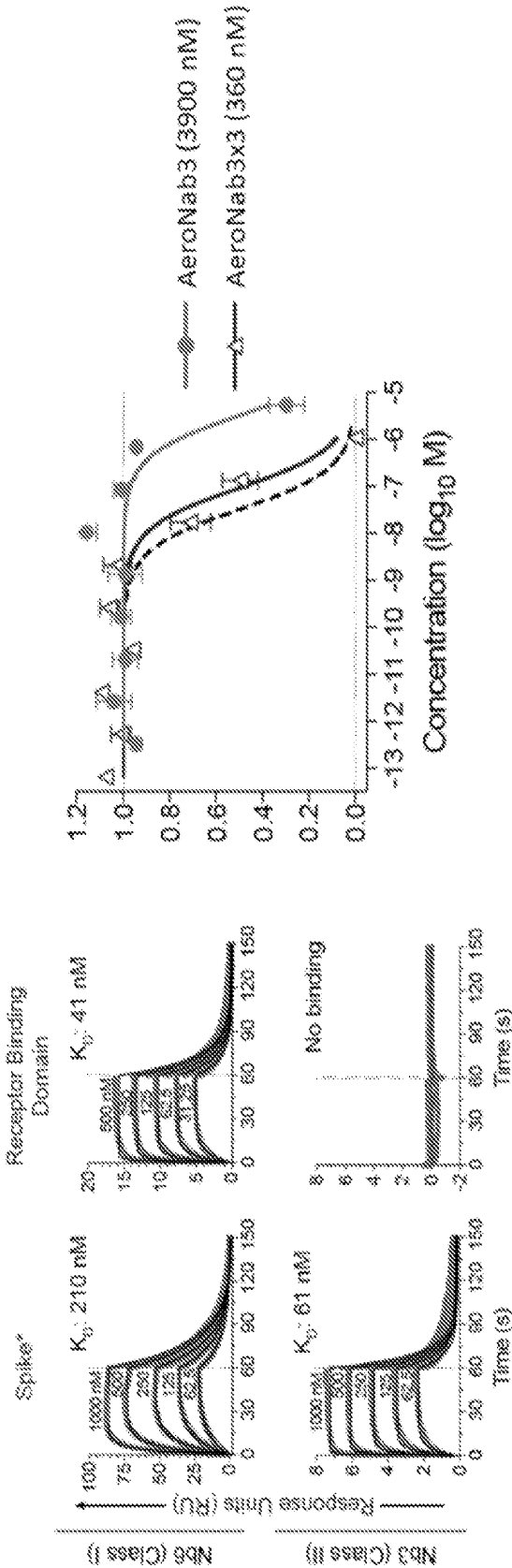


Figure 51

Group No.	No. of Animals	Infected (Y/N)	Treatment	Co-habitation schedule	Observations
1	4	Y	None	N/A	All animals euthanized on study day 4 for evaluation of lung virus titers, oropharyngeal swab titers, and lung weights. Animals weighed daily throughout the study.
2	8	N	Placebo - q.d. x 3 beginning day 1	Cohabitate with group 1 animals -- 4 hours per day (days 1-3)	
3	4	Y	None	N/A	
4	8	N	Nanoparticle A (2 mg/kg/d) - q.d. x 3 beginning day 1	Cohabitate with group 3 animals -- 4 hours per day (days 1-3)	

Figure 52

Group No.	No. of Animals	Treatment	Dose	Treatment Schedule	Observations
1	8	Nanoparticle A	2 mg/kg/d	q.d. x 5 days beginning 2 hours pre-infection	All animals euthanized on study day 4 for evaluation of lung virus titers, oropharyngeal titers, and lung weights. Animals weighed daily throughout the study.
2	8	Nanoparticle A	0.63 mg/kg/d		
3	8	Nanoparticle A	0.2 mg/kg/d		
4	8	Placebo	-		
5	5	Normal Controls	-	-	Normal controls for weight gain.

