

Supplementary Table S1. Case and control participants

SI case	Window SI [midpoint] (dpi)	Env subtype (initial, SI)	Plasma control ID	Plasma sample timing (dpi)	Cervical control ID	Cervical swab sample timing (dpi)	Contemporaneous plasma VL (log copies/ml)
QA013*	264-385 [325]	D, A		264		264	5.28
			QC594	233	QC594	233	5.55
			QC100	251	QC100	251	2.68
			QD435	256.5	QD435	256.5	4.29
QA252*	1046-1487 [1267]	D, ND		1046		1046	3.67
			QA523	1065	QA523	1065	5.01
			QC370	1057	QC370	1057	5.20
			QC888	1031	QC888	1031	5.57
QA413*	714-1007 [861]	A, A		714		714	4.94
			QA584	717.5	QA584	717.5	4.64
			QD976	709.5	QD976	709.5	3.23
			QH372	712	QH372	712	3.76
QB008*	303.5-591.5 [448]	C, C/A		303.5		303.5	4.52
			QC406	262	QC406	262	5.06
			QH301	354.5	QH301	354.5	4.73
			QD370	278.5	QD370	278.5	4.22
QB045*	1680-2048 [1864]	A, A		1680		1680	4.49
			QB585	1680.5	QB585	1680.5	3.34
			QB765	1679	QB765	1679	4.32
			QD595	1677.5	QD595	1677.5	4.45
QB210	17-163 [90]	D, D		17			4.93
			QA465	17			6.53

			QB857	17		4.75	
			QC048	17		5.30	
QB609	101-485 [293]	D, A			101	-	
					QB857	69	4.17
					QC048	73	5.05
					QH349	126	-
QB685*	303-1453 [878]	A, ND		303	275	2.79	
			QA101	275	QA101	275	5.60
			QC805	271	QC805	271	4.79
			QH359	271	QH359	271	4.57
QB726*	749-1031 [890]	A, A		749	749	4.07	
			QA918	749	QA918	749	5.32
			QD399	751.5	QD399	751.5	4.39
			QF575	743.5	QF575	743.5	4.66
QB850	52-73 [63]	A, D		52	52	5.22	
			QA595	53	QA595	53	4.81
			QB868	53	QB868	53	4.76
			QF815	53	QF815	53	4.71
QC369	29-143 [86]	A, A		29	29	-	
			QD224	29	QD224	29	5.19
			QG958	31	QG958	31	3.28
			QH646	25.5	QH646	25.5	3.78
QC858*	341-440 [391]	D, ND		341	341	4.29	
			QA560	350	QA560	350	3.78
			QB216	336.5	QB216	336.5	4.14

			QC344	317	QC344	317	4.30
QC885	58-152 [105]	A, ND		58		58	5.56
			QB461	60	QB461	60	5.58
			QD359	58	QD359	58	5.24
			QD416	58.5	QD416	58.5	4.44
QD022*	1832-1957 [1895]	A, C		1832		1832	4.30
			QA261	1839	QA261	1839	5.50
			QA520	1829.5	QA520	1829.5	5.75
			QC440	1824.5	QC440	1824.5	5.99
QD149*	996-1086 [1041]	A, A		996		996	3.00
			QB554	995	QB554	995	4.28
			QC036	998.5	QC036	998.5	5.66
			QG501	989.5	QG501	989.5	5.20
QD151*	241-801 [521]	A, A		241		213	5.14
			QB424	214	QB424	214	5.23
			QF446	211	QF446	211	5.26
			QF927	211.5	QF927	211.5	5.35
QD696	49-174 [112]	A, A		49			6.16
			QA842	49			5.43
			QC511	47			4.20
			QG658	50.5			5.34
QF441*	255-444 [350]	A, A		255		255	5.20
			QC808	250.5	QC808	250.5	5.62
			QD342	251.5	QD342	251.5	4.65
			QD774	266.5	QD774	266.5	5.25

