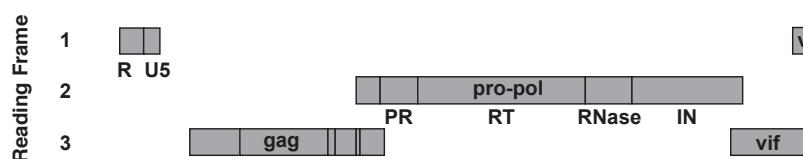
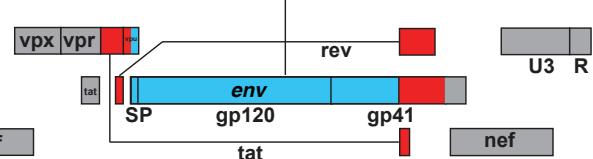
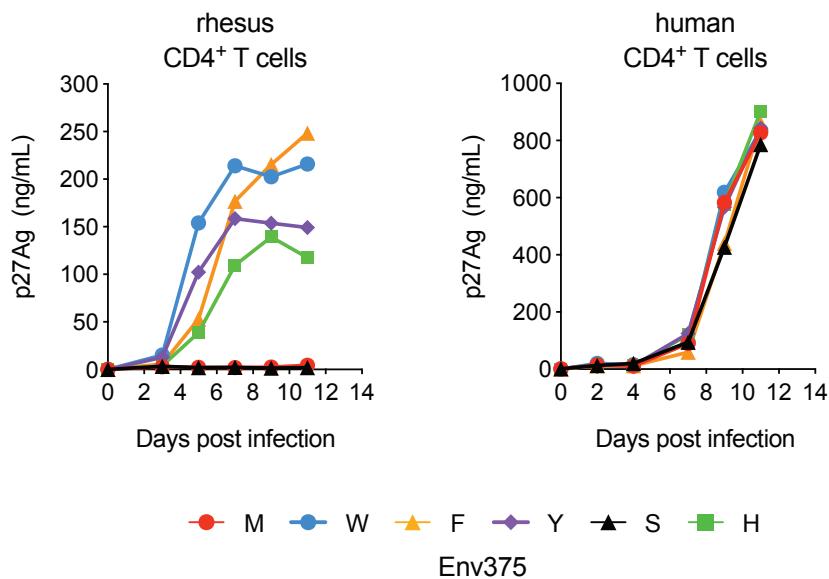


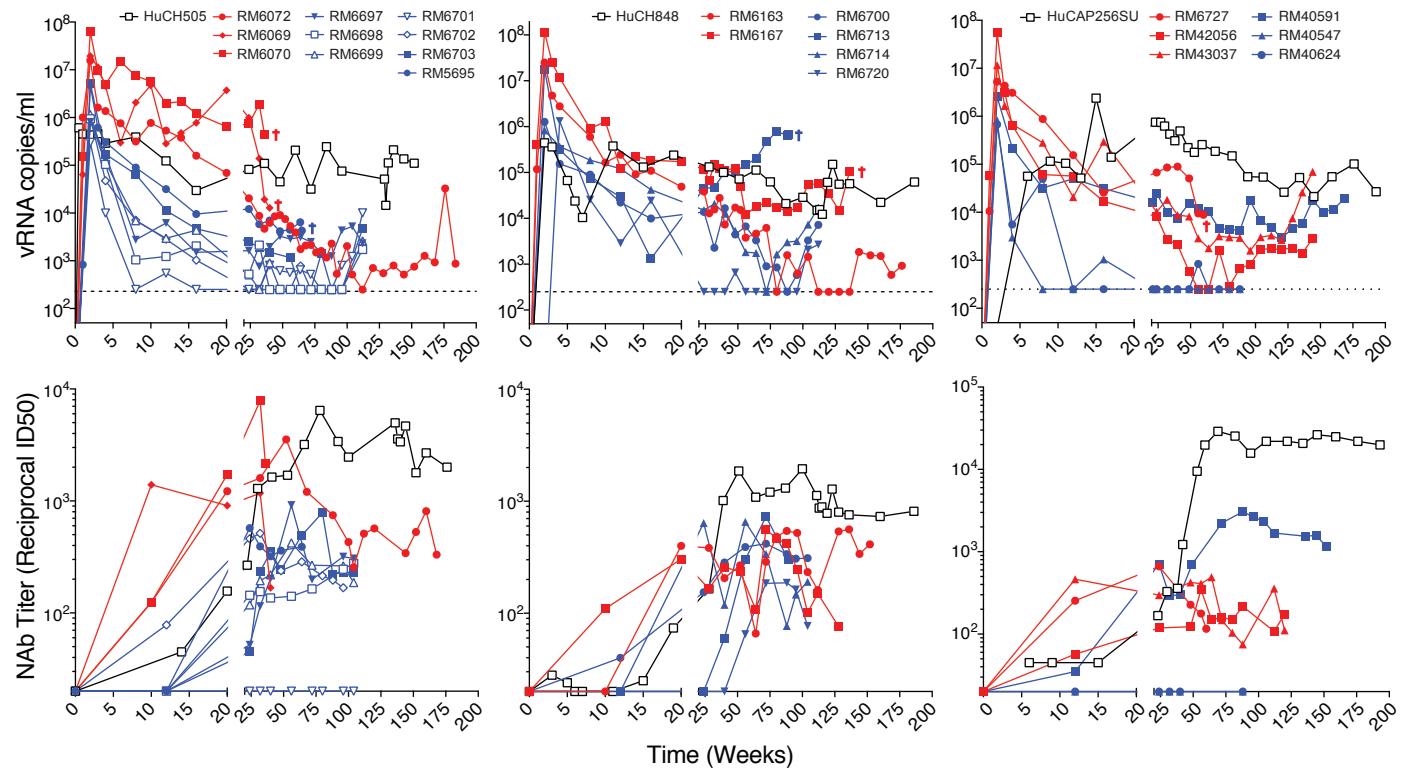
A***SHIV.CAP256SU.dCT******375 S/M/Y/H/W/F*****B****SHIV.CAP256SU Env375 variant**

	375S	375M	375Y	375H	375W	375F
PGT121	0.051	0.042	0.046	0.044	0.036	0.031
8ANC195	13.3	16.3	13.9	17.3	22.4	17.3
10E8	5.9	6.9	9.2	12.6	10.6	5.2
VRC01	0.11	0.14	0.22	0.21	0.52	0.77
PG9	0.038	0.050	0.053	0.048	0.063	0.038
PGDM1400	0.005	0.007	0.005	0.006	0.010	0.006
VRC26.25	0.0003	0.0004	0.0004	0.0006	0.0006	0.0003
447-52D	>25	>25	>25	>25	>25	>25
17b	>25	>25	>25	>25	>25	>25

