

Supplementary Figure 1

A

Pseudovirus	single scFv IC ₅₀ in nM				
	CAP256.25	PGT121	3BNC117	10E8v4	8ANC195
Q23.17	9.66	0.19	1.5	14.4	249.9
Q168.A2	34.93	>1595	1.1	17.3	22.9
Q259.D2.17	22.33	34.60	>1595	35.7	>1595
Q461.E2	28.71	>1595	1.8	17.3	276.2
Q769.D22	>1595	>1595	0.5	5.5	11.5
Q842.D12	116.74	2.00	0.4	18.6	1069.1
BG505.W6M 332N	4.54	0.56	0.6	3.4	9.1
CAAN5342.A2	>1595	2.29	22.7	29.3	>1595
AC10.0.29	233.03	1.46	>1595	3.5	62.7
RHPA4259.7	>1595	0.44	0.6	12.0	8.7
TRO.11	>1595	2.23	1.6	8.9	7.0
PVO.4	26.55	5.34	1.5	22.3	66.4
SC422661.8	>1595	105.45	3.5	1.7	115.8
REJO.67	>1595	>1595	9.3	4.5	39.1
TRJO4551.18	>1595	830.45	91.5	13.2	491.4
WITO.33	>1595	>1595	0.9	4.4	>1595
THRO4156.18	>1595	>1595	70.3	4.2	>1595
QH0692.42	>1595	>1595	3.6	12.0	233.9
6535.3	>1595	0.12	188.0	5.6	19.4
Du151.2	1.10	0.17	1053.7	9.0	>1595
Du156.12	0.47	0.51	52.0	1.3	86.1
Du172.17	>1595	337.88	>1595	1.8	1369.9
Du422.1	8.85	7.72	>1595	4.4	>1595
ZM53M.PB12	0.06	2.28	60.5	11.1	5.3
ZM109F.PB4	35.09	>1595	>1595	3.4	>1595
ZM135M.PL10A	>1595	>1595	1.8	2.2	>1595
ZM197M.PB7	0.32	>1595	17.5	1.0	1369.9
ZM214M.PL15	16.08	1.51	6.2	4.6	34.5
ZM233M.PB6	0.99	588.24	108.2	3.4	85.1
ZM249M.PL1	16.08	11.68	2.3	13.7	285.8
CAP8.6F	257.00	0.34	>1595	6.0	100.7
CAP45.2.00.G3	3.39	1211.07	>1595	3.6	804.7
CAP61.4.22.F10A	144.00	0.67	93.1	10.7	458.3
CAP63.A9	4.90	5.32	21.1	17.5	>1595
CAP84.32	293.00	0.14	562.0	11.5	>1595
CAP85.9	>1595	1.83	597.1	2.9	1207.1
CAP88.B5	>1595	153.33	998.9	0.3	176.9
CAP206.8	4.51	692.04	>1595	2.7	>1595
CAP210.2.00.E8	0.11	>1595	14.5	11.9	>1595
CAP228.51	24.93	>1595	>1595	1370.0	>1595
CAP239.2.00.G3J	2.91	0.77	>1595	3.2	>1595
CAP244.D3	>1595	>1595	70.2	9.2	193.7
CAP255.2.00.16J	>1595	0.35	35.1	13.6	862.2
CAP256.SU	0.08	0.64	14.5	23.1	9.4
ConC	0.17	0.56	70.8	5.9	37.4
Geometric mean	6.5	4.0	13.6	7.2	101.3
Breadth	62%	71%	78%	100%	69%