QF564	17-1270 [644]	A, A		17		6.60	
			QB680	17		7.26	
			QC914	17		5.93	
			QH209	17		4.01	
QG262	59-144 [81]	A, A		59		3.45	
			QA966	57		5.64	
			QC152	63		6.09	
			QF441	59		4.73	
QG284*	155-260 [208]	A, A		155	155	4.07	
			QC168	165	QC168	165	5.90
			QC449	151	QC449	151	5.89
			QH381	153.5	QH381	153.5	4.37

* case-control sets included in neutralization assays
SI = superinfection, VL = viral load, dpi = days post-infection

Supplementary Table S2. Analysis of interaction between gp140 IgA binding and IgG binding and ADCC

Correlate	OR	95% CI	p-value	aOR[§]	95% CI	p-value
^V1V2 IgG * gp140 IgA interaction	1.29	0.54-3.11	0.57	0.60	0.15-2.35	0.46
Plasma ADCC * gp140 IgA interaction	0.92	0.18-4.80	0.92	0.89	0.18-4.57	0.89

N = 20 cases, 60 controls for all analyses

^dichotomized detectable vs. undetectable

§ adjusted for VL

CI = confidence interval, OR = odds ratio, SI = superinfection

Supplementary Table S3. Sensitivity analysis restricted to samples 180 days or more since initial infection

Correlate	OR	95% CI	p-value	aOR[§]	95% CI	p-value
Plasma neutralization breadth	1.00	0.52-1.93	1.00	1.31	0.71-2.41	0.38
Plasma neutralization potency	0.93	0.75-1.16	0.53	0.98	0.75-1.29	0.89
Plasma ADCC activity	0.46	0.06-3.42	0.45	1.24	0.11-13.53	0.86
Cervical ADCC activity	1.19	0.52-2.71	0.68	1.18	0.52-2.69	0.69
Plasma V1V2 IgG binding [^]						
ZM109	1.13	0.29-4.41	0.86	1.34	0.32-5.66	0.69
ZM53	0.67	0.17-2.73	0.58	0.83	0.18-3.73	0.80
case A2	1.13	0.29-4.45	0.86	1.25	0.28-5.59	0.78
average	0.67	0.17-2.73	0.58	0.83	0.18-3.73	0.80
Plasma gp140 IgA binding	0.83	0.47-1.46	0.51	0.50	0.21-1.23	0.94

N = 12 cases, 36 controls for all analyses

[^]dichotomized detectable vs. undetectable

[§] adjusted for VL

aOR = adjusted odds ratio, CI = confidence interval, OR = odds ratio, SI = superinfection

Supplementary Table S4. Sensitivity analysis restricted to intra-subtype superinfection cases

Correlate	N (case, control)	OR	95% CI	p-value	aOR[§]	95% CI	p-value
Plasma neutralization breadth	10, 30	0.75	0.37-1.53	0.43	1.05	0.51-2.19	0.89
Plasma neutralization potency	10, 30	0.89	0.66-1.19	0.43	0.96	0.58-1.58	0.87
Plasma ADCC activity	12, 36	1.32	0.07-24.71	0.85	1.93	0.11-34.59	0.58
Cervical ADCC activity	12, 36	0.96	0.38-2.46	0.94	1.08	0.43-2.72	0.88
Plasma V1V2 IgG binding [^]							
ZM109	12, 36	0.67	0.15-2.91	0.59	0.62	0.27-1.42	0.42
ZM53	12, 36	0.81	0.14-4.85	0.82	0.80	0.14-4.57	0.80
case A2	12, 36	0.83	0.15-4.55	0.83	0.83	0.14-4.75	0.83
average	12, 36	0.49	0.11-2.25	0.36	0.45	0.10-2.05	0.30
Plasma gp140 IgA binding	12, 36	0.48	0.18-1.29	0.15	0.50	0.19-1.31	0.16

[^]dichotomized detectable vs. undetectable

[§] adjusted for VL

aOR = adjusted odds ratio, CI = confidence interval, OR = odds ratio, SI = superinfection

Supplementary Figure S1. Plasma (a) and cervical (b) total IgG titer.

Colors and symbols represent superinfection cases (study identification numbers displayed) and their matched singly infected controls. P-values are from conditional logistic regression.