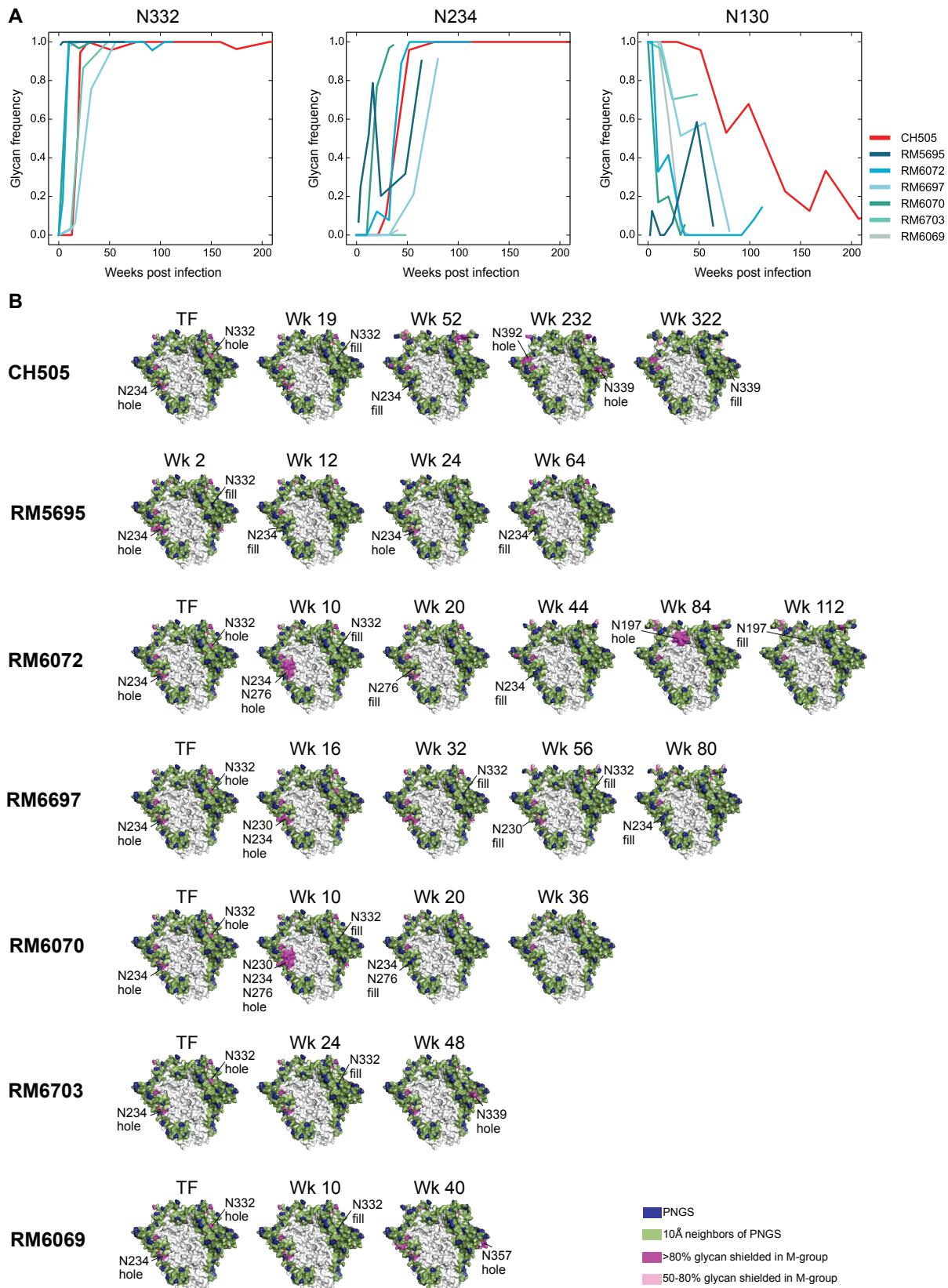
<0.1
0.1-1.0
1.0-10
10-50

IC50 ug/mL

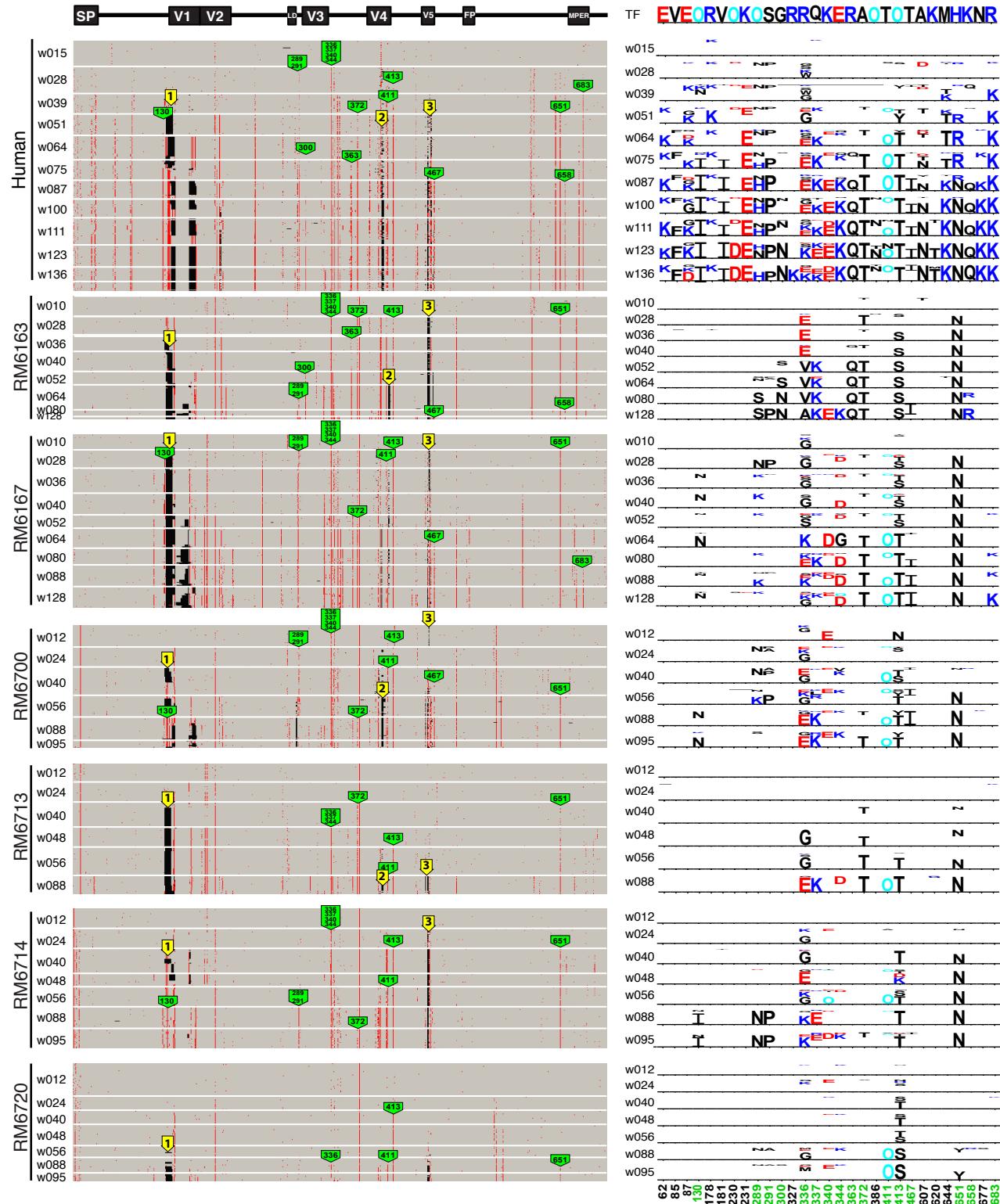
C



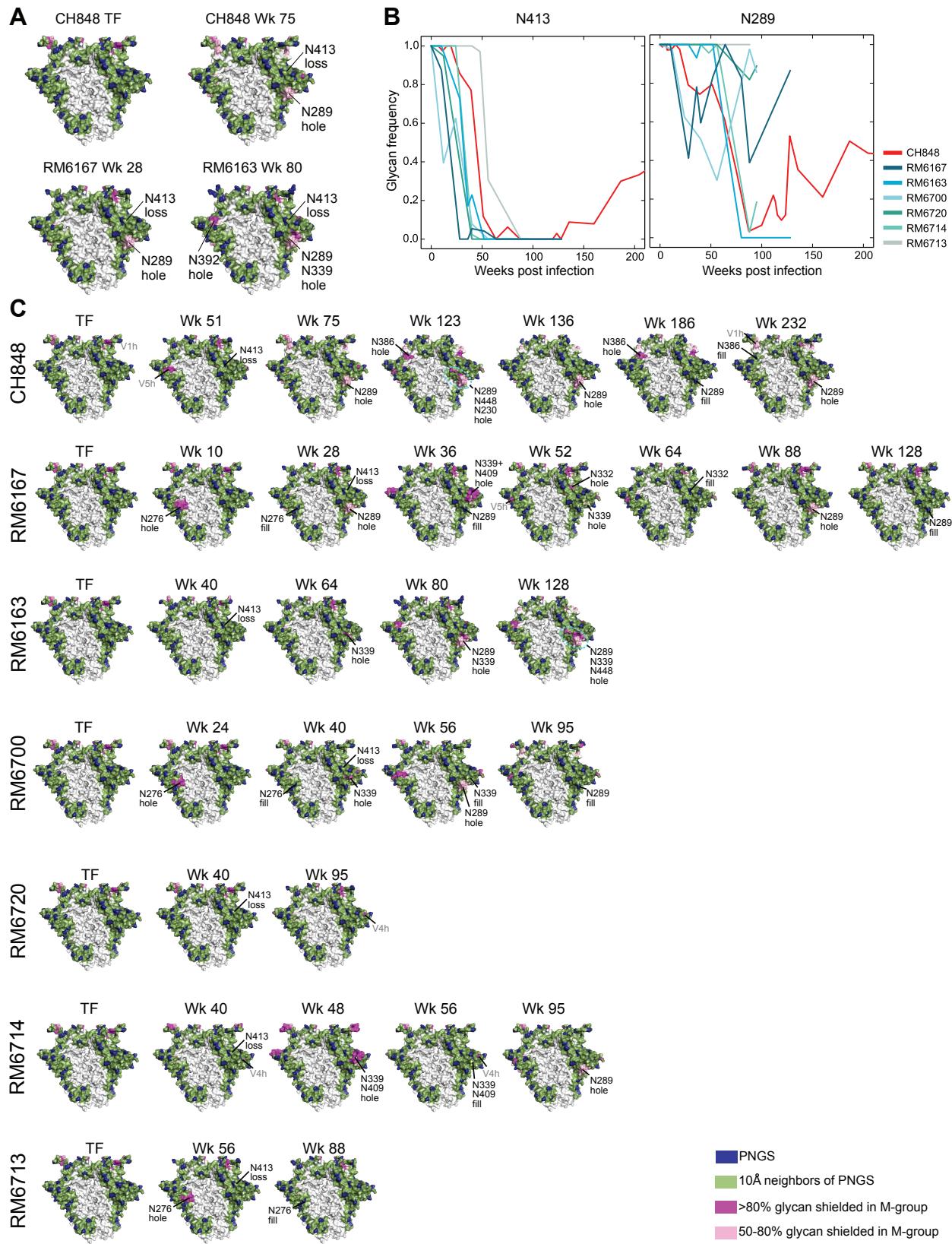
Supplemental Figure S2



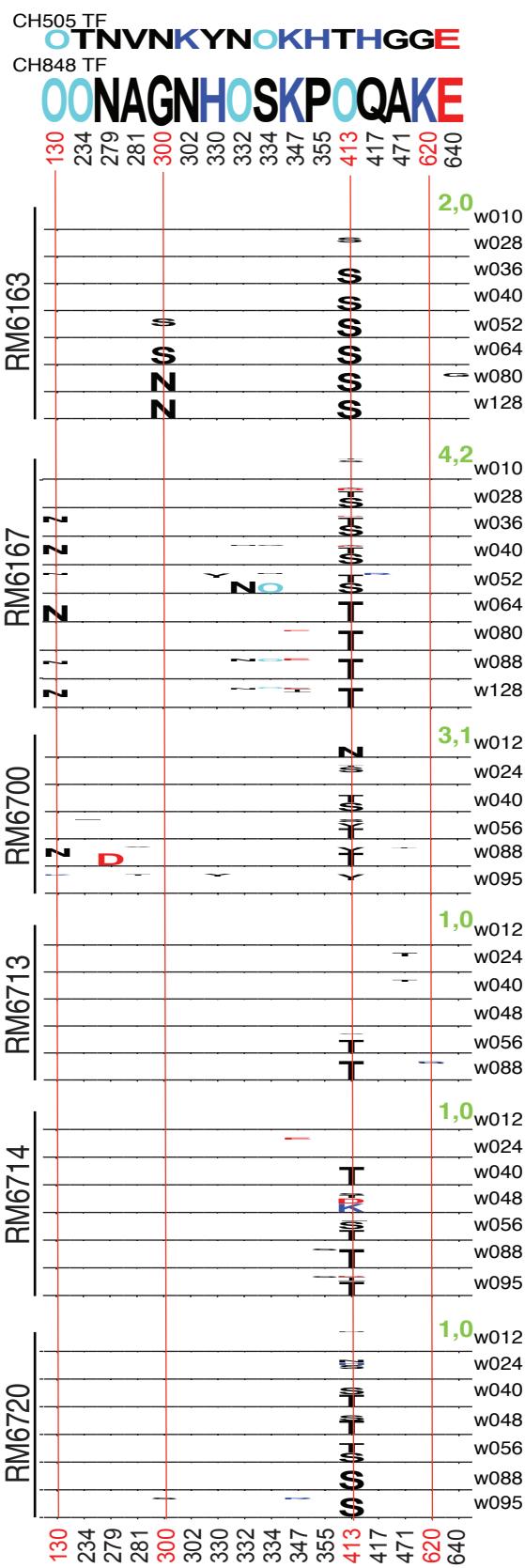
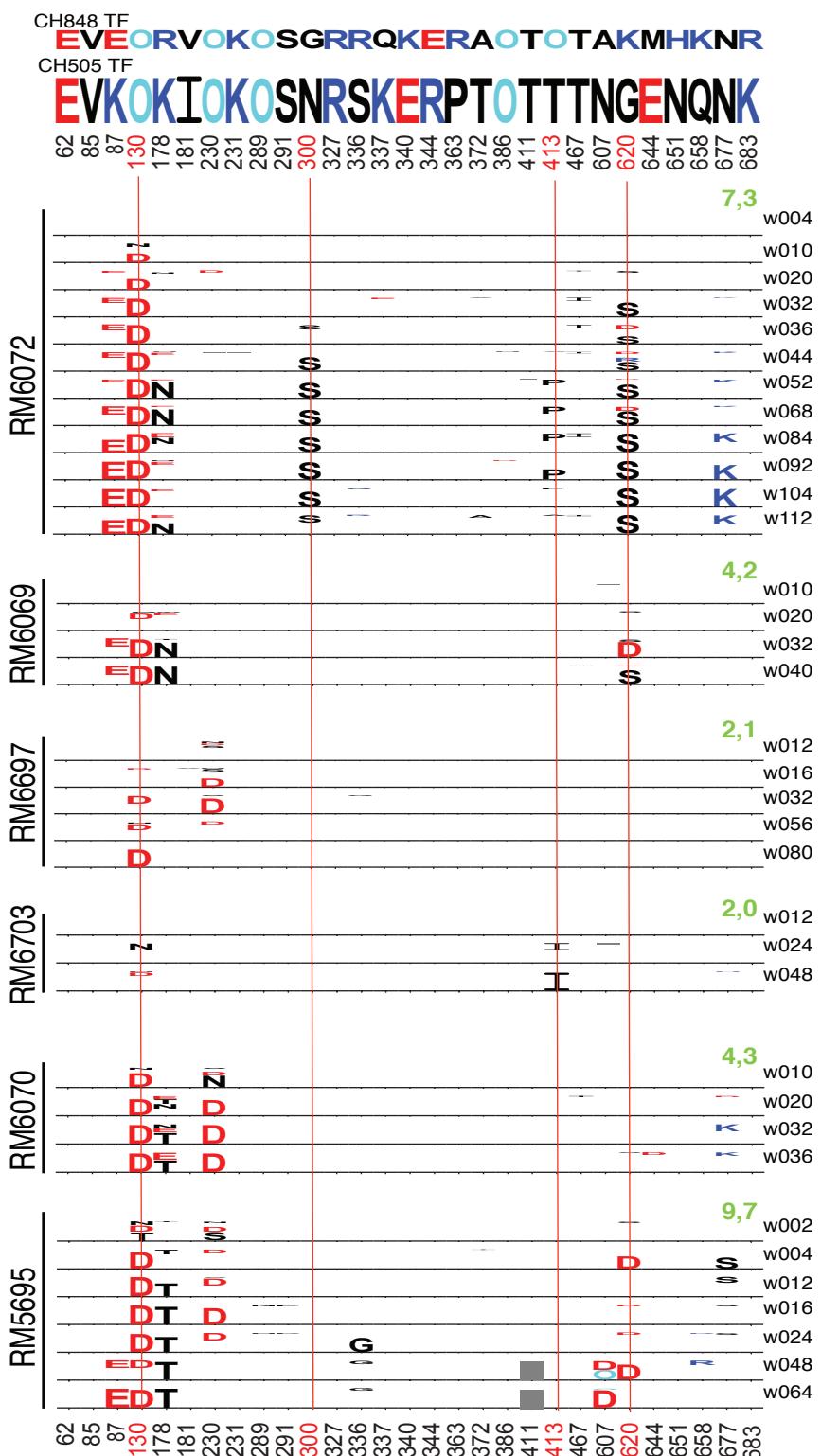
Supplemental Figure S3



