

Supplemental Experimental Procedures

Recombinant Protein Expression and Purification

BiNAbs were generated using previously described approaches (Merchant et al., 1998; Ridgway et al., 1996; Schaefer et al., 2011). For correct heavy-light chain pairing, one of the parental mAbs was expressed in the CrossMab format (CH1-CL swapping), while for the other mAb, the wild-type domain architecture was maintained (Schaefer et al., 2011). For heavy chain heterodimerization, point mutations were introduced in the CH3 domain: Y349C/T366S/L368A/Y407V for the 1st mAb; S354C/T366W for the 2nd mAb (Merchant et al., 1998; Ridgway et al., 1996). Purification tags were added to the C terminus of each heavy chain (His or *Strep*-TagII) for determining heterodimer formation efficiency. Antibodies, gp140^{YU-2}, gp120^{YU-2}, and 2CC-core were generated by transient transfection of HEK293T or 293E cells, as previously described (Bournazos et al., 2014). Antibodies were purified using Protein G Sepharose 4 Fast Flow or MabSelect SuRe LX affinity purification media (GE Healthcare); *Strep*-tagged and His-tagged proteins were purified using the *Strep*-Tactin Superflow Plus Resin (Qiagen) and His-Tag isolation and pull-down dynabeads (ThermoFisher), respectively. Purified proteins were dialyzed in PBS and sterile filtered (0.22 μ m). Purity was assessed by SDS-PAGE and Coomassie staining and was estimated to be >90%. Size exclusion chromatography (SEC) was performed using a Superose 6 Increase 10/300GL column (GE Healthcare) on an Äkta Pure 25 HPLC system. Protein T_m was determined using the Protein Thermal Shift Dye Kit (ThermoFisher) following manufacturer's instructions on a QuantStudio 12K Flex real-time thermal cycler.

In Vitro Neutralization Assay

In vitro neutralization activity of antibodies was assessed against a multiclade panel of HIV-1 envelope pseudoviruses, using previously described protocols (Montefiori, 2005). Neutralization assays were performed by the Collaboration for AIDS Vaccine Discovery (CAVD) core neutralization facility (Harvard University, Boston). IC₅₀ and IC₈₀ values reflect the amount of antibody sufficient to reduce luciferase activity (as measured by relative luminescence units (RLU)) by 50% and 80%, respectively. For comparison of the activity of biNAbs with the corresponding parental mAbs, fold change values were calculated by dividing the IC₅₀ or IC₈₀ titer of the most potent (lowest IC_{50/80}) of the two parental mAbs by the IC_{50/80} titer of the biNAb. Predicted neutralization activity of a mix of two mAbs was determined by selecting the lowest IC_{50/80} titer of the two mAbs for a given virus. For combinations involving 2 mAbs with non-overlapping epitope specificities, this predicted activity (theoretical IC_{50/80}) has been shown to be comparable to the neutralization activity of a 1:1 mAb mix determined experimentally (experimental IC_{50/80}) (Kong et al., 2015). Neutralization activity data of human IgG1 mAbs that were used for comparison in this study were obtained from the CATNAP database (<http://www.hiv.lanl.gov/>). For experiments involving the assessment of the *in vitro* neutralization activity of a mix of two bNAbs, antibodies were mixed at a ratio of 1:1 and the final concentration for determining IC_{50/80} titers was based on the total IgG concentration of the sample.

Anti-gp140 IgG ELISA

For epitope-specific ELISA, gp140^{YU-2}- or 2CC-Core-coated (1 μ g/ml) microtiter plates (Nunc) were used, as previously described (Bournazos et al., 2014). Briefly, recombinant gp140^{YU-2}- or 2CC-Core (1 μ g/ml) was immobilized into high-binding 96-well microtiter plates (Nunc) and following overnight incubation at 4°C, plates were blocked with PBS + 2% (w/v) BSA + 0.05% (v/v) Tween20 for 2 h. After blocking, plates were incubated for 1 h with IgG antibodies and plate-bound IgG was detected by HRP-conjugated goat anti-human IgG (Fc γ -specific, Jackson ImmunoResearch), or goat anti-human kappa or lambda (Bethyl Laboratories). Plates were developed using the TMB (3,3',5,5'-Tetramethylbenzidine) two-component peroxidase substrate

kit (KPL) and reactions stopped with the addition of 1 M phosphoric acid. Absorbance at 450nm was immediately recorded using a SpectraMax Plus spectrophotometer (Molecular Devices) and background absorbance from negative control samples was subtracted. For competition ELISA, binding of biotinylated biNAb (1 µg/ml) to gp140-coated plates was competed with increasing amounts of mAbs, mAb mix (1:1) or biNAb (0.001-100 µg/ml), and detected using HRP-conjugated neutravidin (ThermoFisher). For the quantification of serum concentration of anti-HIV-1 mAbs, goat anti-human IgG (mouse IgG absorbed, Jackson ImmunoResearch)-coated or gp140-coated plates were used (Bournazos et al., 2014). IgG binding was detected using HRP-conjugated goat anti-human IgG (mouse IgG absorbed; Jackson ImmunoResearch), as previously described (Bournazos et al., 2014).