Figure 53

Group No.	Infected (Y/N)	Treatment	Virus Titer – *CCID ₅₀ /mL (Log ₁₀)							
			Hamster							
			1	2	3	4	5	6	7	8
1	Y	None	5.5	6.5	6.7	6.7	-	-	-	-
2	N	Placebo	5.0	5.0	6.3	5.5	4.5	7.3	5.5	6.7
3	Y	None	6.5	6.5	6.5	7.0	-	-	-	-
4	N	Nanoparticle A – 2 mg/kg/d	<0.7	<0.7	<0.7	3.0	4.7	2.7	4.5	3.7

*CCID₅₀ - 50% cell culture infectious dose

Figure 54

Group No.	Infected (Y/N)	Treatment	Virus Titer – *CCID ₅₀ /mL (Log ₁₀)							
			Hamster							
			1	2	3	4	5	6	7	8
1	Y	None	1.7	2.7	2.0	<0.7	-	-	-	-
2	N	Placebo	<0.7	2.0	3.5	2.7	2.0	<0.7	2.5	1.7
3	Y	None	<0.7	<0.7	2.5	<0.7	-	-	-	-
4	N	Nanoparticle A – 2 mg/kg/d	<0.7	1.7	<0.7	2.0	<0.7	<0.7	1.7	<0.7

*CCID₅₀ - 50% cell culture infectious dose

Figure 55

Treatment	Virus Titer – *CCID ₅₀ /mL (Log ₁₀)							
	Hamster							
	1	2	3	4	5	6	7	8
Placebo	6.5	6.7	6.7	7.3	6.7	6.7	6.7	6.7
Nanoparticle A – 2 mg/kg/d	5.3	4.7	4.5	4.3	4.5	6.0	5.3	6.0
Nanoparticle A – 0.63 mg/kg/d	6.7	4.3	3.0	5.3	5.3	4.7	5.7	6.0
Nanoparticle A – 0.2 mg/kg/d	7.3	6.0	4.5	7.0	5.3	7.5	6.0	7.3

*CCID₅₀ - 50% cell culture infectious dose

Figure 56

Treatment	Virus Titer – *CCID ₅₀ /mL (Log ₁₀)							
	Hamster							
	1	2	3	4	5	6	7	8
Placebo	<0.7	<0.7	2.0	<0.7	<0.7	<0.7	<0.7	<0.7
Nanoparticle A – 2 mg/kg/d	<0.7	<0.7	2.0	<0.7	<0.7	<0.7	<0.7	<0.7
Nanoparticle A – 0.63 mg/kg/d	<0.7	<0.7	2.0	2.0	<0.7	<0.7	<0.7	<0.7
Nanoparticle A – 0.2 mg/kg/d	<0.7	<0.7	1.7	1.7	<0.7	<0.7	2.0	<0.7