Supplementary Figure S4



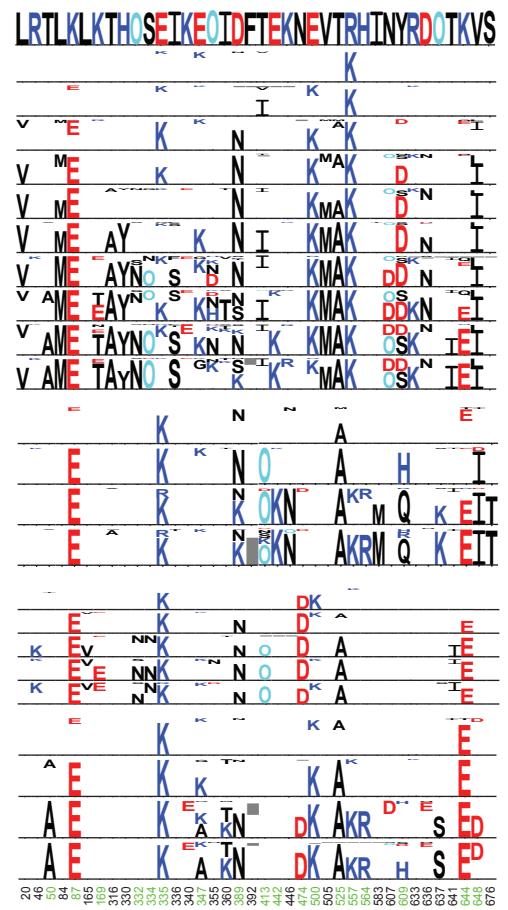
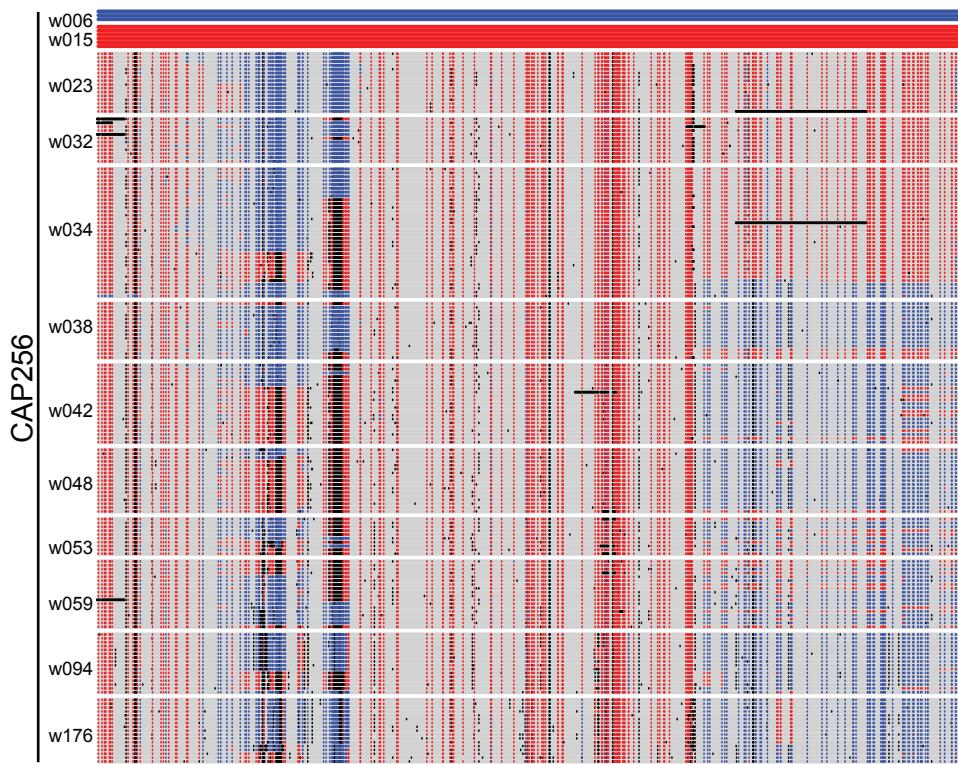
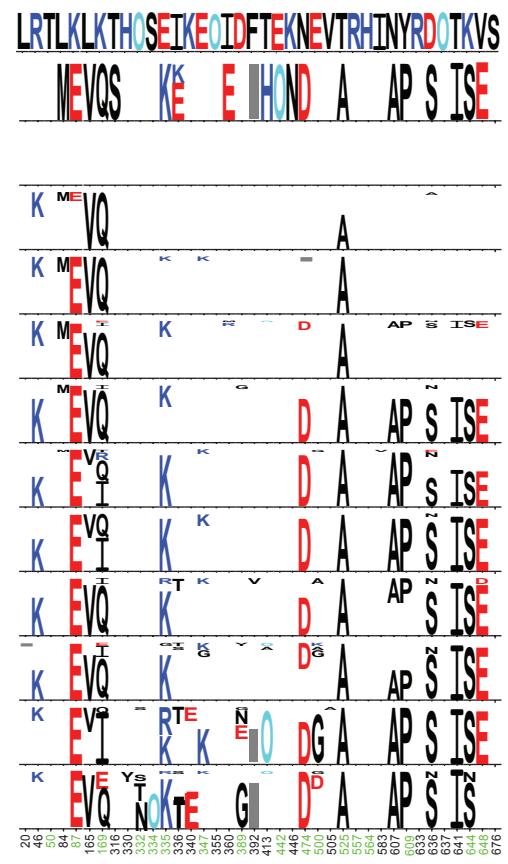
Supplemental Figure S5

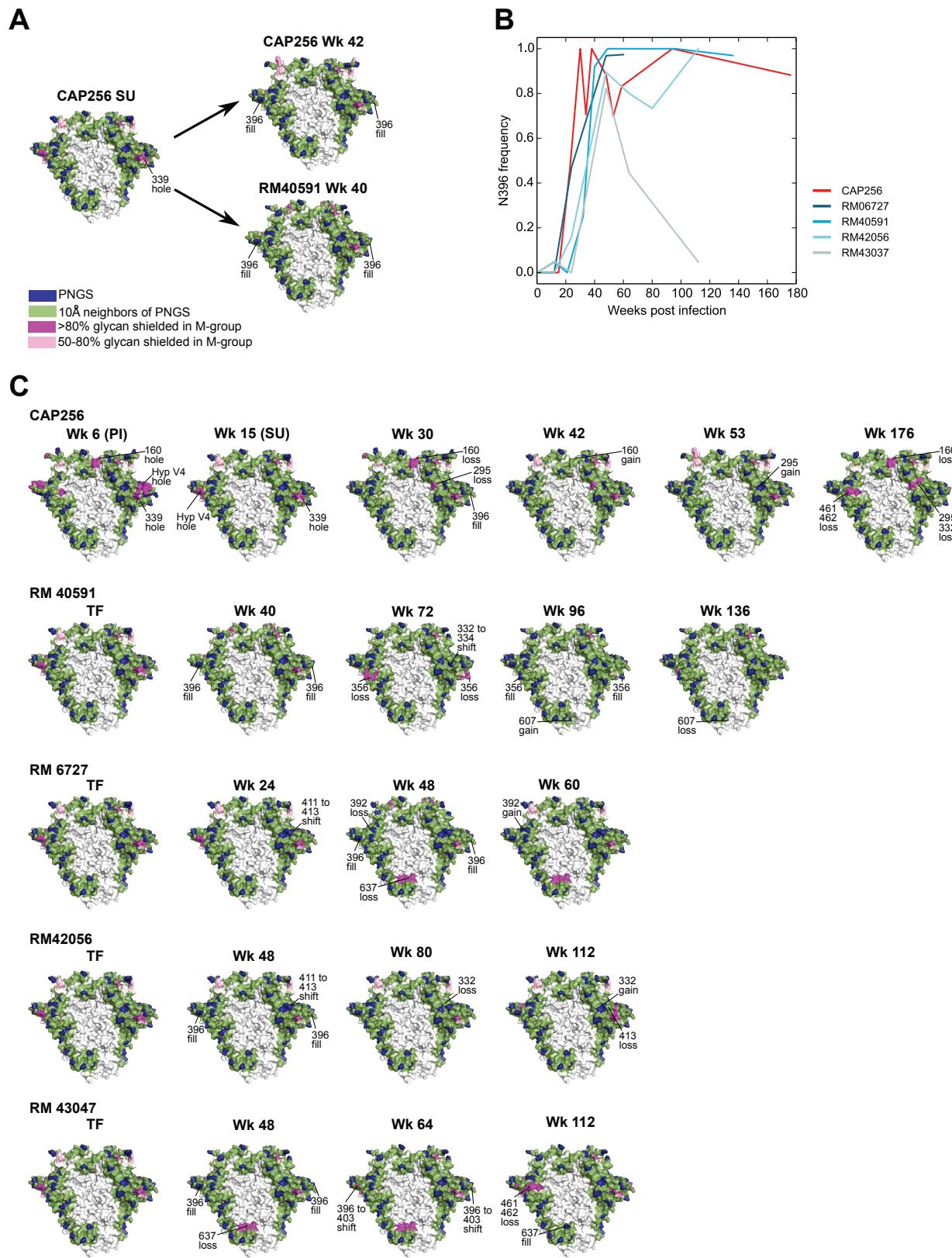
A**B**

The human CH848 sites identified by LASSIE applied to SHIV CH505 infected macaques

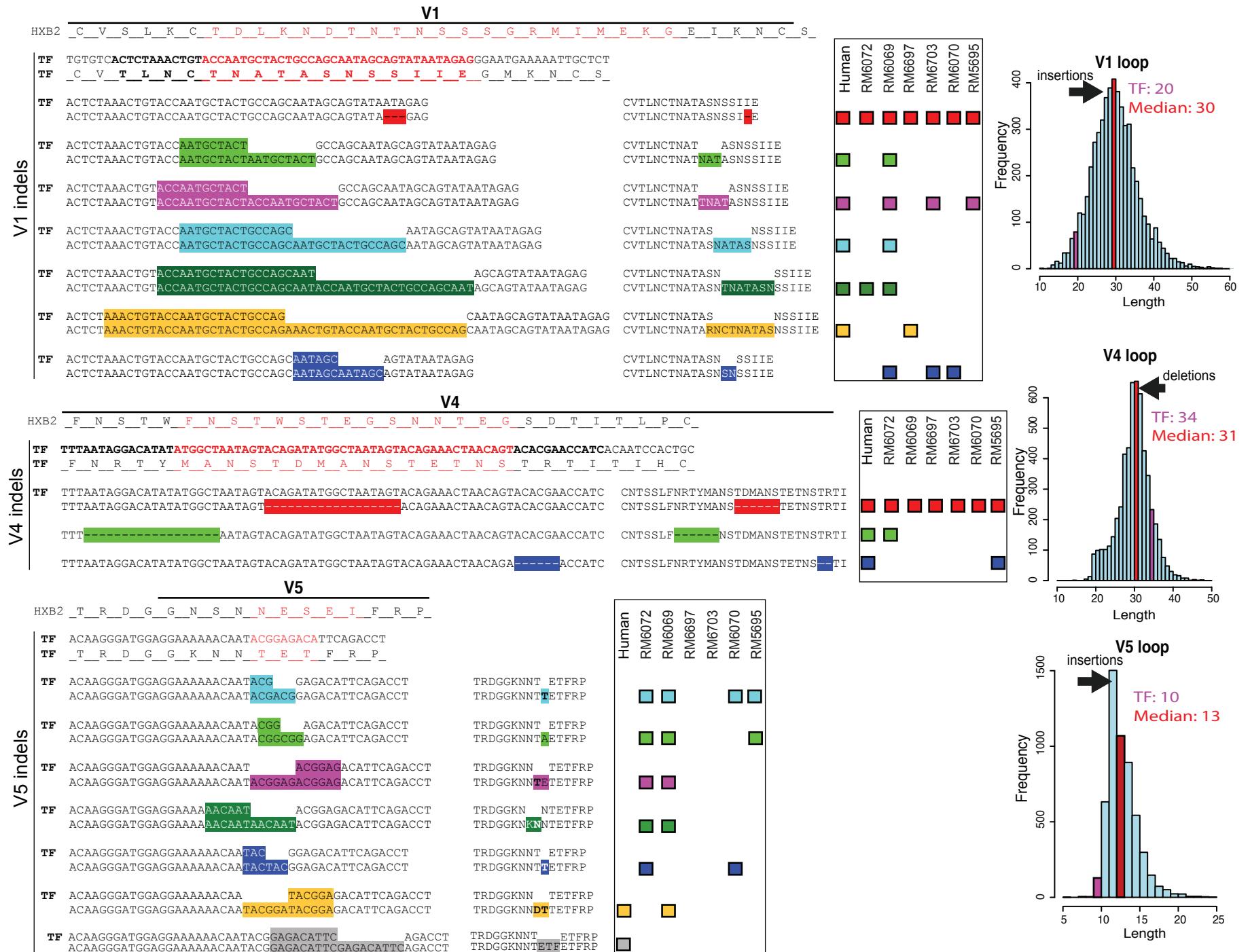
TF Loss:

Total number of sites, followed by selected sites not shared between CH848 and CH505