Surface Plasmon Resonance (SPR)

All experiments were performed with a Biacore T200 SPR system (Biacore, GE Healthcare) at 25°C in HBS-EP+ buffer (10 mM HEPES, pH 7.4; 150 mM NaCl; 3.4 mM EDTA; 0.005% (v/v) surfactant P20). For the measurement of the affinity of IgG hinge domain variants for mouse and human FcγRs, IgG antibodies (diluted at 25 µg/ml in 10 mM sodium acetate, pH 4.5) were immobilized on Series S CM5 chips by amine coupling at a density of 1000 RU. Recombinant human or mouse soluble FcγR ectodomains (Sinobiological) were injected through flow cells at a flow rate of 20 µl/min, with the concentration ranging from 15.625 – 2000 nM (1:2 successive dilutions). Association time was 120 s followed by a 300-s dissociation step. At the end of each cycle, sensor surface was regenerated with 50 mM NaOH (50 µl/min, 30 s). Background binding to blank immobilized flow cells was subtracted and affinity constants were calculated using BIAcore T200 evaluation software (GE Healthcare) using the 1:1 Langmuir binding model.

Virus Production

HIV-1^{T251-18} was generated by cloning the T251-18 *env* gene (CRF02_AG; NIH AIDS Reagent program) to the NL4-3 HIV-1 vector backbone and produced by transfection in 293T cells, as previously described (Klein et al., 2012). HIV-1 virus preparations were quantified by p24 ELISA (Lenti-X p24 Rapid Titer Kit, Clontech), following manufacturer's recommendations.

In Vivo Experiments

All *in vivo* experiments were performed in compliance with federal laws and institutional guidelines and have been approved by the Rockefeller University Institutional Animal Care and Use Committee. Humanized NRG (NOD.Cg-*Rag1*^{tm1Mom}*Il2rg*^{tm1Wjl}/SzJ) mice were generated by intrahepatic human CD34⁺ HSCs injection of sublethally irradiated neonatal NRG mice, as previously described (Klein et al., 2012). Mice were screened at 6-8 wk of age for human leukocyte reconstitution by flow cytometry (as described in (Bournazos et al., 2014; Klein et al., 2012)) and mice with a measurable human CD45⁺ graft (10-15 weeks, males and females) were infected following i.p. injection of HIV-1^{T251-18} (180 ng p24). Viral load was quantified 3 weeks post-infection and mice with viral loads >10³ copies/ml were included in treatment experiments. Mice were randomly assigned to experimental groups and both groups had comparable baseline average viremia levels. Antibodies (either 1 mg of 3BNC117/PGT135 biNAb or 1 mg 1:1 mix of 3BNC117 (0.5 mg) and PGT135 (0.5mg)) were administered biweekly s.c. for 4 weeks. Each experimental group consisted of 9 mice; a group size previously determined to sufficiently detect response to antibody therapy (Bournazos et al., 2014; Klein et al., 2012). Plasma HIV-1 viral load was determined by quantitative reverse-transcriptase PCR as previously described (Bournazos et al., 2014; Klein et al., 2012). The lower limit of detection for this assay was previously determined to be 800 copies/ml (Klein et al., 2012).

HIV gp120 Sequence Analysis

Plasma-extracted viral RNA was reverse transcribed using the Superscript III first strand cDNA synthesis kit (Life Technologies) and the gp120 sequence-specific primer 5'-TAGCAATAGTTGTGTGGTCC-3'. Resulting cDNA was used as the template for PCR amplification using the following primer pairs: 5'-TAGCAATAGTTGTGTGGTCC-3' and 5'-ATTGCTCTGCTGTTGCACTATAC-3'. Products from this PCR reaction were subjected to a second PCR round using the following nested primer pairs: 5'-AGAAAGAGCAGAAGACAGTGGC-3' and 5'-TACCGTCAGCGTCATTGACGC-3'. All PCR reactions were performed using the Platinum *Taq* High Fidelity DNA polymerase (ThermoFisher) and PCR amplicons were ligated into pCR4-TOPO vectors. Inserts from individual colonies were sequenced (Genewiz) using M13F (5'-TGTAACGACGGCCAGT-3'), M13R (5'-CAGGAAACAGCTATGAC-3'), and gp120-specific primers (5'-GTCTGGGCTACACATGCCTGC-3'; 5'-CCATGCAAAAATGTCAGCACA-3'; 5'-GATGATATAACTCTCCAATGCAG-3'). Sequence reads were aligned to gp120^{T251-18} and mutations were numbered using HXBc2 numbering. To determine the presence of mutations within the gp120 ORF following bNAbs therapy, virus gp120 was cloned from each mouse from plasma-extracted viral RNA obtained at the last experimental time point. Non-synonymous mutations present in the majority (>50%) of the analyzed clones (6-8 clones/mouse) were defined as recurrent mutations. Mice with evidence for recurrent mutations were further analyzed to determine viral gp120 sequence at baseline (i.e. prior to treatment initiation) to assess whether the observed mutations emerged following antibody treatment.