B

Pseudovirus	single scFv IC ₈₀ in nM				
	CAP256.25	PGT121	3BNC117	10E8v4	8ANC195
Q23.17	350.00	0.50	5.1	52.9	593.1
Q168.A2	>1595	>1595	3.4	52.0	89.9
Q259.D2.17	1000.00	>1595	>1595	108.4	>1595
Q461.E2	223.81	>1595	6.3	71.4	>1595
Q769.D22	>1595	>1595	1.4	46.5	86.5
Q842.D12	1218.50	13.03	1.1	68.7	>1595
BG505.W6M 332N	67.54	1.16	1.6	14.8	45.1
CAAN5342.A2	>1595	36.23	63.5	160.0	>1595
AC10.0.29	>1595	8.24	>1595	13.0	>1595
RHPA4259.7	>1595	2.36	2.1	39.5	36.1
TRO.11	>1595	7.33	6.2	37.8	29.9
PVO.4	324.90	24.22	4.7	87.2	326.1
SC422661.8	>1595	536.41	9.9	10.1	>1595
REJO.67	>1595	>1595	42.8	16.5	308.9
TRJO4551.18	>1595	>1595	346.1	46.2	>1595
WITO.33	>1595	>1595	3.1	17.3	>1595
THRO4156.18	>1595	>1595	214.3	12.9	>1595
QH0692.42	>1595	>1595	9.9	48.5	>1595
6535.3	>1595	0.41	327.0	19.2	103.8
Du151.2	51.53	0.99	>1595	27.0	>1595
Du156.12	4.58	1.10	281.3	6.6	346.5
Du172.17	>1595	>1595	>1595	14.5	>1595
Du422.1	487.75	137.41	>1595	14.6	>1595
ZM53M.PB12	0.43	148.92	378.9	68.9	28.0
ZM109F.PB4	>1595	>1595	>1595	23.8	>1595
ZM135M.PL10A	>1595	>1595	6.2	11.0	>1595
ZM197M.PB7	3.19	>1595	64.8	5.2	>1595
ZM214M.PL15	716.09	20.28	73.0	52.6	>1595
ZM233M.PB6	22.54	>1595	490.1	15.4	878.5
ZM249M.PL1	1594.90	732.15	16.0	80.3	1000.0
CAP8.6F	>1595	2.00	>1595	22.3	364.3
CAP45.2.00.G3	683.66	>1595	>1595	11.9	>1595
CAP61.4.22.F10A	978.48	3.60	251.6	60.1	>1595
CAP63.A9	133.98	26.57	113.8	70.8	>1595
CAP84.32	>1595	0.41	1622.6	34.6	>1595
CAP85.9	>1595	6.15	>1595	16.3	>1595
CAP88.B5	>1595	>1595	>1595	1.4	481.9
CAP206.8	69.47	>1595	>1595	11.0	>1595
CAP210.2.00.E8	0.49	>1595	>1595	68.1	>1595
CAP228.51	>1595	>1595	>1595	>1595	>1595
CAP239.2.00.G3J	34.16	5.88	>1595	16.8	>1595
CAP244.D3	>1595	>1595	340.9	39.4	536.5
CAP255.2.00.16J	>1595	0.98	242.6	66.5	>1595
CAP256.SU	0.45	2.11	56.7	86.5	31.5
ConC	1.61	1.63	233.2	19.2	252.6
Geometric mean	58.0	6.8	34.4	28.0	170.6
Breadth	49%	56%	69%	98%	40%