A**B****C****D****Supplemental Figure S7**

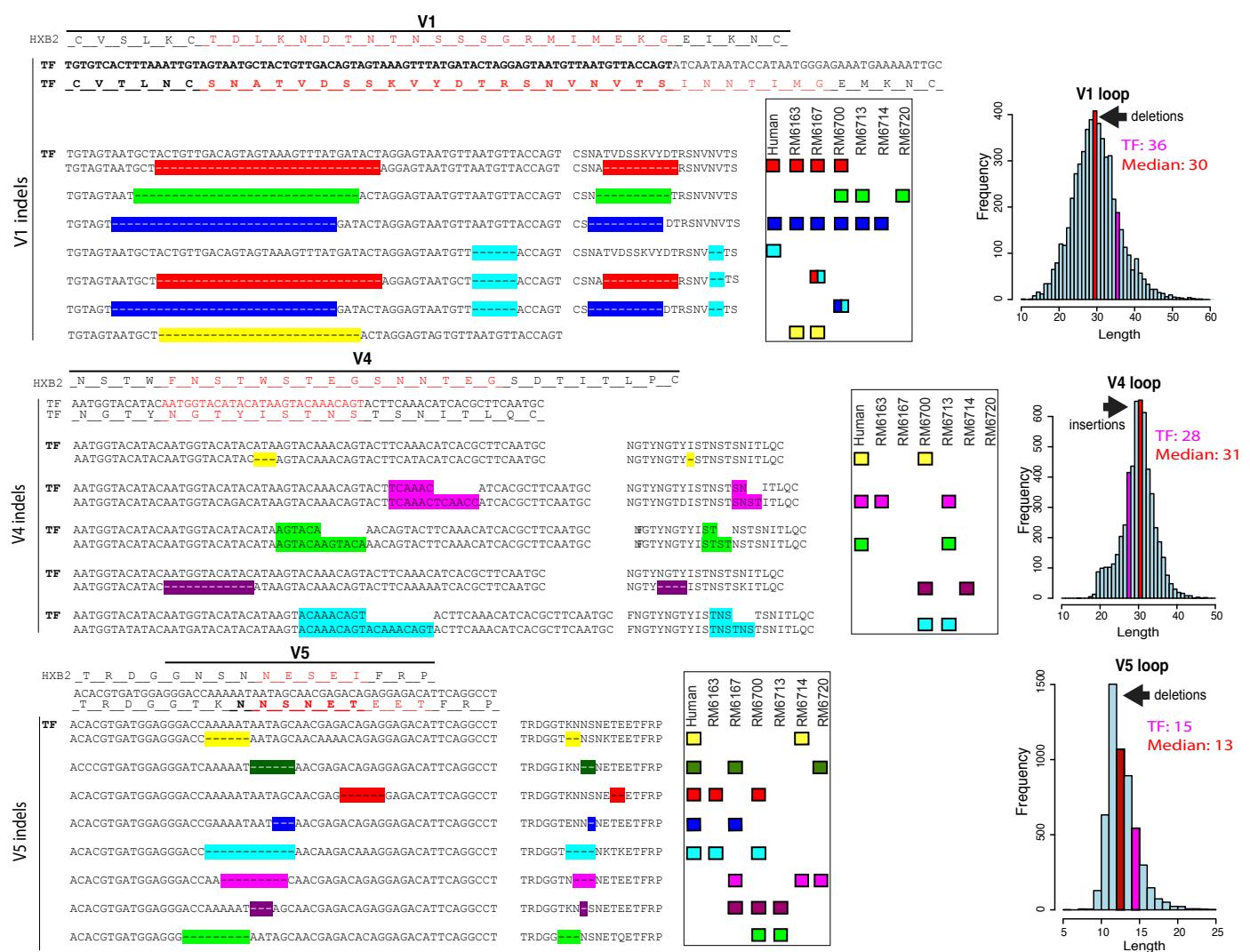


Supplemental Figure S8



Supplemental Figure S9

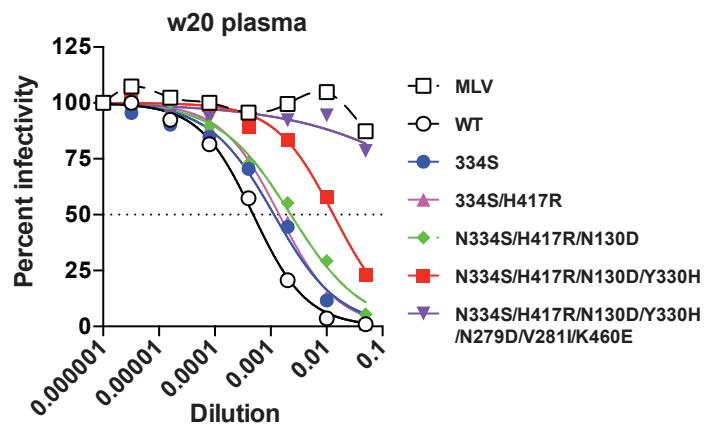
Supplemental Figure S10



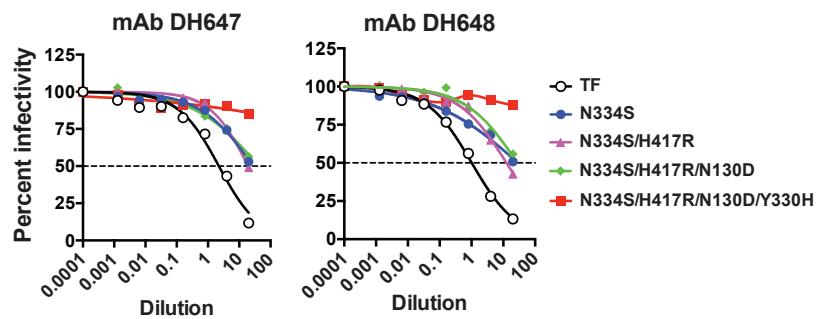
A

Virus	Mutation Location	RM6072 plasma	
		w10	w20
TF_ID50		286	2,397
TF RID50 (ID50 _{mut} /ID50 _{TF})		1	1
N130D	V1	0.3	0.6
T234N	C2	0.3	1.2
N279D	Loop-D	<0.1	0.7
V281I	Loop-D	<0.1	0.7
K302N	V3	224.3	51.9
Y330H	V3	0.7	1.5
N334S	V3C3	0.2	0.4
H417R	V4	1.1	1.2
K460E	V5	<0.1	1.8

>3 fold resistant | >3 fold sensitive

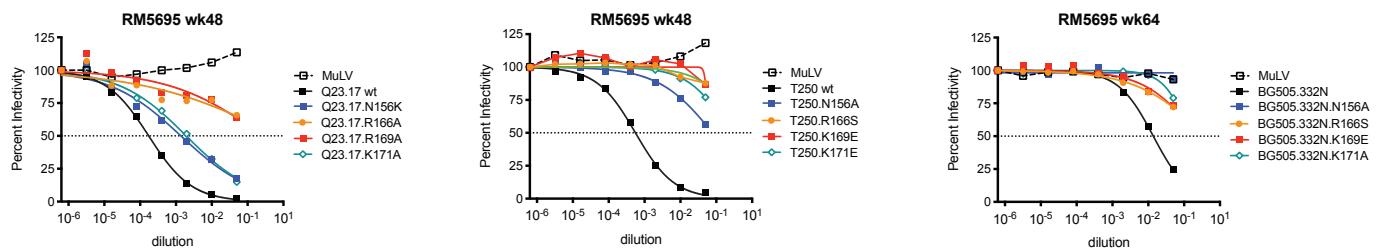
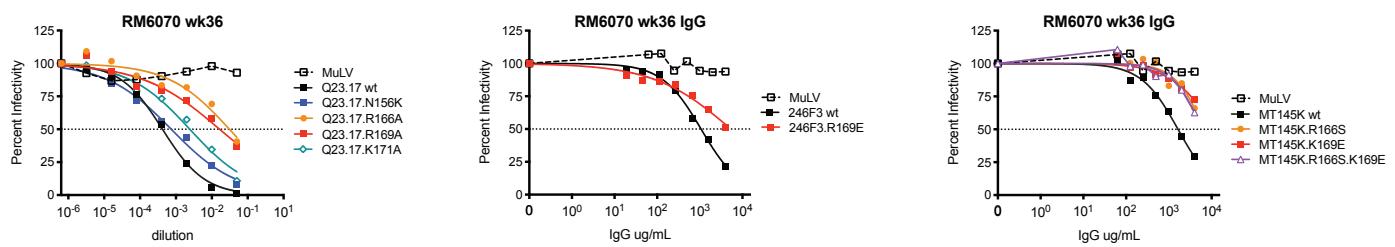
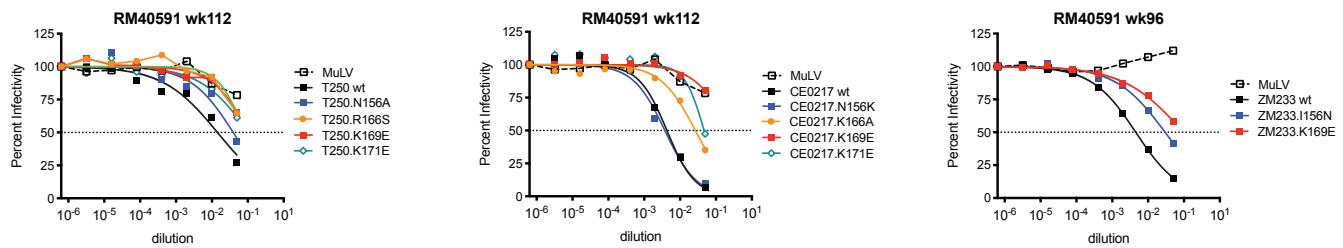
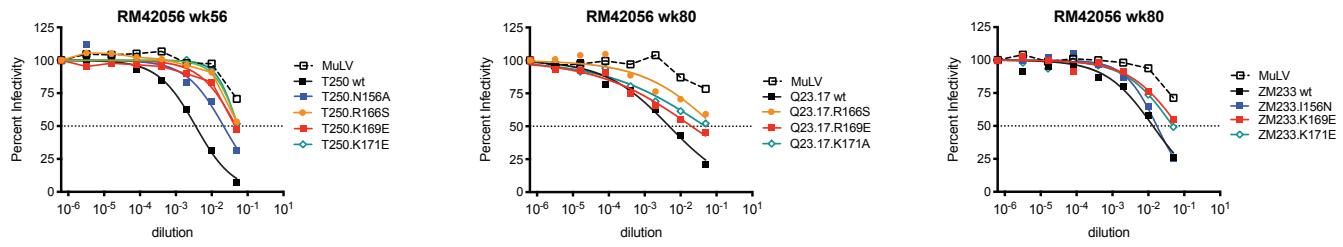
**B**

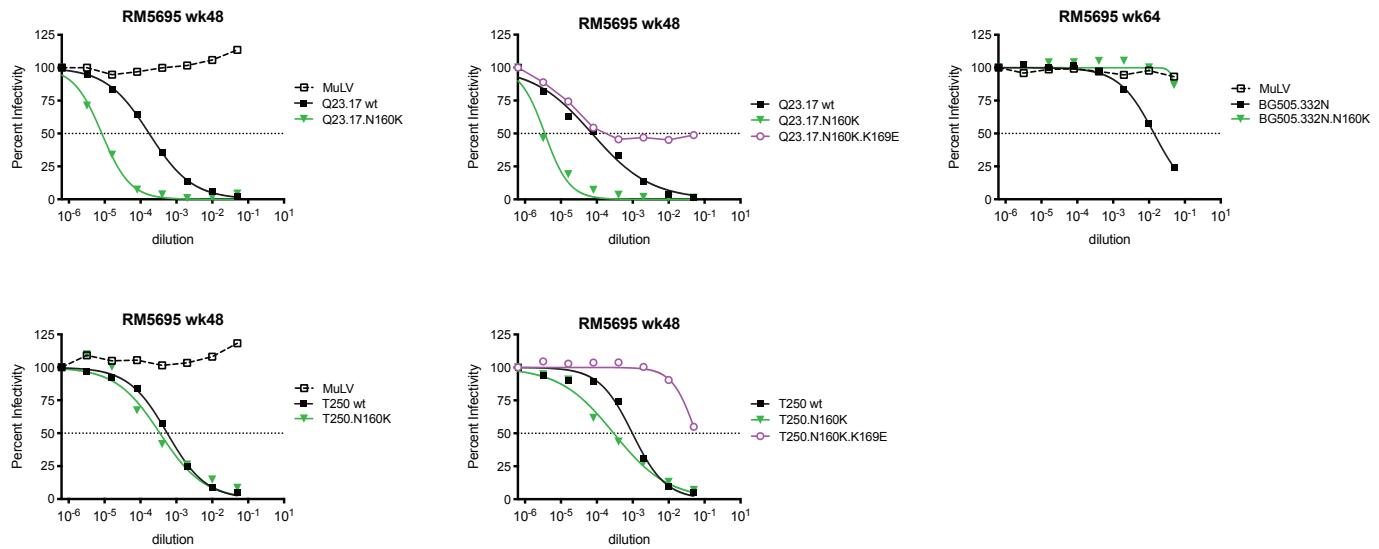
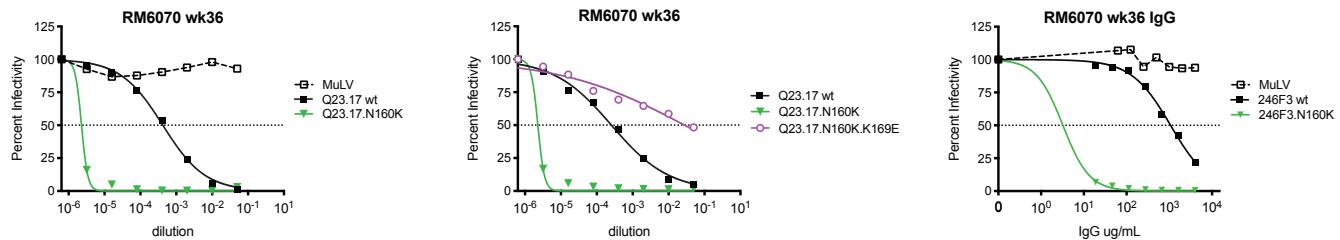
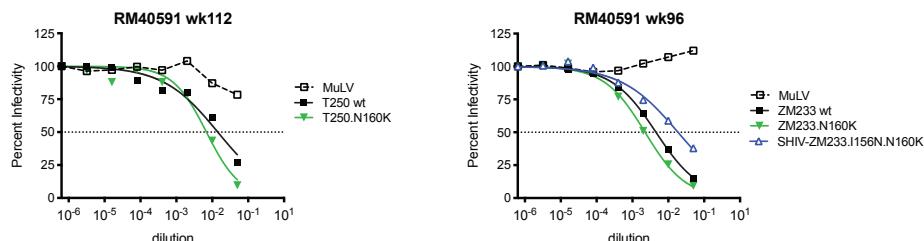
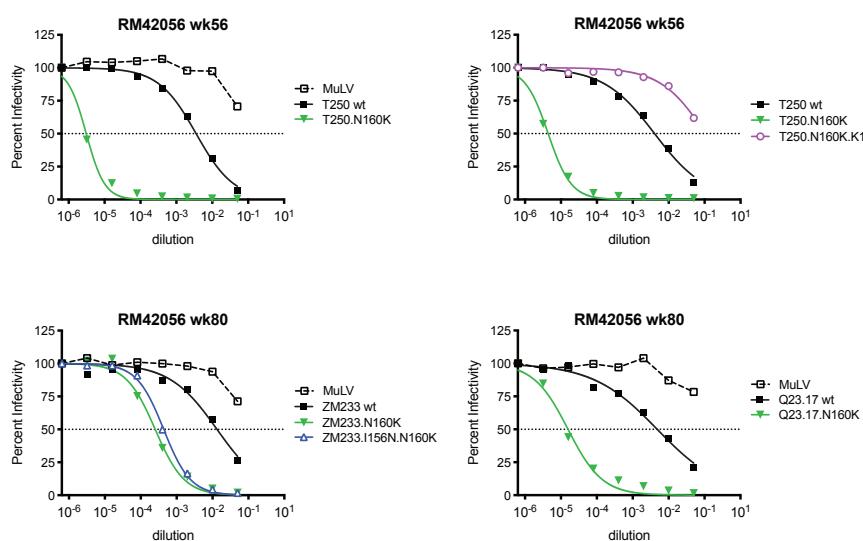
Virus	Mutation Location	RM6072 V3 mAbs	
		DH647	DH648
TF IC ₅₀ (ug/ml)		2.2	1.0
N130D	V1	3.3	0.9
K302N	V3	15.5	>20
Y330H	V3	2.5	1.8
N334S	V3C3	>20	>20
H417R	V4	2.0	2.0