*CCID₅₀ - 50% cell culture infectious dose

Figure 57

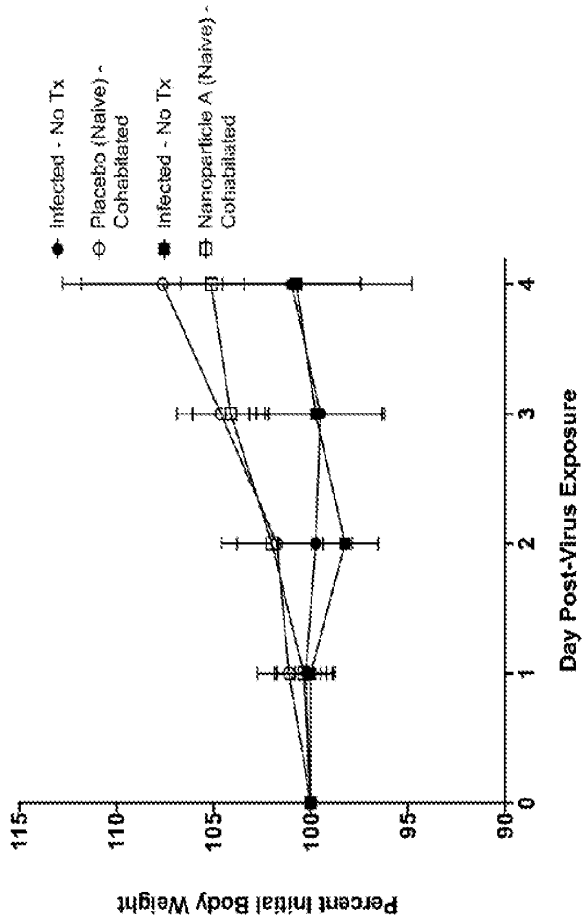


Figure 58

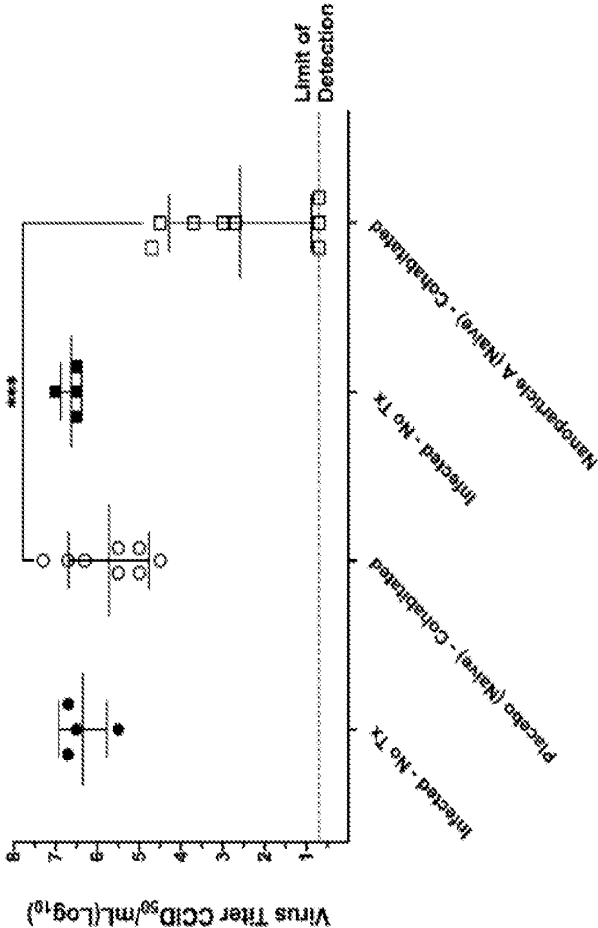