C

Pseudovirus	single scFv IC ₅₀ in µg/mL				
	CAP256.25	PGT121	3BNC117	10E8v4	8ANC195
Q23.17	0.30	0.0054	0.042	0.42	7.2
Q168.A2	1.1	>50	0.030	0.51	0.67
Q259.D2.17	0.70	1.00	>50	1.0	>50
Q461.E2	0.90	>50	0.050	0.51	8.0
Q769.D22	>50	>50	0.014	0.16	0.33
Q842.D12	3.7	0.058	0.012	0.54	31
BG505.W6M 332N	0.14	0.016	0.016	0.098	0.26
CAAN5342.A2	>50	0.066	0.65	0.86	>50
AC10.0.29	7.3	0.042	>50	0.10	1.8
RHPA4259.7	>50	0.013	0.016	0.35	0.25
TRO.11	>50	0.064	0.047	0.26	0.20
PVO.4	0.83	0.15	0.044	0.65	1.9
SC422661.8	>50	3.0	0.099	0.050	3.4
REJO.67	>50	>50	0.27	0.13	1.1
TRJO4551.18	>50	24	2.6	0.39	14
WITO.33	>50	>50	0.025	0.13	>50
THRO4156.18	>50	>50	2.0	0.12	>50
QH0692.42	>50	>50	0.10	0.35	6.8
6535.3	>50	0.0035	5.4	0.16	0.56
Du151.2	0.034	0.0049	30	0.26	>50
Du156.12	0.015	0.015	1.5	0.039	2.5
Du172.17	>50	9.8	>50	0.052	40
Du422.1	0.28	0.22	>50	0.13	>50
ZM53M.PB12	0.0020	0.066	1.7	0.33	0.15
ZM109F.PB4	1.1	>50	>50	0.098	>50
ZM135M.PL10A	>50	>50	0.050	0.063	>50
ZM197M.PB7	0.0100	>50	0.50	0.029	40
ZM214M.PL15	0.50	0.043	0.18	0.14	1.00
ZM233M.PB6	0.031	17	3.1	0.100	2.5
ZM249M.PL1	0.50	0.34	0.065	0.40	8.3
CAP8.6F	8.1	0.0098	>50	0.18	2.9
CAP45.2.00.G3	0.11	35	>50	0.10	23
CAP61.4.22.F10A	4.5	0.019	2.7	0.31	13
CAP63.A9	0.15	0.15	0.60	0.51	>50
CAP84.32	9.2	0.0040	16	0.34	>50
CAP85.9	>50	0.053	17	0.085	35
CAP88.B5	>50	4.4	28	0.0098	5.1
CAP206.8	0.14	20	>50	0.078	>50
CAP210.2.00.E8	0.0034	>50	0.41	0.35	>50
CAP228.51	0.78	>50	>50	40	>50
CAP239.2.00.G3J	0.091	0.022	>50	0.095	>50
CAP244.D3	>50	>50	2.0	0.27	5.6
CAP255.2.00.16J	>50	0.0100	1.0	0.40	25
CAP256.SU	0.0024	0.018	0.41	0.68	0.27
ConC	0.0054	0.016	2.0	0.17	1.1
Geometric mean	0.20	0.12	0.39	0.21	2.94
Breadth	62%	71%	78%	100%	69%