**C**

Virus	Mutation Location	RM6072 CD4bs mAbs		Human CH505 CD4bs mAbs		
		DH650.UCA	DH650	CH235.UCA	CH235.IA3	CH235.9
TF IC ₅₀ (ug/ml)		>20	2.2	>20	3.6	0.4
T234N	C2	>20	>20	>20	>20	0.6
N279D	Loop-D	>20	>20	>20	>20	0.4
V281I	Loop-D	>20	3.5	>20	5.6	0.2
K460E	V5	>20	>20	>20	13.2	1.3

Supplemental Figure S11

A**B****C****D****Supplemental Figure S12**

A**B****C****D****Supplemental Figure S13**

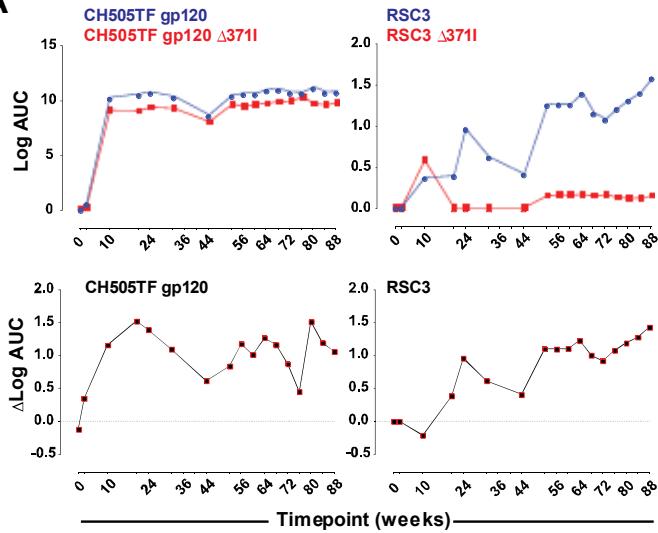
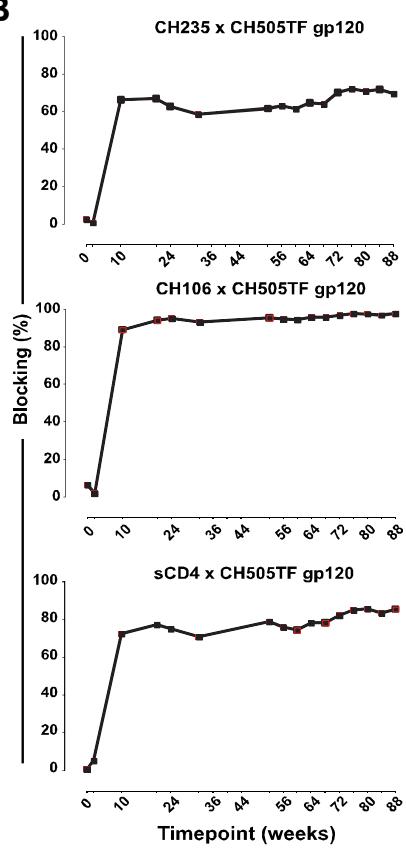
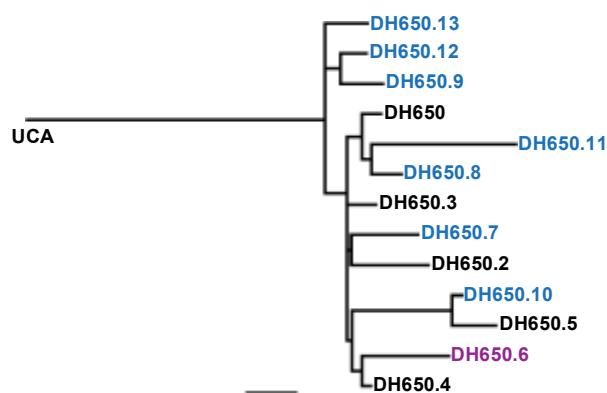
A Autologous NAb responses to wildtype and V1 deleted variants of CH848 TF in SHIV CH848 infected RM plasma

Animal ID	Plasma timepoint	CH848	CH848	CH848	w36con
		TF	R336G	TFdV1 (V1Δ10aa)	(V1Δ10aa+ Mut)
RM6167	w10	220	72	130	<20
	w36	435	ND	948	28

B

Epitope mapping of autologous, strain-specific neutralizing mAbs from RM6163

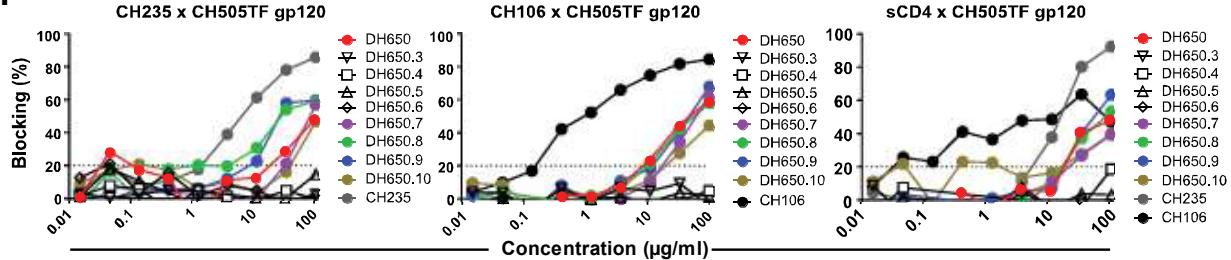
Animal ID	Antibody ID	CH848				IC50, µg/mL
		CH848	TF	TFdV1 (Δ10aa)	CH848	
RM6163	DH898.1	2.84		11.49	3.19	>50
	DH898.2	6.57		27.38	8.56	>50
	DH898.3	3.69		16.35	5.93	>50
	DH898.4	0.64		3.29	0.86	>50
	DH898.5	2.83		12.18	5.40	>50
	DH898.6	3.12		21.67	5.74	>50

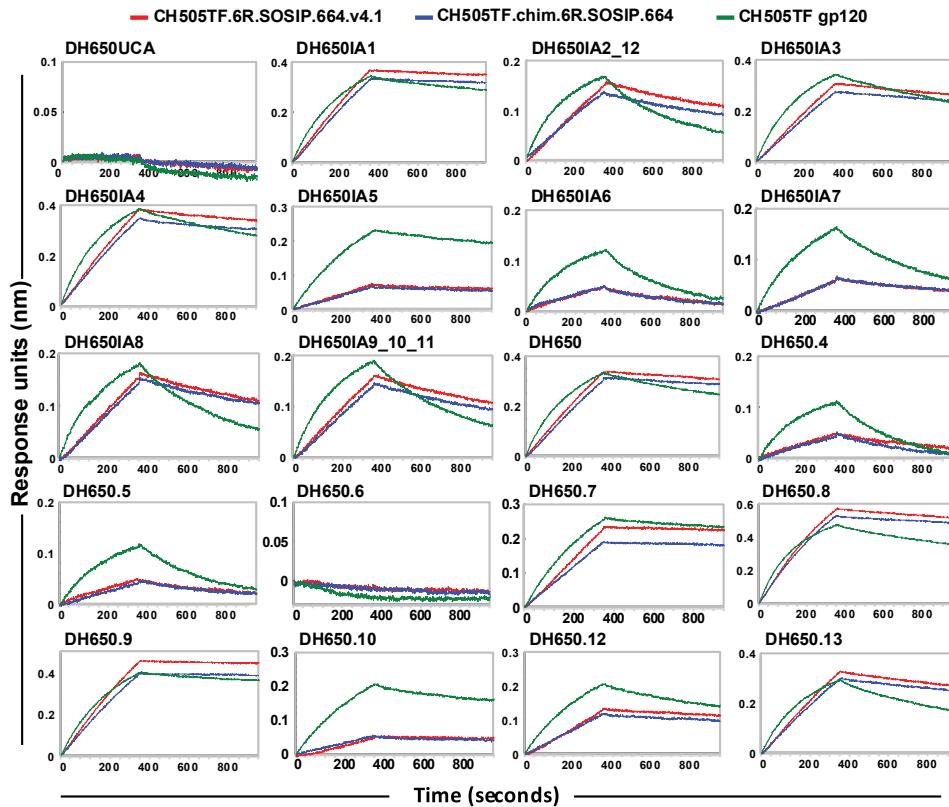
A**B****C****D**

mAb ID	Heavy chain (IGHV)			Light chain (IGKV)			
	IGHV	IGHJ	CDR3 length (aa)	Mut. Freq. (%. nn)	IGKV	CDR3 length (aa)	Mut. Freq. (%. nn)
DH650	IGHV1-H	IGHJ4-1	14	4.9%	IGKV2-S17	9	3.2%
DH650.1	IGHV1-H	IGHJ4-1	14	4.9%	Unrecovered gene sequence		
DH650.2	IGHV1-H	IGHJ4-1	14	6.2%	IGKV2-S17	9	4.3%
DH650.3	IGHV1-H	IGHJ4-1	14	4.9%	IGKV2-S17	9	4.3%
DH650.4	IGHV1-H	IGHJ4-1	14	4.5%	IGKV2-S17	9	2.8%
DH650.5	IGHV1-H	IGHJ4-1	14	8.7%	IGKV2-S17	9	3.9%
DH650.6	IGHV1-H	IGHJ4-1	14	4.9%	IGKV2-S17	9	5.3%
DH650.7	IGHV1-H	IGHJ4-1	14	6.9%	IGKV2-S17	9	3.9%
DH650.8	IGHV1-H	IGHJ4-1	14	4.9%	IGKV2-S17	9	4.6%
DH650.9	IGHV1-H	IGHJ4-1	14	6.2%	IGKV2-S17	9	2.5%
DH650.10	IGHV1-H	IGHJ4-1	14	8.3%	IGKV2-S17	9	3.2%
DH650.11	IGHV1-H	IGHJ4-1	14	6.2%	IGKV2-S17	9	5.2%
DH650.12	IGHV1-H	IGHJ4-1	14	5.6%	IGKV2-S17	9	3.5%
DH650.13	IGHV1-H	IGHJ4-1	14	5.6%	IGKV2-S17	9	3.2%
DH650.14	IGHV1-H	IGHJ4-1	14	8.0%	Unrecovered gene sequence		

E

Antibody ID	CH505TF gp120 binding titer; EC50 (μ g/ml)	
	WT	Δ 371I
DH650	0.09	22.66
DH650.3	1.94	No binding
DH650.4	1.09	No binding
DH650.5	2.02	No binding
DH650.6	No binding	No binding
DH650.7	0.22	8.72
DH650.8	0.10	7.52
DH650.9	0.16	24.05
DH650.10	0.44	No binding
CH235	0.05	No binding
CH106	0.03	No binding