Figure 59

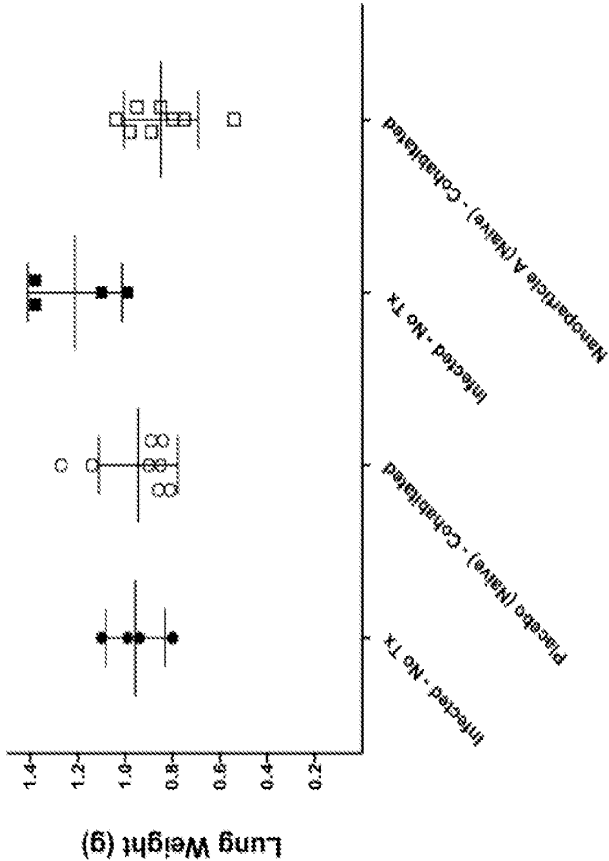


Figure 60

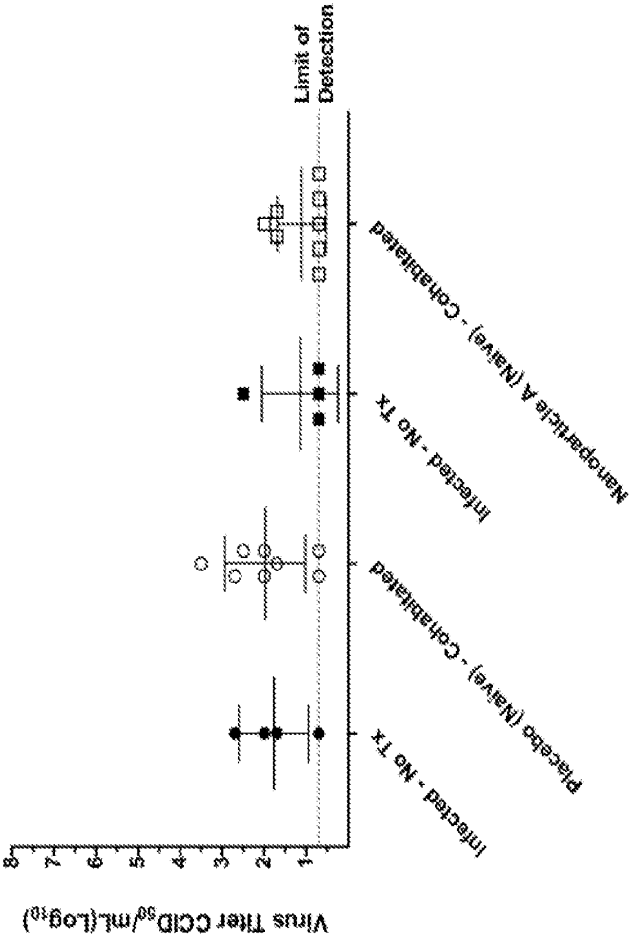


Figure 61