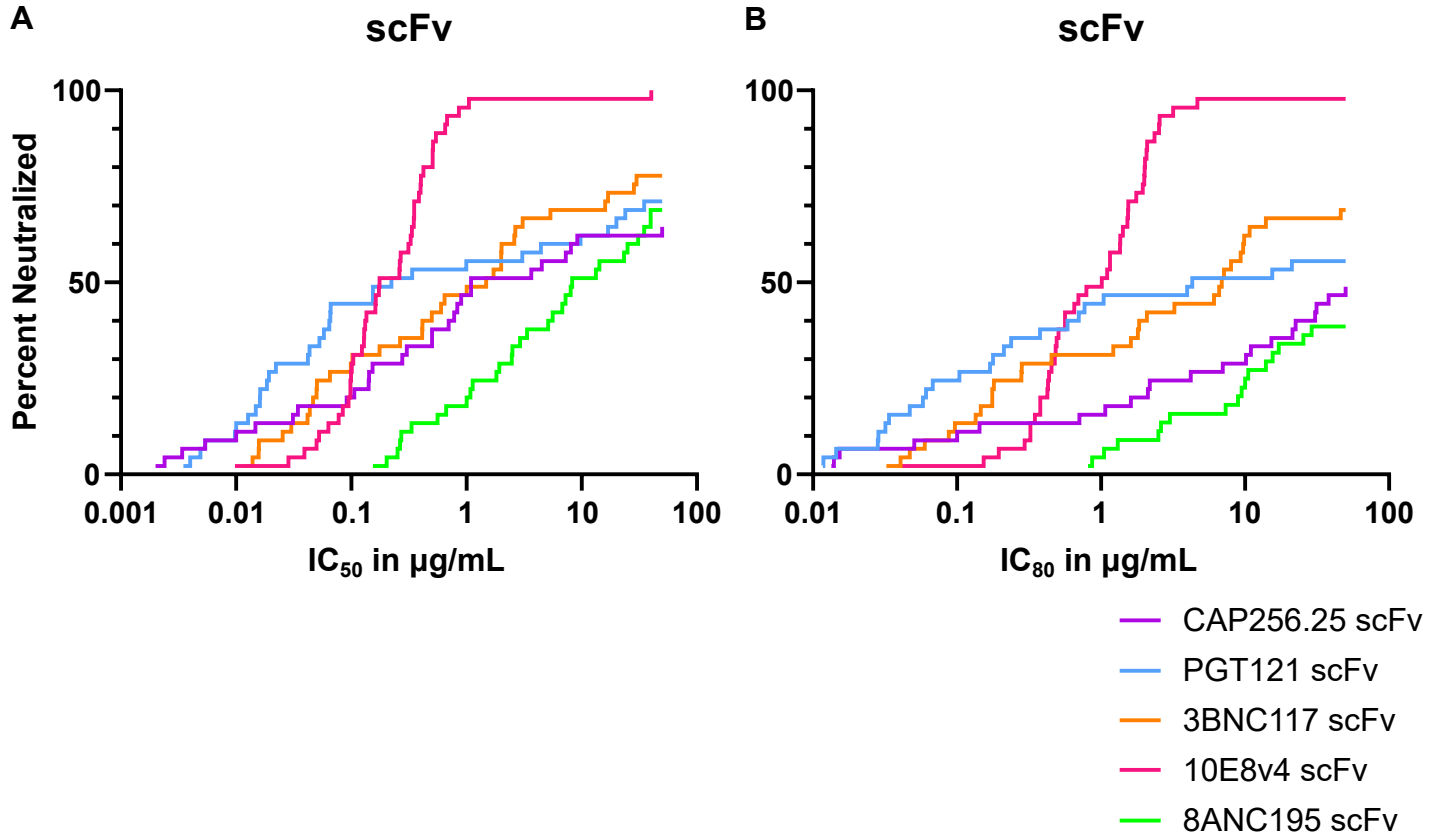
D

Pseudovirus	single scFv IC ₈₀ in µg/mL				
	CAP256.25	PGT121	3BNC117	10E8v4	8ANC195
Q23.17	11	0.014	0.15	1.5	17
Q168.A2	>50	>50	0.097	1.5	2.6
Q259.D2.17	31	>50	>50	3.2	>50
Q461.E2	7.0	>50	0.18	2.1	>50
Q769.D22	>50	>50	0.041	1.4	2.5
Q842.D12	38	0.38	0.032	2.0	>50
BG505.W6M 332N	2.1	0.034	0.047	0.43	1.3
CAAN5342.A2	>50	1.0	1.8	4.7	>50
AC10.0.29	>50	0.24	>50	0.38	>50
RHPA4259.7	>50	0.068	0.060	1.2	1.0
TRO.11	>50	0.21	0.18	1.1	0.87
PVO.4	10	0.70	0.13	2.6	9.5
SC422661.8	>50	15	0.28	0.30	>50
REJO.67	>50	>50	1.2	0.48	9.0
TRJO4551.18	>50	>50	9.9	1.4	>50
WITO.33	>50	>50	0.088	0.51	>50
THRO4156.18	>50	>50	6.1	0.38	>50
QH0692.42	>50	>50	0.28	1.4	>50
6535.3	>50	0.012	9.3	0.56	3.0
Du151.2	1.6	0.028	>50	0.79	>50
Du156.12	0.14	0.032	8.0	0.19	10
Du172.17	>50	>50	>50	0.42	>50