F**Supplemental Figure S15**

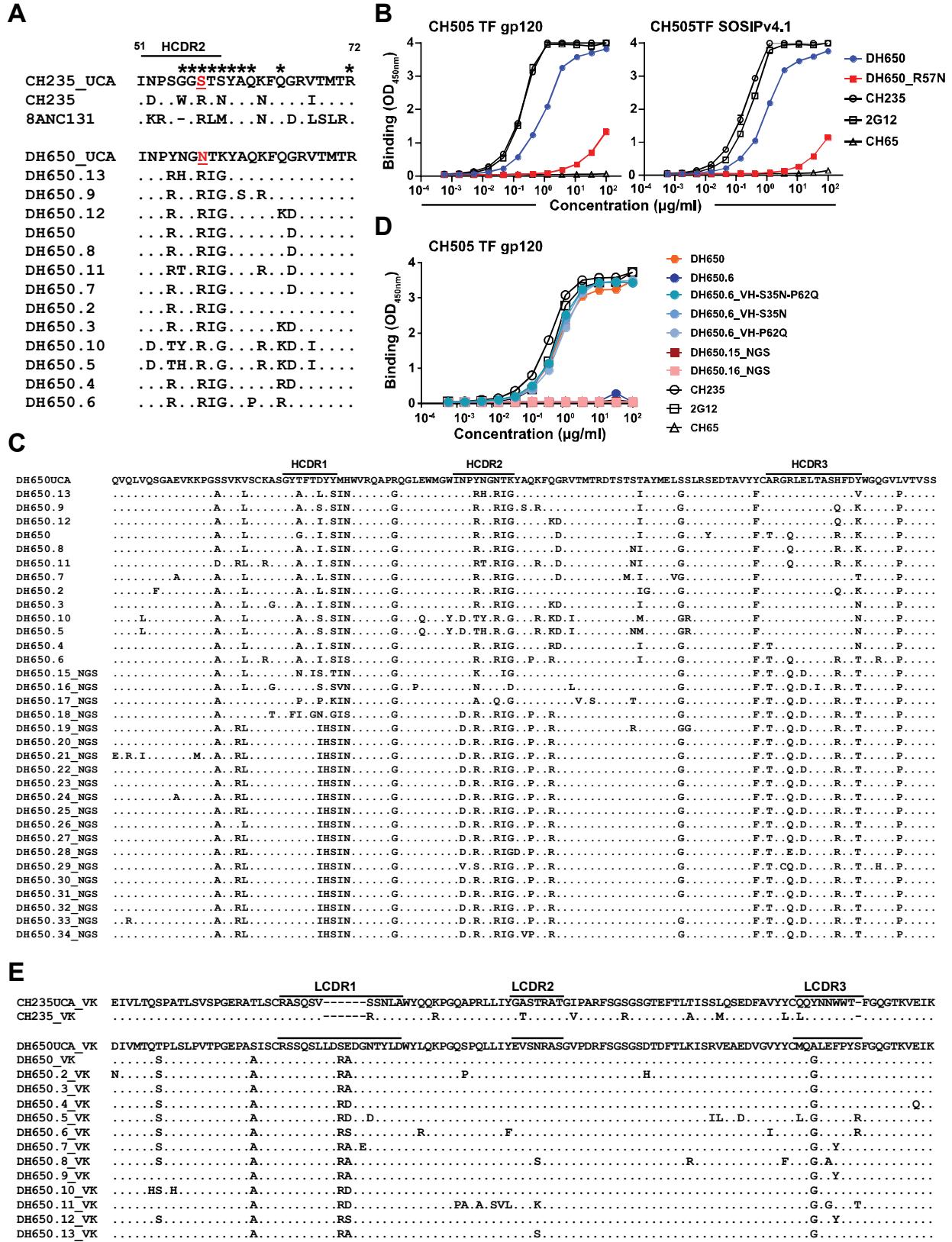
A**B**

IC50, µg/mL	>50	10-50	1-10	0.1-1	<0.1
Antibody ID	TF	TF gly4	MuLV		
DH650UCA	>50	>50	>50		
DH650IA1	3.8	<0.02	>50		
DH650IA2_12	>50	0.06	>50		
DH650IA3	4.2	<0.02	>50		
DH650IA4	4.6	<0.02	>50		
DH650IA5	11.4	<0.02	>50		
DH650IA6	>50	<0.02	>50		
DH650IA7	>50	<0.02	>50		
DH650IA8	20.0	<0.02	>50		
DH650IA9_10_11	20.0	0.03	>50		
DH650	2.6	<0.02	>50		
DH650.2	10.0	<0.02	>50		
DH650.3	>50	0.4	>50		
DH650.4	>50	<0.02	>50		
DH650.5	>50	0.06	>50		
DH650.6	>50	>50	>50		
DH650.7	3.3	<0.02	>50		
DH650.8	2.0	<0.02	>50		
DH650.9	3.8	<0.02	>50		
DH650.10	10.3	<0.02	>50		
DH650.12	9.6	<0.02	>50		
DH650.13	8.3	<0.02	>50		

C

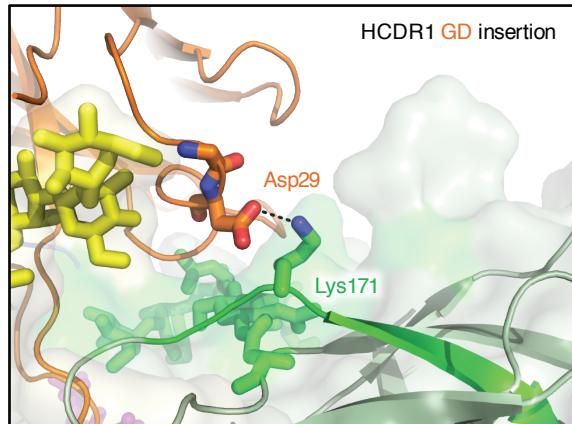
Antibody ID	IC50, µg/mL	>50	10-50	1-10	0.1-1	<0.1	
Antibody ID	HIV-1 isolate/ Tier phenotype/ IC50, µg/mL						
	CH505 TF	JRFL	Q168	Q842	BG1168	SF162	MuLV
	2	2	2	2	1	1	n/a
DH650	9.6	>50	>50	>50	>50	>50	>50
DH650.3	>50	>50	>50	>50	>50	>50	>50
DH650.4	>50	>50	>50	>50	>50	>50	>50
DH650.5	>50	>50	>50	>50	>50	>50	>50
DH650.6	>50	>50	>50	>50	>50	>50	>50
DH650.7	5.0	>50	>50	>50	>50	>50	>50
DH650.8	4.5	>50	>50	>50	>50	>50	>50
DH650.9	4.4	>50	>50	>50	>50	>50	>50
DH650.10	23.7	>50	>50	>50	>50	>50	>50
CH235	0.58	1.7	>50	3.9	>50	>50	>50

Supplemental Figure S16



Supplemental Figure S17

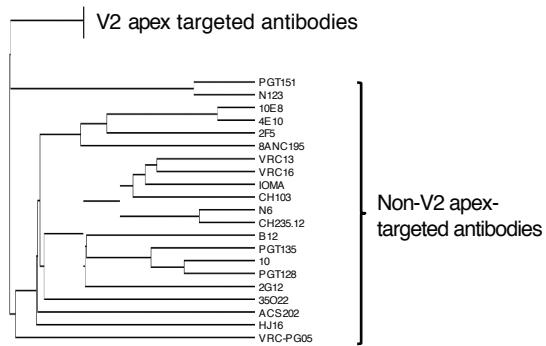
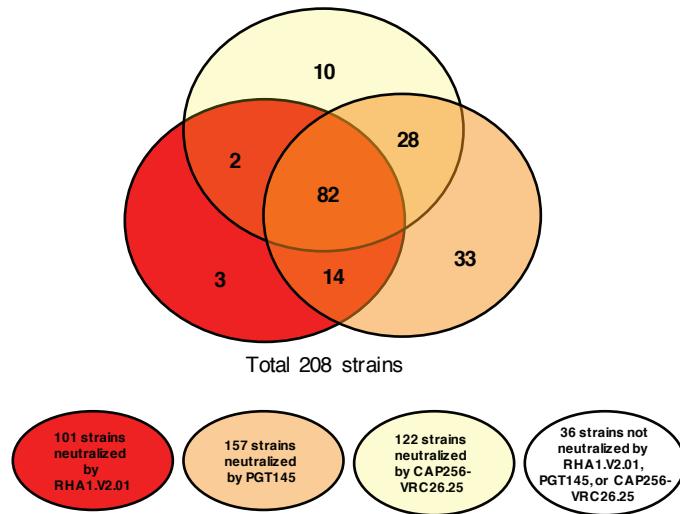
A**B****Supplemental Figure S18**

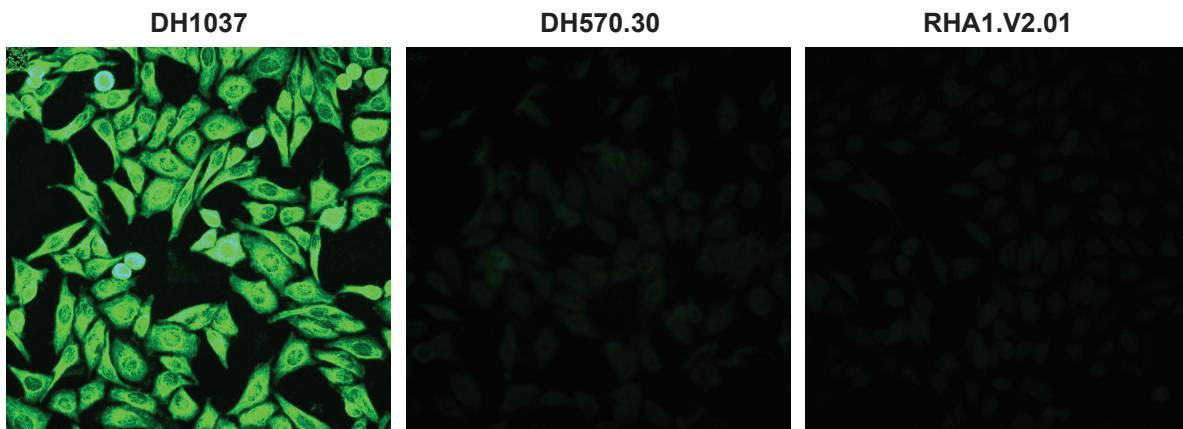
A**B**

VH4-ABB*01	<u>CAR</u>	-----
DH3-9	-----YYEDDYGYYYT-----	
JH2-P	-----WYFDLW	
RHA1.V2.01	<u>CAR</u> KGEDFYEDDYGQYFTAGWFFDLW	
RHA1.V2.02	<u>CAR</u> KGEDFYEDDYGQYFTAGWYFDLW	
RHA1.V2.03	<u>CAR</u> KGEDFYEDDYGQYFTAGWYFDLW	
RHA1.V2.04	<u>CAR</u> KGEDFYEDDYGQYFTAGWFFDLW	
VH4-ABB*01	<u>CAR</u>	-----
DH3-9	-----YYEDDYGYYT-----	
JH2-P	-----WYFDLW	
RHA1.V2.01	<u>C</u> KGEDF.....Q.F.AG.F....	
RHA1.V2.02	<u>C</u> KGEDF.....Q.F.AG.....	
RHA1.V2.03	<u>C</u> KGEDF.....Q.F.AG.....	
RHA1.V2.04	<u>C</u> KGEDF.....Q.F.AG.....	

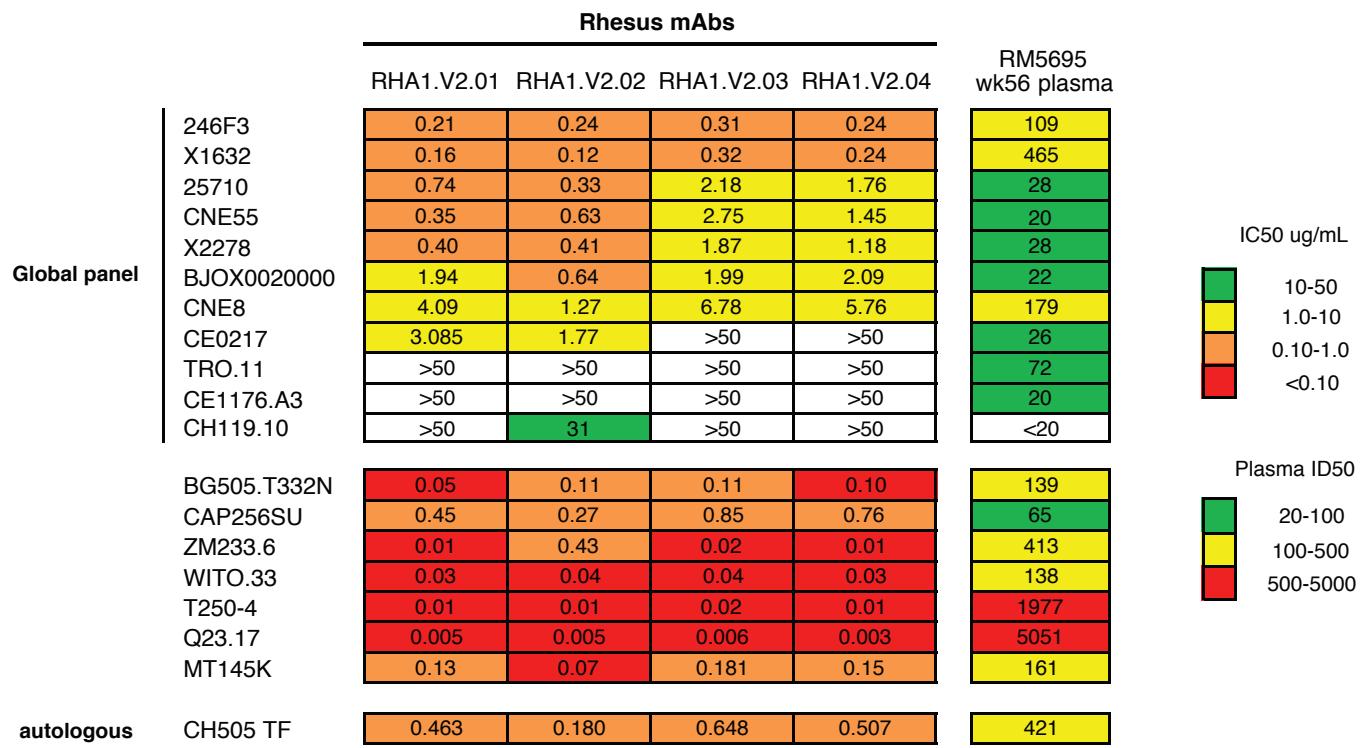
C

PGT145 CLTGSKHRLRDYFLYNEYGPNYEEWGDYLATLDVW
 PCT64-35S CMT---GVERGDFWSDDYS-QHYNT---YLIDVW
 RHA1.V2.01 CAR----KGEDFYEDDYG-QYFTA---GWFFDLW
 RHA1.V2.02 CAR----KGEDFYEDDYG-QYFTA---GWYFDLW
 RHA1.V2.03 CAR----KGEDFYEDDYG-QYFTA---GWYFDLW
 RHA1.V2.04 CAR----KGEDFYEDDYG-QYFTA---GWFFDLW