Supplemental Tables

Table S1: Comparison of the *in vitro* neutralization activity of human IgG1 3BNC117 and 10-1074 mAbs and 3BNC117/10-1074 biNAb. **Related to Figure 1.**

| Virus ID | Clade | 3BNC117 | 10-1074 | 3BNC117 /10-1074 | log Fold Change | Virus ID | Clade | 3BNC117 | 10-1074 | 3BNC117 /10-1074 | log Fold Change |
|-----------------------|---------|---------|---------|------------------|-----------------|-----------------|----------------|--------------|--------------|------------------|-----------------|
| 6535.3 | B | 0.303 | 0.013 | 0.083 | -0.805 | Q769.d22 | A | 0.008 | >20 | 0.028 | -0.524 |
| QH0692.42 | B | 0.238 | 0.073 | 0.282 | -0.587 | Q259.d2.17 | A | 0.016 | 11.912 | 0.359 | -1.357 |
| SC422661.8 | B | 0.045 | 0.072 | 0.108 | -0.381 | Q842.d12 | A | 0.002 | 12.812 | 0.019 | -0.899 |
| PVO.4 | B | 0.076 | 0.074 | 0.067 | 0.043 | Q260.v5.c36 | A | 0.200 | 0.201 | 0.312 | -0.193 |
| TRO.11 | B | 0.062 | 0.014 | 0.060 | -0.632 | 3415.v1.c1 | A | 0.115 | >20 | 0.224 | -0.224 |
| AC10.0.29 | B | 7.028 | 0.037 | 0.248 | -0.826 | 3365.v2.c2 | A | 0.015 | 0.160 | 0.066 | -0.633 |
| RHPA4259.7 | B | 0.026 | 0.049 | 0.030 | -0.059 | 191955_A11 | A (T/F) | >20 | >20 | >20 | ND |
| THRO4156.18 | B | 2.552 | >20 | 7.226 | -0.452 | 191084_B7-19 | A (T/F) | 0.070 | 0.067 | 0.121 | -0.327 |
| REJO4541.67 | B | 0.030 | >20 | 0.129 | -0.635 | 9004SS_A3_4 | A (T/F) | 0.070 | 0.015 | 0.068 | -0.656 |
| TRJO4551.58 | B | 0.059 | 0.459 | 0.270 | -0.661 | T257-31 | CRF02_AG | 0.125 | >20 | 0.369 | -0.469 |
| WITO4160.33 | B | 0.024 | 0.139 | 0.066 | -0.438 | 928-28 | CRF02_AG | 0.153 | 1.911 | 0.424 | -0.442 |
| CAAN5342.A2 | B | 0.612 | 0.014 | 0.115 | -0.915 | 263-8 | CRF02_AG | 0.028 | 0.793 | 0.053 | -0.276 |
| YU2.DG | B | 0.034 | 0.110 | 0.037 | -0.038 | T250-4 | CRF02_AG | >20 | 0.002 | 0.040 | -1.301 |
| WEAU_d15_410_787 | B (T/F) | 0.050 | 0.035 | 0.107 | -0.485 | T251-18 | CRF02_AG | 0.220 | 1.011 | 0.455 | -0.315 |
| 1006_11_C3_1601 | B (T/F) | 0.030 | 0.001 | 0.018 | -1.255 | T278-50 | CRF02_AG | >20 | 7.477 | >20 | -0.427 |
| 1054_07_TC4_1499 | B (T/F) | 0.070 | 0.113 | 0.177 | -0.403 | T255-34 | CRF02_AG | 0.037 | >20 | 0.186 | -0.697 |
| 1056_10_TA11_1826 | B (T/F) | 0.300 | 0.072 | 0.240 | -0.523 | 211-9 | CRF02_AG | 0.350 | 0.203 | 0.680 | -0.525 |
| 1012_11_TC21_3257 | B (T/F) | 0.020 | 0.023 | 0.029 | -0.161 | 235-47 | CRF02_AG | 0.024 | 0.092 | 0.114 | -0.670 |
| 6240_08_TA5_4622 | B (T/F) | 0.330 | 0.087 | 0.225 | -0.413 | 620345.c01 | CRF01_AE | >20 | >20 | >20 | ND |
| 6244_13_B5_4576 | B (T/F) | 0.040 | 0.197 | 0.107 | -0.427 | CNE8 | CRF01_AE | 0.026 | >20 | 0.406 | -1.194 |
| 62357_14_D3_4589 | B (T/F) | 0.060 | >20 | 0.120 | -0.301 | C1080.c03 | CRF01_AE | 0.123 | >20 | 0.400 | -0.511 |
| SC05_8C11_2344 | B (T/F) | 0.150 | 0.037 | 0.178 | -0.682 | R2184.c04 | CRF01_AE | 0.033 | >20 | 0.062 | -0.271 |
| Du156.12 | C | 0.032 | 0.014 | 0.059 | -0.625 | R1166.c01 | CRF01_AE | 0.208 | >20 | 0.354 | -0.231 |
| Du172.17 | C | 0.263 | 0.087 | 0.344 | -0.597 | R3265.c06 | CRF01_AE | 0.058 | >20 | 3.613 | -1.797 |
| Du422.1 | C | >20 | 0.082 | 0.964 | -1.070 | C2101.c01 | CRF01_AE | 0.059 | >20 | 0.131 | -0.347 |
| ZM197M.PB7 | C | 0.354 | >20 | 1.185 | -0.525 | C3347.c11 | CRF01_AE | 0.029 | >20 | 0.077 | -0.419 |
| ZM214M.PL15 | C | 0.082 | 0.590 | 0.299 | -0.562 | C4118.c09 | CRF01_AE | 0.032 | >20 | 0.462 | -1.161 |
| ZM233M.PB6 | C | 0.181 | 0.095 | 0.314 | -0.519 | CNE5 | CRF01_AE | 0.347 | >20 | 1.950 | -0.750 |
| ZM249M.PL1 | C | 0.037 | >20 | 0.224 | -0.780 | BJOX009000.02.4 | CRF01_AE | 0.400 | >20 | 2.557 | -0.806 |