Du422.1	15	4.0	>50	0.43	>50
ZM53M.PB12	0.013	4.3	11	2.0	0.81
ZM109F.PB4	>50	>50	>50	0.70	>50
ZM135M.PL10A	>50	>50	0.18	0.32	>50
ZM197M.PB7	0.100	>50	1.8	0.15	>50
ZM214M.PL15	22	0.59	2.1	1.5	>50
ZM233M.PB6	0.71	>50	14	0.45	25
ZM249M.PL1	50	21	0.45	2.4	29
CAP8.6F	>50	0.058	>50	0.65	11
CAP45.2.00.G3	21	>50	>50	0.35	>50
CAP61.4.22.F10A	31	0.10	7.2	1.8	>50
CAP63.A9	4.2	0.77	3.2	2.1	>50
CAP84.32	>50	0.012	46	1.0	>50
CAP85.9	>50	0.18	>50	0.48	>50
CAP88.B5	>50	>50	>50	0.040	14
CAP206.8	2.2	>50	>50	0.32	>50
CAP210.2.00.E8	0.015	>50	>50	2.0	>50
CAP228.51	>50	>50	>50	>50	>50
CAP239.2.00.G3J	1.1	0.17	>50	0.49	>50
CAP244.D3	>50	>50	9.7	1.2	16
CAP255.2.00.16J	>50	0.028	6.9	1.9	>50
CAP256.SU	0.014	0.061	1.6	2.5	0.91
ConC	0.050	0.047	6.6	0.56	7.3
Geometric mean	1.8	0.20	1.0	0.82	4.9
Breadth	49%	56%	69%	98%	40%