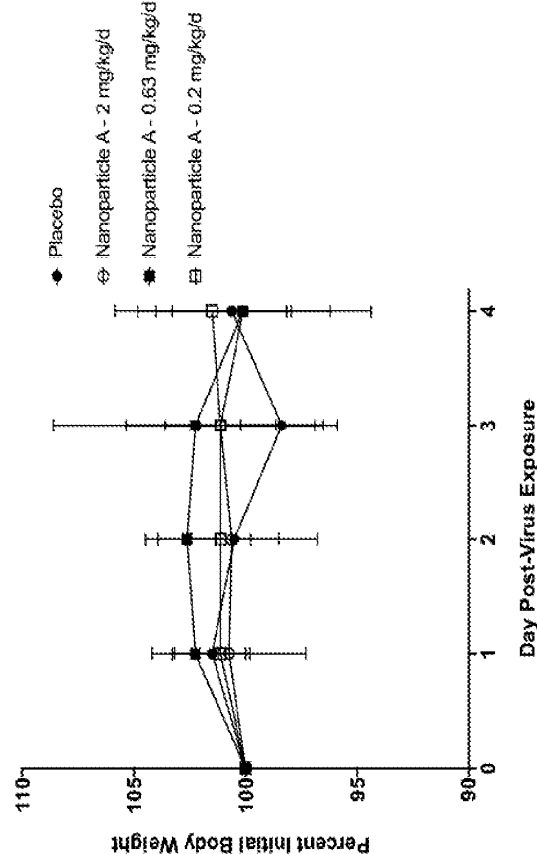


Figure 62

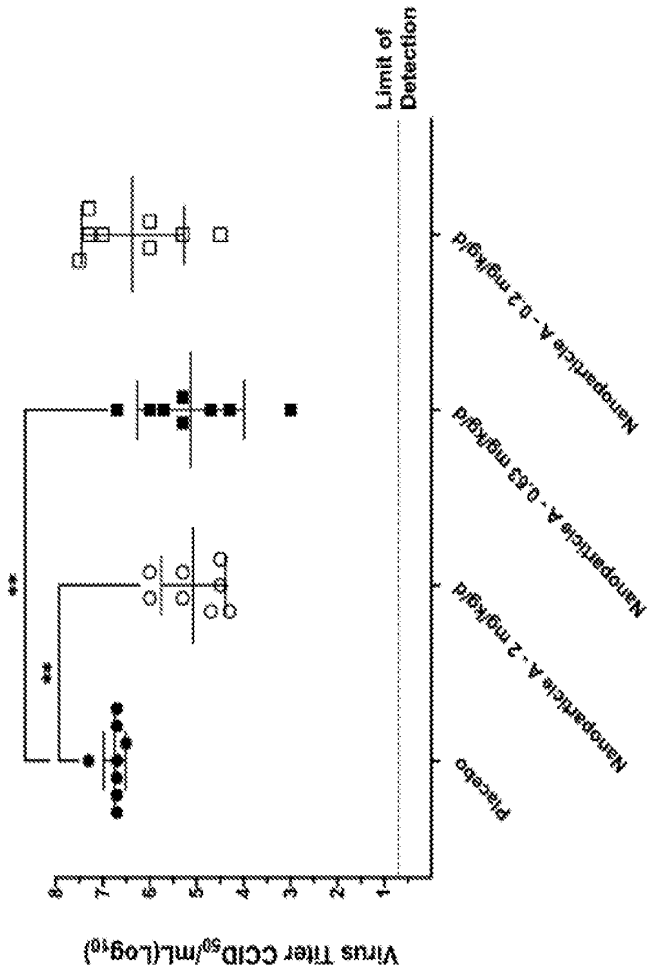


Figure 63

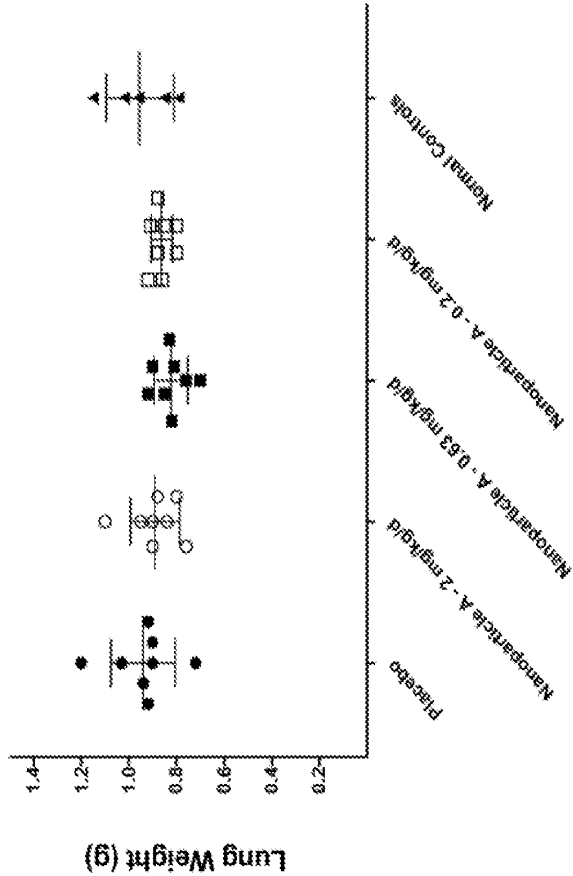


Figure 64