| ZM53M.PB12 | C | 0.212 | >20 | 0.811 | -0.584 | BJOX015000.11.5 | CRF01_AE (T/F) | 0.050 | >20 | 0.589 | -1.071 |
| ZM109F.PB4 | C | 0.052 | >20 | 2.252 | -1.635 | BJOX010000.06.2 | CRF01_AE (T/F) | 1.580 | >20 | 12.713 | -0.906 |
| ZM135M.PL10a | C | 0.058 | 0.146 | 0.183 | -0.502 | BJOX025000.01.1 | CRF01_AE (T/F) | 0.050 | >20 | 0.286 | -0.757 |
| CAP45.2.00.G3 | C | 1.399 | >20 | >20 | -1.155 | BJOX028000.10.3 | CRF01_AE (T/F) | 0.010 | >20 | 0.044 | -0.643 |
| CAP210.2.00.E8 | C | 9.713 | >20 | >20 | -0.314 | X1193_c1 | G | 0.060 | 0.091 | 0.181 | -0.480 |
| HIV-001428-2.42 | C | 0.017 | 0.055 | 0.029 | -0.229 | P0402_c2_11 | G | 0.060 | 0.011 | 0.036 | -0.515 |
| HIV-0013095-2.11 | C | 0.243 | >20 | 4.045 | -1.222 | X1254_c3 | G | 0.080 | 0.162 | 0.320 | -0.602 |
| HIV-16055-2.3 | C | 3.888 | >20 | >20 | -0.711 | X2088_c9 | G | >20 | 0.004 | 0.126 | -1.498 |
| HIV-16845-2.22 | C | >20 | 1.930 | 4.447 | -0.363 | X2131_C1_B5 | G | 0.430 | 0.023 | 0.171 | -0.871 |
| Ce1086_B2 | C (T/F) | 0.090 | >50 | 1.722 | -1.282 | P1981_C5_3 | G | 0.740 | 0.005 | 0.077 | -1.188 |
| Ce0393_C3 | C (T/F) | 0.200 | >50 | 0.916 | -0.661 | X1632_S2_B10 | G | 15.690 | >20 | >20 | -0.105 |
| Ce1176_A3 | C (T/F) | 0.220 | 0.022 | 0.211 | -0.982 | 3016.v5.c45 | D | 0.834 | >20 | 17.306 | -1.317 |
| Ce2010_F5 | C (T/F) | 0.050 | >20 | 0.288 | -0.760 | A07412M1.vrc12 | D | 0.020 | 0.014 | 0.104 | -0.871 |
| Ce0682_E4 | C (T/F) | 0.030 | >20 | 0.077 | -0.409 | Z31965.c01 | D | 0.039 | >20 | 0.275 | -0.844 |
| Ce1172_H1 | C (T/F) | >20 | 0.022 | 0.454 | -1.315 | Z31966.c02 | D | 0.290 | >20 | 4.740 | -1.213 |
| Ce2060_G9 | C (T/F) | 0.240 | >20 | 0.359 | -0.175 | 191821_E6_1 | D (T/F) | 0.090 | >20 | 0.902 | -1.001 |
| Ce703010054_2A2 | C (T/F) | 0.370 | >20 | 1.710 | -0.665 | 3817.v2.c59 | CD | 0.191 | 1.151 | 0.916 | -0.680 |
| BF1266.431a | C (T/F) | 0.030 | >20 | 0.358 | -1.077 | 6480.v4.c25 | CD | 0.010 | 0.005 | 0.034 | -0.833 |
| 246F_C1G | C (T/F) | 19.320 | 0.055 | 0.640 | -1.066 | 6952.v1.c20 | CD | 0.150 | 0.030 | 0.251 | -0.923 |
| 249M_B10 | C (T/F) | 0.100 | >20 | 0.355 | -0.550 | 6811.v7.c18 | CD | 0.030 | 0.002 | 0.029 | -1.161 |
| ZM247v1(Rev-) | C (T/F) | >20 | 0.060 | 1.538 | -1.409 | 89-F1_2_25 | CD | >20 | >20 | >20 | ND |
| 7030102001E5(Rev-) | C (T/F) | 0.290 | 0.010 | 0.127 | -1.104 | 3301.v1.c24 | AC | 0.028 | 0.020 | 0.066 | -0.519 |
| 1394C9G1(Rev-) | C (T/F) | >20 | 0.038 | 0.592 | -1.193 | 6041.v3.c23 | AC | 0.010 | >20 | 0.197 | -1.294 |
| Ce704809221_1B3 | C (T/F) | 0.080 | 0.102 | 0.357 | -0.650 | 6540.v4.c1 | AC | >20 | >20 | >20 | ND |
| CNE19 | BC | 0.020 | 0.344 | 0.124 | -0.792 | 6545.v4.c1 | AC | >20 | >20 | >20 | ND |
| CNE20 | BC | >20 | 0.001 | 0.054 | -1.732 | 0815.v3.c3 | ACD | 0.015 | 0.088 | 0.029 | -0.292 |
| CNE21 | BC | >20 | 0.049 | 0.548 | -1.049 | 6103.v3.c10 | ACD | 0.220 | 0.041 | 0.265 | -0.810 |
| CNE17 | BC | 5.760 | 1.993 | 3.337 | -0.224 | | | | | | |
| CNE30 | BC | 0.280 | 0.353 | 0.772 | -0.440 | | | | | | |
| CNE52 | BC | 0.020 | 1.711 | 0.174 | -0.940 | | | | | | |
| CNE53 | BC | 0.059 | 0.023 | 0.128 | -0.745 | | | | | | |
| CNE58 | BC | 0.336 | 0.137 | 0.364 | -0.424 | | | | | | |
| MS208_A1 | A | 0.016 | >20 | 0.200 | -1.092 | | | | | | |
| Q23_17 | A | 0.016 | 0.006 | 0.020 | -0.523 | | | | | | |
| Q461.e2 | A | 0.059 | >20 | 0.167 | -0.455 | | | | | | |
| Total Viruses | | | | | | | | 120 | 120 | 120 | |
| %Breadth | | | | | | | | 87.5 | 58.3 | 91.7 | |
| Geometric mean | | | | | | | | 0.103 | 0.071 | 0.242 | |