D

Pseudovirus	Experimental IC ₅₀ titres in µg/mL																								
	single scFv					2 scFv combinations										3 scFv combinations									
	CAP256.25	PGT121	3BNC117	10E8v4	8ANC195	CAP256.25 +PGT121	CAP256.25 +3BNC117	CAP256.25 +10E8v4	CAP256.25 +8ANC195	PGT121 +3BNC117	PGT121 +10E8v4	PGT121 +8ANC195	3BNC117 +8ANC195	3BNC117 +10E8v4	10E8v4 +8ANC195	CAP256.25 +PGT121 +10E8v4	CAP256.25 +3BNC117 +10E8v4	CAP256.25 +10E8v4 +8ANC195	PGT121 +3BNC117 +10E8v4	PGT121 +10E8v4 +8ANC195	3BNC117 +10E8v4 +8ANC195	CAP256.25 +3BNC117 +PGT121	CAP256.25 +PGT121 +8ANC195	CAP256.25 +3BNC117 +8ANC195	3BNC117 +PGT121 +8ANC195
Q23.17	11	0.014	0.15	1.5	17	0.020	0.15	0.36	7.4	0.017	0.025	0.022	0.16	0.11	1.4	0.009	0.075	0.45	0.010	0.010	0.11	0.008	0.009	0.079	0.010
Q168.A2	>30	>30	0.097	1.5	2.6	>30	0.082	0.53	1.6	0.089	1.7	3.3	0.084	0.079	0.59	0.70	0.049	0.28	0.065	0.44	0.074	0.081	1.0	0.058	0.082
Q842.D12	>30	0.38	0.032	2.0	>30	0.27	0.027	1.7	17	0.016	0.11	0.21	0.025	0.020	2.0	0.20	0.022	1.1	0.016	0.14	0.025	0.019	0.27	0.022	0.017
AC10.0.29	>30	0.24	>30	0.38	>30	0.17	>30	0.31	11	0.18	0.096	0.24	29	0.36	0.30	0.080	0.29	0.24	0.073	0.068	0.30	0.18	0.21	8.3	0.15
RHPA4259.7	>30	0.068	0.060	1.2	1.0	0.14	0.053	0.92	1.0	0.035	0.081	0.082	0.066	0.064	0.41	0.059	0.034	0.32	0.019	0.032	0.040	0.018	0.041	0.045	0.023
PVO.4	10	0.70	0.13	2.6	9.5	0.61	0.12	0.88	1.4	0.088	0.37	0.42	0.14	0.12	0.93	0.36	0.085	0.49	0.080	0.24	0.11	0.085	0.47	0.13	0.10
6535.3	>30	0.012	9.3	0.56	3.0	0.012	30	0.39	1.8	0.011	0.011	0.015	1.8	0.40	0.23	0.008	0.45	0.38	0.014	0.008	0.26	0.009	0.008	1.9	0.014
Du155.12	0.14	0.032	8.0	0.19	10	0.019	0.11	0.044	0.16	0.036	0.023	0.042	2.2	0.19	0.18	0.013	0.052	0.955	0.020	0.013	0.29	0.012	0.011	0.22	0.025
ZME3M.PB12	0.013	4.3	11	2.0	0.81	0.016	0.017	0.016	0.016	0.79	0.17	1.2	0.58	0.94	0.30	0.009	0.010	0.009	0.20	0.11	0.34	0.007	0.006	0.012	0.28
ZM233M.PB6	0.71	>30	14	0.45	25	0.86	0.54	0.083	0.64	9.7	0.38	>30	7.2	0.74	0.42	0.13	0.13	0.090	0.50	0.41	0.41	1.4	2.3	0.85	2.7
ZM249M.PL1	>30	21	0.45	2.4	29	5.9	0.30	0.65	10	0.75	0.73	5.0	0.41	0.29	1.9	0.62	0.16	0.60	0.26	1.0	0.36	0.35	2.7	0.46	0.76
CAP8.6F	>30	0.058	>30	0.65	11	0.036	>30	0.37	9.1	0.046	0.028	0.037	12	0.95	0.47	0.024	0.56	0.27	0.037	0.018	0.48	0.042	0.030	7.7	0.057
CAP61.4.22.F10A	31	0.10	7.2	1.8	>30	0.053	4.7	0.65	12	0.069	0.038	0.052	8.4	1.1	1.2	0.037	0.72	0.53	0.047	0.026	1.1	0.061	0.046	5.2	0.061
CAP84.32	>30	0.012	>30	1.0	>30	0.016	>30	0.65	>30	0.014	0.010	0.014	29	1.2	1.4	0.012	0.87	0.83	0.010	0.011	0.60	0.010	0.009	14	0.032
CAP88.B5	>30	>30	>30	0.040	14	>30	>30	0.027	30	12	0.017	9.5	18	0.023	0.035	0.025	0.013	0.012	0.026	0.017	0.019	13	3.1	13	6.6
CAP256.SU	0.014	0.061	1.6	2.5	0.91	0.010	0.015	0.014	0.014	0.057	0.047	0.064	0.73	0.63	0.87	0.008	0.011	0.010	0.045	0.037	0.29	0.012	0.006	0.013	0.060
ConC	0.050	0.047	6.6	0.56	7.3	0.013	0.097	0.044	0.11	0.026	0.018	0.031	3.3	0.29	0.27	0.009	0.028	0.027	0.022	0.022	0.21	0.009	0.008	0.077	0.027
Geometric mean	0.49	0.13	1.0	0.86	5.8	0.071	0.17	0.21	1.5	0.11	0.070	0.16	1.3	0.24	0.55	0.041	0.084	0.16	0.042	0.051	0.19	0.049	0.074	0.38	0.088