D**E**

A**B**

	Autoantigens									
	SSA	SSB	Sm	RNP	Scl 70	Jo 1	dsDNA	Cent B	Histone	
Positive control 1	-	-	-	-	-	-	-	+	-	-
Positive control 2	+	+	-	-	-	+	+	-	-	+
Positive control 3	-	-	+	+	+	-	-	-	-	-
CH65	-	-	-	-	-	-	-	-	-	-
4E10	-	+	+	-	-	+	-	+	-	+
RHA1.V2.01	-	-	-	-	-	-	-	-	-	-



Supplemental Figure S21

RHA1.V2.01

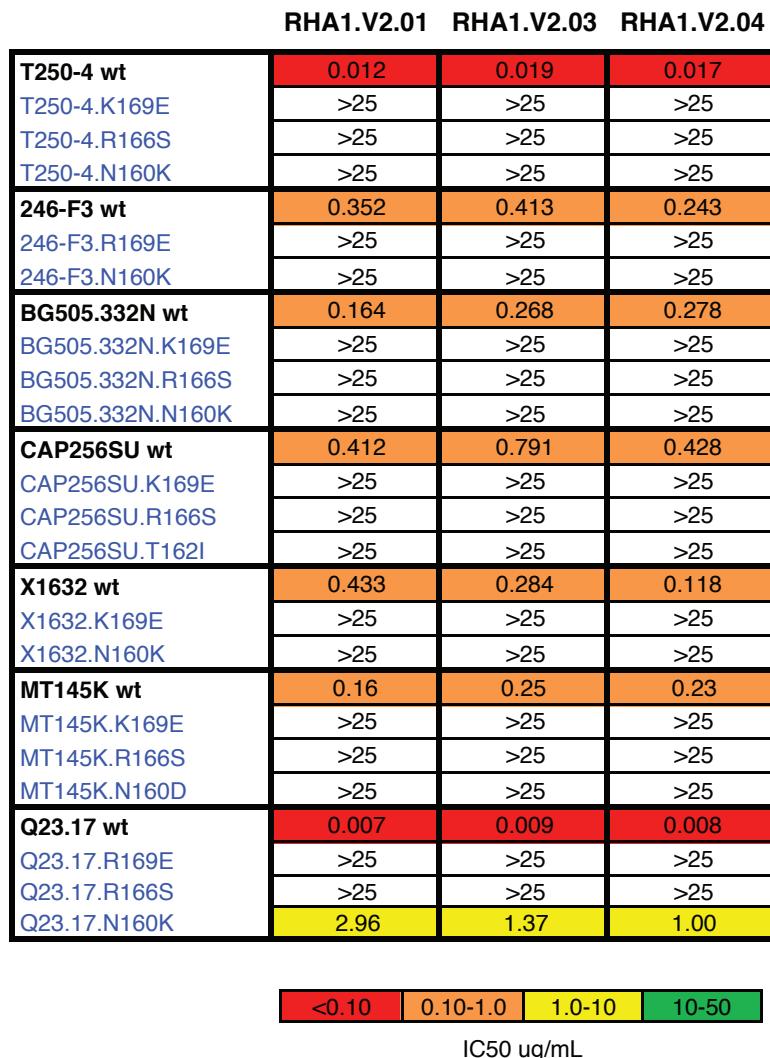
IC50 (ug/mL)
.001-.01
.01-.100
.100-1.00
1.00-10.0
>10.0

Virus ID	Clade	
0260.v5.c36	A	13.9
0330.v4.c3	A	0.046
0439.v5.c1	A	>50
3365.v2.c20	A	0.390
3718.v3.c11	A	0.809
398-F1.F6.20	A	>50
BB201.B42	A	0.010
BB539.2B13	A	>50
BG505.W6M.C2	A	0.067
BI369.9A	A	0.083
BS208.B1	A	0.045
KER2008.12	A	0.043
KER2018.11	A	0.013
KNH1209.18	A	0.958
MB201.A1	A	14.7
MB539.2B7	A	1.36
MI369.A5	A	0.682
MS208.A1	A	>50
Q23.17	A	0.005
Q259.17	A	0.397
Q769.d22	A	>50
Q769.h5	A	>50
Q842.d12	A	0.020
QH209.14M.A2	A	>50
RW202.2	A	>50
UG037.8	A	>50
246-F3.C10.2	AC	0.179
3301.v1.c24	AC	>50
3589.v1.c4	AC	>50
6540.v4.c1	AC	0.199
6545.v4.c1	AC	0.120
0815.v3.c3	ACD	>50
6095.v1.c10	ACD	12.5
3468.v1.c12	AD	>50
Q168.a2	AD	0.069
Q461.e2	AD	>50
620345.c1	AE	23.5
BJOX009000.02.4	AE	>50
BJOX010000.06.2	AE	>50
BJOX025000.01.1	AE	>50
BJOX028000.10.3	AE	>50
C1080.c3	AE	0.001
C2101.c1	AE	>50
C3347.c11	AE	>50
C4118.09	AE	0.049
CM244.ec1	AE	0.004
CNE3	AE	0.041
CNE5	AE	0.017
CNE55	AE	1.17
CNE56	AE	>50
CNE59	AE	0.102
CNE8	AE	8.55
M02138	AE	>50
R1166.c1	AE	>50
R2184.c4	AE	>50
R3265.c6	AE	>50
TH023.6	AE	>50
TH966.8	AE	0.092
TH976.17	AE	>50
235-47	AG	0.251
242-14	AG	0.869
263-8	AG	>50
269-12	AG	>50
271-11	AG	0.018
928-28	AG	>50
DJ263.8	AG	1.06
T250-4	AG	0.010
T251-18	AG	>50
T253-11	AG	>50
T255-34	AG	0.077
T257-31	AG	30.3
T266-60	AG	13.5
T278-50	AG	9.27
T280-5	AG	>50
T33-7	AG	0.011

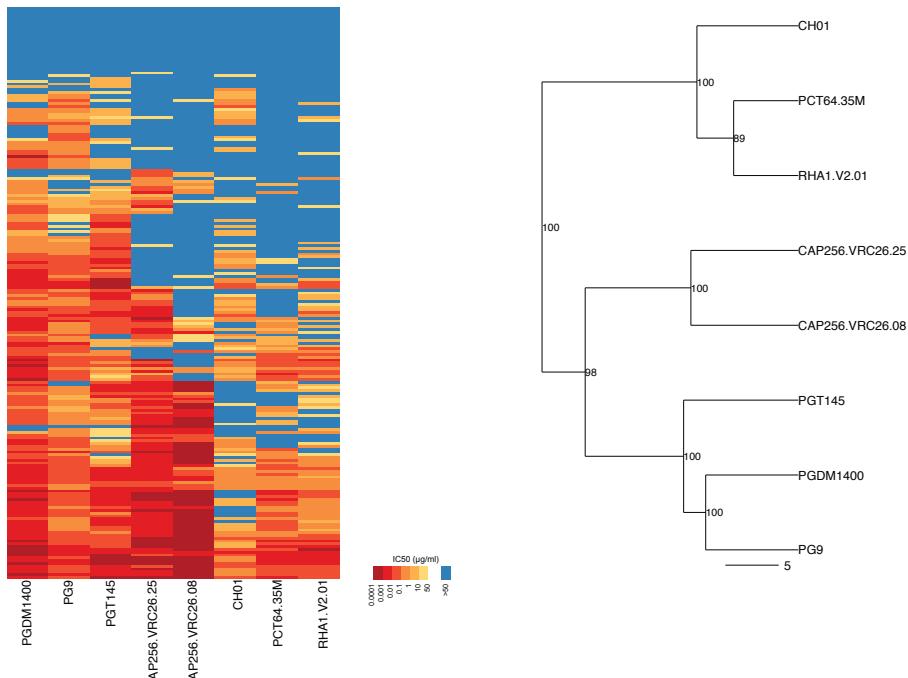
Virus ID	Clade	
3988.25	B	11.5
5768.04	B	0.985
6101.10	B	>50
6535.3	B	4.16
45_01dG5	B	3.97
89.6.DG	B	>50
AC10.29	B	1.17
ADA.DG	B	8.96
Bal.01	B	>50
Bal.26	B	>50
BG1168.01	B	>50
BL01.DG	B	>50
BR07.DG	B	>50
BX08.16	B	0.073
CAAN.A2	B	>50
CNE10	B	>50
CNE12	B	>50
CNE14	B	>50
CNE4	B	>50
CNE57	B	>50
HO86.8	B	43.6
HT593.1	B	6.70
HXB2.DG	B	>50
JRCSF.JB	B	0.015
JRFL.JB	B	>50
MN.3	B	>50
PVO.04	B	>50
QH0515.01	B	>50
QH0692.42	B	>50
REJO.67	B	1.06
RHPA.7	B	>50
SC422.8	B	>50
SF162.LS	B	>50
SS1196.01	B	>50
THRO.18	B	>50
TRJ0.58	B	>50
TRO.11	B	>50
WITO.33	B	0.019
X2278.C2.B6	B	0.133
YU2.DG	B	>50
BJOX002000.03.2	BC	0.821
CH038.12	BC	1.97
CH070.1	BC	0.052
CH117.4	BC	0.005
CH119.10	BC	21.1
CH181.12	BC	0.009
CNE15	BC	>50
CNE19	BC	>50
CNE20	BC	7.47
CNE21	BC	0.069
CNE40	BC	>50
CNE7	BC	>50

Virus ID	Clade	
286.36	C	0.701
288.38	C	>50
0013095-2.11	C	>50
001428-2.42	C	0.057
00836-2.5	C	>50
0921.v2.c14	C	>50
16055-2.3	C	0.077
16845-2.22	C	>50
16936-2.21	C	>50
25710-2.43	C	0.856
25711-2.4	C	>50
25925-2.22	C	0.156
26191-2.48	C	0.404
3168.v4.c10	C	>50
3637.v5.c3	C	>50
3873.v1.c24	C	6.10
426c	C	>50
6322.v4.c1	C	>50
6471.v1.c16	C	>50
6631.v3.c10	C	>50
6644.v2.c33	C	>50
6785.v5.c14	C	0.107
6838.v1.c35	C	0.271
96ZM651.02	C	>50
BR025.9	C	0.051
CAP210.E8	C	11.2
CAP244.D3	C	>50
CAP256.206.C9	C	0.225
CAP45.G3	C	0.006
Ce1176.A3	C	>50
CE703010217.B6	C	2.19
CNE30	C	>50
CNE31	C	>50
CNE53	C	6.18
CNE58	C	0.045
DU123.06	C	0.281
DU151.02	C	1.05
DU156.12	C	0.350
DU172.17	C	>50
DU422.01	C	>50
MW965.26	C	12.6
SO18.18	C	0.205
TV1.29	C	2.28
TZA125.17	C	40.8
TZBD.02	C	4.01
ZA012.29	C	>50
ZM106.9	C	24.7
ZM109.4	C	>50
ZM135.10a	C	>50
ZM176.66	C	0.078
ZM197.7	C	43.1
ZM214.15	C	>50
ZM215.8	C	>50
ZM233.6	C	0.009
ZM249.1	C	0.324
ZM53.12	C	0.589
ZM55.28a	C	>50
3326.v4.c3	CD	0.162
3337.v2.c6	CD	>50
3817.v2.c59	CD	>50
191821.E6.1	D	48.6
231965.c01	D	>50
247-23	D	0.211
3016.v5.c45	D	0.572
57128.vrc15	D	>50
6405.v4.c34	D	>50
A03349M1.vrc4a	D	>50
A07412M1.vrc12	D	9.22
NKU3006.ec1	D	>50
UG021.16	D	>50
UG024.2	D	>50
P0402.c2.11	G	2.14
P1981.C5.3	G	>50
X1193.c1	G	>50
X1254.c3	G	>50
X1632.S2.B10	G	0.112
X2088.c9	G	>50
X2131.C1.B5	G	5.90
SIVmac251.30.SG3	NA	>50
SVA.MLV	NA	>50