In vitro neutralization activity was determined by standardized TZM-bl assay. IC₅₀ values are expressed as µg/ml. Fold change values were calculated by dividing the IC₅₀ titer of the most potent (lowest IC₅₀) of the two parental mAbs (3BNC117 or 10-1074) by the IC₅₀ titer of the biNAb (3BNC117/10-1074). ND: not determined

Table S2: Comparison of the *in vitro* neutralization activity of human IgG1 PG16 and PGT121 mAbs and PG16/PGT121 bInAb. **Related to Figure 2.**

| Virus ID | Clade | PG16 | PGT121 | PG16/ PGT121 | log Fold Change | Virus ID | Clade | PG16 | PGT121 | PG16/ PGT121 | log Fold Change |
|--------------------|---------|--------|--------|-----------------|--------------------|----------------------------|----------------|--------------|--------|-----------------|--------------------|
| 6535.3 | B | 0.653 | 0.008 | 1.333 | -2.222 | MS208.A1 | A | 0.002 | >50 | 0.052 | -1.415 |
| QH0692.42 | B | >50 | 1.041 | >40 | -1.585 | Q23.17 | A | 0.008 | 0.01 | 0.001 | 0.903 |
| SC422661.8 | B | 0.858 | 0.101 | 14.791 | -2.166 | Q461.e2 | A | 1.755 | >50 | 5.863 | -0.524 |
| PVO.4 | B | 15.272 | 0.131 | 6.705 | -1.709 | Q769.d22 | A | 0.005 | >50 | 0.176 | -1.547 |
| TRO.11 | B | 1.922 | 0.005 | 0.699 | -2.146 | Q259.d2.17 | A | 0.065 | 8.99 | 0.224 | -0.537 |
| AC10.0.29 | B | 0.023 | 0.037 | 0.055 | -0.379 | Q842.d12 | A | 0.032 | 0.023 | 0.023 | 0.000 |
| RHPA4259.7 | B | 0.375 | 0.014 | 1.303 | -1.969 | 0260.v5.c36 | A | 1.538 | 0.054 | 0.817 | -1.180 |
| THRO4156.18 | B | 6.825 | >50 | 10.836 | -0.201 | 191955_A11 | A (T/F) | 0.009 | >50 | 0.022 | -0.388 |
| REJO4541.67 | B | 0.039 | 3.607 | 0.091 | -0.368 | 191084_B7_19 | A (T/F) | 0.024 | 0.042 | 0.034 | -0.151 |
| TRJO4551.58 | B | 1.008 | 3.728 | 4.837 | -0.681 | 9004SS_A3_4 | A (T/F) | 0.020 | 0.008 | 0.026 | -0.512 |
| WITO4160.33 | B | 0.002 | 0.459 | 0.007 | -0.544 | T257-31 | CRF02_AG | 0.007 | >50 | 0.017 | -0.385 |
| CAANS342.A2 | B | 1.831 | 0.011 | 2.507 | -2.358 | 928-28 | CRF02_AG | 0.034 | >50 | 0.090 | -0.423 |
| YU2.DG | B | 0.055 | 0.047 | 0.414 | -0.946 | 263-8 | CRF02_AG | 0.347 | 3.347 | 0.531 | -0.185 |
| BaL_26 | B | 0.163 | 0.014 | 3.266 | -2.353 | T250-4 | CRF02_AG | 0.002 | 0.001 | 0.004 | -0.602 |
| WEAU_d15_410_787 | B (T/F) | 0.435 | 0.083 | 1.032 | -1.095 | T251-18 | CRF02_AG | 1.721 | 17.702 | 11.345 | -0.819 |
| 1006_11_C3_1601 | B (T/F) | >50 | 0.008 | 1.196 | -2.175 | T275-30 | CRF02_AG | 0.227 | >50 | 6.072 | -1.427 |
| 1054_07_TC4_1499 | B (T/F) | >50 | 0.115 | >40 | 0.782 | T255-34 | CRF02_AG | 0.024 | 6.725 | 0.037 | -0.188 |
| 1056_10_TA11_1826 | B (T/F) | 0.315 | 0.066 | 1.219 | -1.266 | 211-9 | CRF02_AG | 0.029 | 1.455 | 0.027 | 0.031 |
| 1012_11_TC21_3257 | B (T/F) | 0.030 | 0.008 | 0.094 | -1.070 | 235-47 | CRF02_AG | 0.092 | 0.332 | 1.039 | -1.053 |
| 6240_08_TA5_4622 | B (T/F) | >50 | 0.128 | 18.289 | -2.155 | 620345.c01 | CRF01_AE | >50 | >50 | >50 | ND |
| 6244_13_B5_4576 | B (T/F) | >50 | 0.249 | >40 | -2.206 | C1080.c03 | CRF01_AE | 0.001 | >50 | 0.002 | -0.301 |
| 62357_14_D3_4589 | B (T/F) | >50 | 1.036 | >40 | -1.587 | R2184.c04 | CRF01_AE | 0.670 | >50 | 5.155 | -0.886 |
| SC05_8C11_2344 | B (T/F) | 0.070 | 0.093 | 0.624 | -0.950 | R1166.c01 | CRF01_AE | 0.280 | >50 | 4.583 | -1.214 |
| Du156.12 | C | 0.006 | 0.007 | 0.029 | -0.684 | R3265.c06 | CRF01_AE | 0.016 | >50 | 0.052 | -0.512 |
| Du172.17 | C | 0.033 | 0.115 | 0.082 | -0.395 | C2101.c01 | CRF01_AE | 0.012 | >50 | 0.012 | 0.000 |
| Du422.1 | C | 0.261 | 0.029 | 0.096 | -0.520 | C3347.c11 | CRF01_AE | 0.008 | >50 | 0.019 | -0.376 |