Supplementary 3: Breadth and Potency of single scFv against a 45 virus panel



Supplementary Figure 5. Active coverage by scFv of a 45 virus panel

IC ₈₀ of scFv							
	active coverage ≥ 1 scFv				active coverage ≥ 2 scFv		
	1µg/mL	10µg/mL	50µg/mL		1µg/mL	10µg/mL	50µg/mL
CAP256.25 +8ANC195	20%	58%	80%		4%	9%	20%
3BNC117 +8ANC195	40%	67%	80%		2%	22%	36%
PGT121 +8ANC195	47%	67%	82%		4%	18%	27%
CAP256.25 +3BNC117	51%	71%	89%		0%	16%	33%
CAP256.25 +PGT121	58%	69%	82%		7%	18%	33%
10E8v4+ 8ANC195	64%	98%	98%		0%	24%	40%
3BNC117 +PGT121	67%	82%	91%		13%	33%	40%
CAP256.25 +10E8v4	73%	98%	100%		9%	29%	49%
PGT121 +10E8v4	80%	98%	98%		20%	51%	56%
3BNC117 +10E8v4	93%	98%	98%		9%	62%	67%

	active coverage ≥ 1 scFv				active coverage ≥ 2 scFv		
	1µg/mL	10µg/mL	50µg/mL		1µg/mL	10µg/mL	50µg/mL
CAP256.25 +3BNC117 +8ANC195	53%	82%	98%		7%	33%	49%
CAP256.25 +PGT121 +8ANC195	58%	80%	93%		11%	27%	44%
3BNC117 +PGT121 +8ANC195	69%	84%	93%		16%	42%	53%
CAP256.25 +3BNC117 +PGT121	76%	89%	100%		20%	44%	53%
CAP256.25 +10E8v4 +8ANC195	82%	98%	100%		13%	44%	69%
PGT121 +10E8v4 +8ANC195	84%	98%	98%		24%	58%	69%
CAP256.25 +PGT121 +10E8v4	89%	98%	100%		27%	62%	71%
3BNC117+ 10E8v4+ 8ANC195	93%	98%	98%		11%	64%	71%
CAP256.25 +3BNC117 +10E8v4	96%	98%	100%		18%	76%	82%
3BNC117 +PGT121 +10E8v4	96%	98%	98%		38%	80%	82%

	active coverage ≥ 1 scFv				active coverage ≥ 2 scFv		
	1µg/mL	10µg/mL	50µg/mL		1µg/mL	10µg/mL	50µg/mL
CAP256.25 +3BNC117 +PGT121 +10E8v4	98%	98%	100%		44%	87%	91%
3BNC117 +PGT121 +10E8v4 +8ANC195	96%	98%	98%		40%	80%	84%
CAP256.25 +3BNC117 +10E8v4 +8ANC195	96%	98%	100%		24%	76%	87%
CAP256.25 +PGT121 +10E8v4 +8ANC195	91%	98%	100%		31%	69%	82%
CAP256.25 +3BNC117 +PGT121 +8ANC195	78%	93%	100%		22%	51%	64%

B

Active coverage by IgG of a 45 virus panel

		IgG IC ₈₀ , Bliss Hill model									
		3BNC117 +10E8v4	PGT121 +10E8v4	CAP256.25 +10E8v4	10E8v4 +8ANC195	PGT121 +3BNC117	CAP256.25 +3BNC117	CAP256.25 +PGT121	PGT121 +8ANC195	CAP256.25 +8ANC195	3BNC117 +8ANC195
active coverage ≥ 1 scFv	50µg/mL	100%	100%	100%	100%	100%	100%	96%	98%	93%	91%
	10µg/mL	100%	96%	93%	89%	98%	100%	89%	84%	73%	89%
	1µg/mL	78%	78%	64%	33%	89%	84%	76%	58%	49%	69%
active coverage ≥ 2 scFv	50µg/mL	82%	78%	60%	47%	64%	47%	49%	36%	24%	42%
	10µg/mL	64%	58%	44%	29%	56%	40%	38%	22%	18%	31%
	1µg/mL	4%	7%	7%	0%	33%	27%	24%	4%	2%	2%

		PGT121 +3BNC117 +10E8v4	CAP256.25 +3BNC117 +10E8v4	3BNC117 +10E8v4 +8ANC195	PGT121 +10E8v4 +8ANC195	CAP256.25 +10E8v4 +8ANC195	CAP256.25 +PGT121 +10E8v4	PGT121 +3BNC117 +8ANC195	CAP256.25 +PGT121 +3BNC117	CAP256.25 +3BNC117 +8ANC195	CAP256.25 +PGT121 +8ANC195
active coverage ≥ 1 scFv	50µg/mL	100%	100%	100%	100%	100%	100%	100%	100%	100%	98%
	10µg/mL	100%	100%	100%	96%	96%	100%	98%	100%	100%	96%
	1µg/mL	96%	96%	84%	82%	76%	89%	89%	98%	87%	78%
active coverage ≥ 2 scFv	50µg/mL	96%	100%	87%	89%	82%	89%	80%	89%	73%	69%
	10µg/mL	89%	91%	71%	69%	60%	82%	69%	80%	58%	51%
	1µg/mL	36%	33%	7%	11%	9%	33%	36%	53%	27%	27%