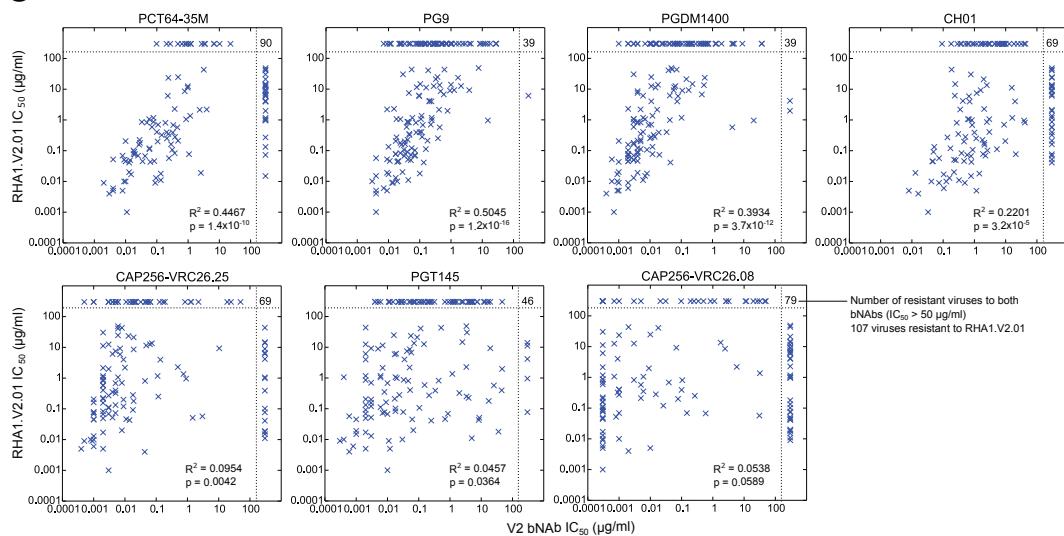
Supplemental Figure S22



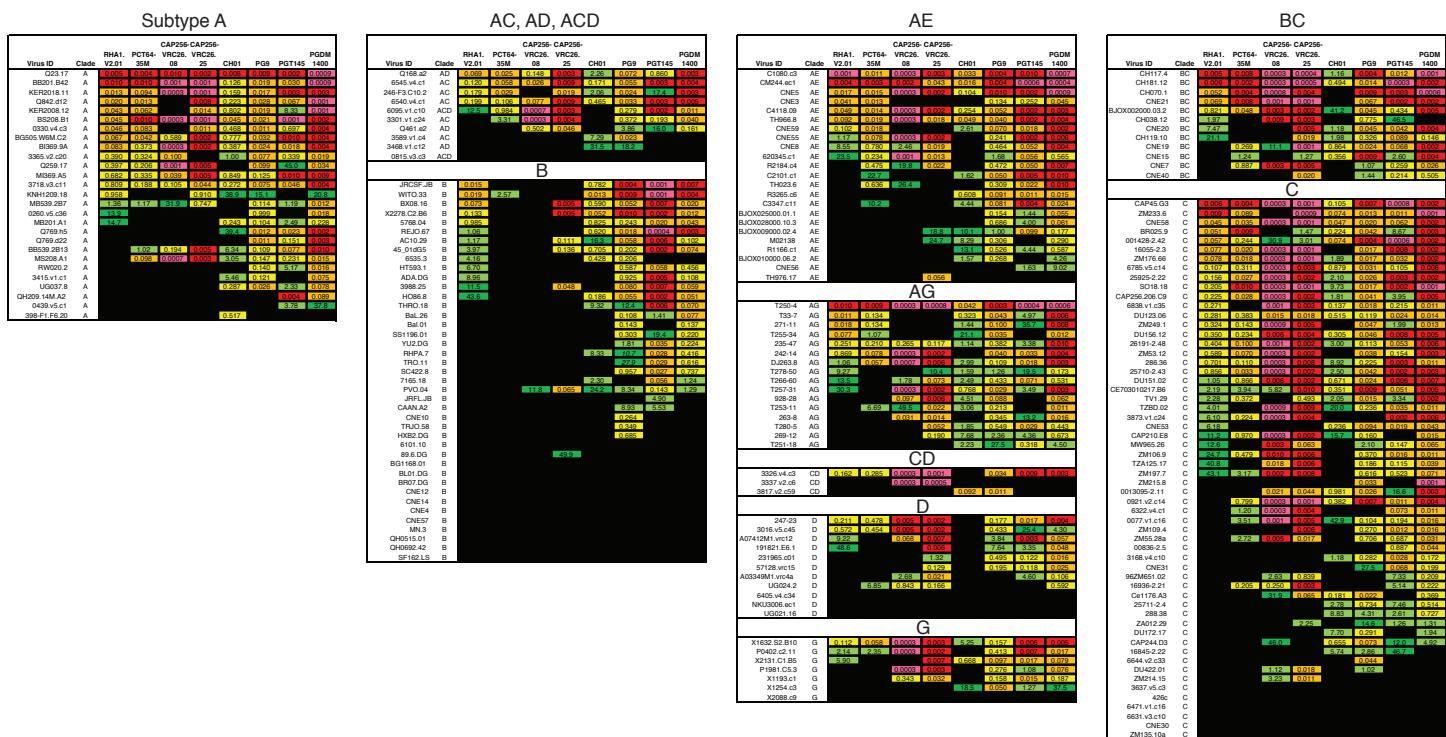
Supplemental Figure S23

A**B**

	RHA1 sensitive	RHA1 resistant		RHA1 sensitive	RHA1 resistant		RHA1 sensitive	RHA1 resistant		RHA1 sensitive	RHA1 resistant
PCT64-35M sensitive	72	17		CAP256.25 sensitive	84	38		PG9 sensitive	100	68	
PCT6-35M resistant	29	90		CAP256.25 resistant	17	69		PG9 resistant	1	39	
p=2.0x10 ⁻¹⁶ ; Odds ratio (OR)=13.14; Accuracy (Acc) = 0.78				p=1.7x10 ⁻¹² ; OR=57.35; Acc = 0.74				p=2.3x10 ⁻¹² ; OR=57.35; Acc = 0.69			
PGT145 sensitive	96	61		CAP256.08 sensitive	67	28		CH01 sensitive	72	38	
PGT145 resistant	5	46		CAP256.08 resistant	34	79		CH01 resistant	29	69	
p=4.4x10 ⁻¹¹ ; OR=14.47; Acc=0.68				p=7.3x10 ⁻⁹ ; OR=5.56; Acc=0.70				p=2.4x10 ⁻⁷ ; OR=4.51; Acc=0.67			
PGDM1400 sensitive	99	68									
PGDM1400 resistant	2	39									
p=2.8x10 ⁻¹¹ ; OR=28.39; Acc = 0.66											

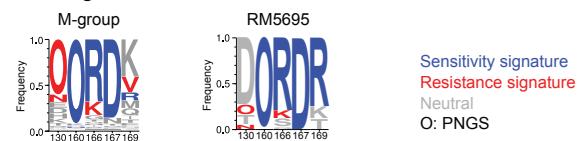
C**Supplemental Figure S24**

Supplemental Figure S25

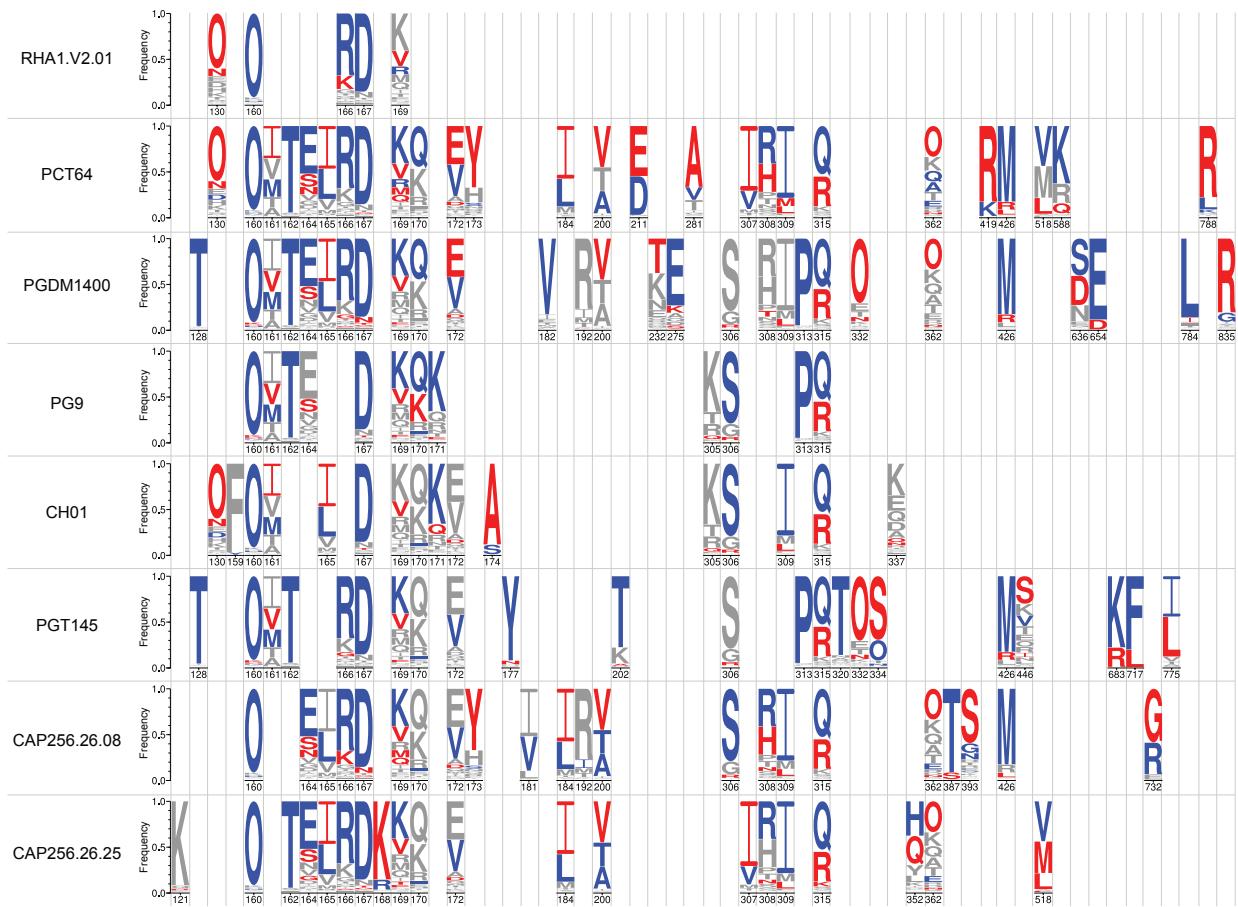


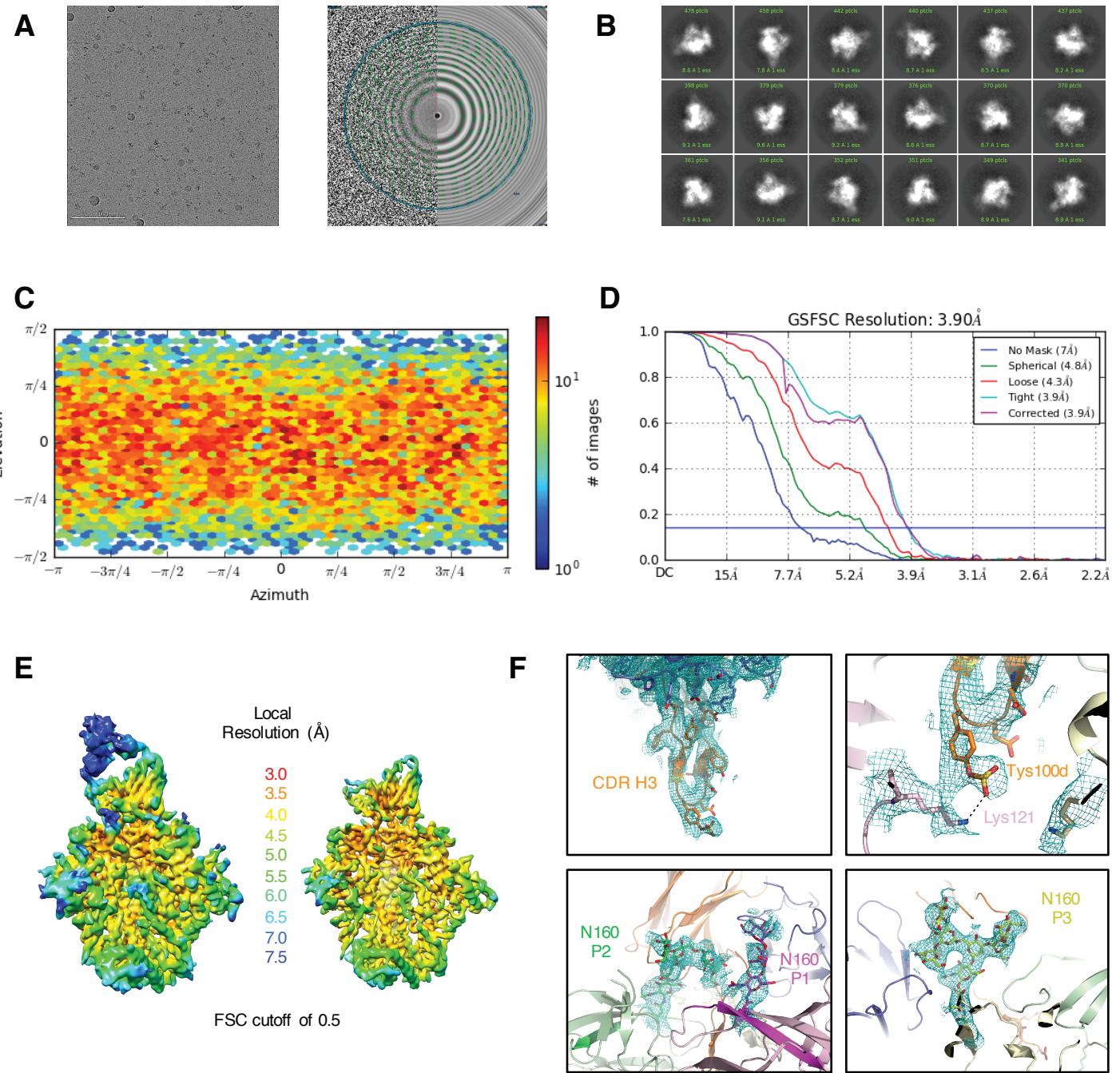
A

RHA1.V2.01 Signatures

**B**

RHA1.V2.01 & other V2 apex bNAb signatures





Supplemental Figure S27