| ZM197M.PB7 | C | 1.496 | >50 | 0.592 | 0.403 | C4118.c09 | CRF01_AE | 0.022 | >50 | 0.040 | -0.260 |
| ZM214M.PL15 | C | >50 | 0.236 | >40 | -2.229 | CNE5 | CRF01_AE | 0.008 | >50 | 0.004 | 0.301 |
| ZM233M.PB6 | C | 0.002 | 1.451 | 0.002 | 0.000 | BJOX009000.02.4 | CRF01_AE | 1.188 | 3.626 | 2.032 | -0.233 |
| ZM249M.PL1 | C | 0.127 | >50 | 0.049 | 0.414 | CNE55 | CRF01_AE | 1.006 | >50 | 15.160 | -1.178 |
| ZM53M.PB12 | C | 0.007 | 0.001 | 0.011 | -1.041 | BJOX015000.11.5 | CRF01_AE (T/F) | 3.129 | >50 | 10.879 | -0.541 |
| ZM109F.PB4 | C | 7.033 | 7.894 | >40 | -0.755 | BJOX010000.06.2 | CRF01_AE (T/F) | 1.202 | >50 | 10.276 | -0.932 |
| ZM135M.PL10a | C | >50 | 0.576 | 17.298 | -1.478 | BJOX025000.01.1 | CRF01_AE (T/F) | 0.071 | >50 | 0.271 | -0.582 |
| CAP45.2.00.G3 | C | 0.001 | 0.083 | 0.001 | 0.000 | X1193_c1 | G | 0.018 | 0.045 | 0.028 | -0.192 |
| CAP210.2.00.E8 | C | 0.010 | 5.082 | 0.242 | -1.384 | P0402_c2_11 | G | 0.025 | 0.02 | 0.914 | -1.660 |
| HIV-001428-2.42 | C | 0.039 | 0.026 | 0.001 | 1.415 | X2088_c9 | G | >50 | 0.011 | 7.752 | -2.848 |
| HIV-0013095-2.11 | C | 0.002 | >50 | 0.019 | -0.978 | X2131_C1_B5 | G | 0.024 | 0.015 | 0.042 | -0.447 |
| HIV-16055-2.3 | C | 0.17 | 0.444 | 0.008 | 1.327 | P1981_C5_3 | G | 0.376 | 0.004 | 0.348 | -1.940 |
| HIV-16845-2.22 | C | 3.126 | 12.685 | 9.374 | -0.477 | X1632_S2_B10 | G | 0.012 | >50 | 0.063 | -0.720 |
| Ce1086_B2 | C (T/F) | >50 | 0.001 | 1.274 | -3.105 | 3016.v5.c45 | D | >50 | >50 | >50 | ND |
| Ce0393_C3 | C (T/F) | 0.002 | >50 | 0.006 | -0.477 | A07412M1.vrc12 | D | 0.343 | 0.001 | 1.958 | -3.292 |
| Ce1176_A3 | C (T/F) | 0.003 | 0.017 | 0.009 | -0.477 | 231965.c01 | D | 1.438 | >50 | 0.540 | 0.425 |
| Ce0682_E4 | C (T/F) | 0.026 | >50 | 0.051 | -0.293 | 231966.c02 | D | 0.007 | >50 | 0.024 | -0.535 |
| Ce1172_H1 | C (T/F) | 0.007 | 0.023 | 0.021 | -0.477 | 191821_E6_1 | D (T/F) | 9.600 | >50 | >40 | -0.620 |
| Ce2060_G9 | C (T/F) | 0.075 | >50 | 0.398 | -0.725 | 3817.v2.c59 | CD | 0.008 | >50 | 0.011 | -0.138 |
| Ce703010054_2A2 | C (T/F) | 0.008 | >50 | 0.036 | -0.653 | 6480.v4.c25 | CD | >50 | 0.017 | 1.846 | -2.036 |
| BF1266.431a | C (T/F) | 0.003 | >50 | 0.004 | -0.125 | 6952.v1.c20 | CD | 21.865 | 0.085 | 1.797 | -1.325 |
| 246F_C1G | C (T/F) | >50 | 0.083 | 37.288 | -2.652 | 6811.v7.c18 | CD | >50 | 0.004 | 1.227 | -2.487 |
| 249M_B10 | C (T/F) | 0.026 | >50 | 0.052 | -0.301 | 89-F1_2_25 | CD | 47.612 | >50 | >40 | 0.076 |
| ZM247v1(Rev-) | C (T/F) | 0.016 | 0.027 | 0.038 | -0.376 | 3301.v1.c24 | AC | 0.020 | 0.014 | 0.030 | -0.331 |
| 7030102001E5(Rev-) | C (T/F) | >50 | 0.01 | 4.466 | -2.650 | 6041.v3.c23 | AC | 0.048 | >50 | 0.050 | -0.018 |
| 1394C9G1(Rev-) | C (T/F) | 0.008 | 0.486 | 0.040 | -0.699 | 6540.v4.c1 | AC | 0.035 | >50 | 0.030 | 0.067 |
| Ce704809221_1B3 | C (T/F) | 0.021 | 0.098 | 0.033 | -0.196 | 6545.v4.c1 | AC | 0.044 | >50 | 0.205 | -0.668 |
| CNE19 | BC | 0.024 | 0.018 | 0.057 | -0.501 | 0815.v3.c3 | ACD | >50 | 0.022 | 15.225 | -2.840 |
| CNE20 | BC | 3.633 | 0.002 | 0.429 | -2.331 | 3103.v3.c10 | ACD | 25.391 | 0.042 | 7.101 | -2.228 |
| CNE21 | BC | 0.007 | 0.02 | 0.051 | -0.862 | Total Viruses | | | | | |
| CNE17 | BC | 0.029 | 45.289 | 0.060 | -0.316 | 116 | 116 | 116 | | | |
| CNE30 | BC | >50 | 0.101 | 31.101 | -2.488 | %Breadth | | | | | |
| CNE52 | BC | 0.009 | 3.741 | 0.042 | -0.669 | 82.8 | 63.8 | 91.4 | | | |
| CNE53 | BC | >50 | 0.055 | 3.604 | -1.816 | Geometric mean IC50 | | | | | |
| CNE58 | BC | 0.044 | >50 | 0.033 | 0.125 | 0.073 | 0.083 | 0.207 | | | |

In vitro neutralization activity was determined by standardized TZM-bl assay.
IC₅₀ values are expressed as µg/ml.
Fold change values were calculated by dividing the IC₅₀ titer of the most potent (lowest IC₅₀) of the two parental mAbs (PG16 or PGT121) by the IC₅₀ titer of the bInAb (PG16/PGT121).
ND: not determined

Table S3: Comparison of the *in vitro* neutralization activity of human IgG1 PG16 and PGT128 mAbs and PG16/PGT128 biNAb. **Related to Figure 2.**

| Virus ID | Clade | PG16 | PGT128 | PG16/ PGT128 | log Fold Change | Virus ID | Clade | PG16 | PGT128 | PG16/ PGT128 | log Fold Change |
|--------------------|---------|--------|--------|-----------------|--------------------|----------------------------|----------------|--------------|--------------|-----------------|--------------------|
| 6535.3 | B | 0.653 | 0.004 | 1.288 | -2.508 | Q23.17 | A | 0.008 | 0.009 | 0.001 | 0.863 |
| QH0692.42 | B | >50 | 0.029 | >40 | -3.140 | Q461.e2 | A | 1.755 | >50 | 7.703 | -0.642 |
| SC422661.8 | B | 0.858 | 1.078 | >40 | -1.669 | Q769.d22 | A | 0.005 | >50 | 0.135 | -1.431 |
| PVO.4 | B | 15.272 | 0.011 | 1.820 | -2.219 | Q259.d2.17 | A | 0.065 | >50 | 0.213 | -0.515 |
| TRO.11 | B | 1.922 | 0.019 | 0.646 | -1.531 | Q842.d12 | A | 0.032 | 0.008 | 0.023 | -0.459 |
| AC10.0.29 | B | 0.023 | 0.008 | 0.040 | -0.699 | 0260.v5.c36 | A | 1.538 | 0.058 | 0.635 | -1.039 |
| RHPA4259.7 | B | 0.375 | 0.026 | 0.922 | -1.550 | 0330.v4.c3 | A | 0.005 | 1.604 | 0.014 | -0.447 |
| THRO4156.18 | B | 6.825 | >50 | 15.441 | -0.355 | 191955_A11 | A (T/F) | 0.009 | 14.195 | 0.029 | -0.508 |
| TRJO4541.67 | B | 0.039 | >50 | 0.027 | 0.160 | 191084_B7-19 | A (T/F) | 0.024 | 0.022 | 0.032 | -0.163 |
| TRJO4551.58 | B | 1.008 | 0.018 | 0.356 | -1.296 | 9004SS_A3_4 | A (T/F) | 0.020 | 0.002 | 0.035 | -1.243 |
| WIT04160.33 | B | 0.002 | >50 | 0.006 | -0.477 | T257-31 | CRF02_AG | 0.007 | >50 | 0.019 | -0.434 |
| CAAN5342_A2 | B | 1.831 | 0.514 | 5.701 | -1.045 | 928-28 | CRF02_AG | 0.034 | >50 | 0.111 | -0.514 |
| YU2.DG | B | 0.055 | 0.030 | 0.350 | -1.074 | 263-8 | CRF02_AG | 0.347 | 0.342 | 0.323 | 0.025 |
| BaL_26 | B | 0.163 | 0.021 | 4.691 | -2.349 | T250-4 | CRF02_AG | 0.002 | 0.001 | 0.002 | -0.301 |
| WEAU_d15_410_787 | B (T/F) | 0.435 | 0.032 | 2.310 | -1.858 | T251-18 | CRF02_AG | 1.721 | >50 | 12.683 | -0.867 |
| 1006_11_C3_1601 | B (T/F) | >50 | 0.011 | 6.400 | -2.765 | T278-50 | CRF02_AG | 0.227 | 0.031 | 3.104 | -2.001 |
| 1054_07_TC4_1499 | B (T/F) | >50 | 0.035 | >40 | -3.058 | T255-34 | CRF02_AG | 0.024 | >50 | 0.051 | -0.327 |
| 1056_10_TA11_1826 | B (T/F) | 0.315 | 0.001 | 0.42 | -2.823 | 211-9 | CRF02_AG | 0.029 | 0.062 | 0.033 | -0.056 |
| 1012_11_TC21_3257 | B (T/F) | 0.030 | 0.011 | 0.094 | -0.932 | 235-47 | CRF02_AG | 0.092 | >50 | 1.006 | -1.039 |
| 6240_08_TA5_4622 | B (T/F) | >50 | 0.019 | 12.085 | -2.803 | 620345.c01 | CRF01_AE | >50 | >50 | >50 | ND |
| 6244_13_B5_4576 | B (T/F) | >50 | 0.020 | 12.702 | -2.803 | C1080.c03 | CRF01_AE | 0.001 | 0.283 | 0.003 | -0.477 |
| 62357_14_D3_4589 | B (T/F) | >50 | 1.144 | >40 | -1.544 | R2184.c04 | CRF01_AE | 0.670 | 20.056 | 1.738 | -0.414 |
| SC05_8C11_2344 | B (T/F) | 0.070 | 0.017 | 0.502 | -1.470 | R1166.c01 | CRF01_AE | 0.280 | >50 | 5.646 | -1.305 |
| Du156.12 | C | 0.006 | 0.017 | 0.035 | -0.766 | R3265.c06 | CRF01_AE | 0.016 | >50 | 0.079 | -0.694 |
| Du172.17 | C | 0.033 | 0.028 | 0.096 | -0.535 | C2101.c01 | CRF01_AE | 0.012 | >50 | 0.020 | -0.222 |
| Du422.1 | C | 0.261 | 0.039 | 0.081 | -0.317 | C3347.c11 | CRF01_AE | 0.008 | 0.001 | 0.015 | -1.176 |
| ZM197M.PB7 | C | 1.496 | >50 | 0.574 | 0.416 | C4118.c09 | CRF01_AE | 0.022 | >50 | 0.030 | -0.135 |
| ZM214M.PL15 | C | >50 | 1.498 | >40 | -1.427 | CNE5 | CRF01_AE | 0.008 | 0.018 | 0.004 | 0.301 |
| ZM233M.PB6 | C | 0.002 | >50 | 0.006 | -0.477 | BJOX009000.02.4 | CRF01_AE | 1.188 | 0.001 | 0.721 | -2.858 |
| ZM249M.PL1 | C | 0.127 | 39.657 | 0.040 | 0.502 | CNE55 | CRF01_AE | 1.006 | >50 | 24.829 | -1.392 |
| ZM53M.PB12 | C | 0.007 | >50 | 0.018 | -0.410 | BJOX015000.11.5 | CRF01_AE (T/F) | 3.129 | 0.001 | 0.591 | -2.772 |
| ZM109F.PB4 | C | 7.033 | >50 | >40 | -0.755 | BJOX010000.06.2 | CRF01_AE (T/F) | 1.202 | 4.817 | 2.695 | -0.351 |
| ZM135M.PL10a | C | >50 | >50 | >50 | ND | BJOX025000.01.1 | CRF01_AE (T/F) | 0.071 | >50 | 0.086 | -0.083 |
| CAP45.2.00.G3 | C | 0.001 | >50 | 0.002 | -0.301 | BJOX028000.10.3 | CRF01_AE (T/F) | >50 | 0.024 | 1.159 | -1.684 |
| CAP210.2.00.E8 | C | 0.010 | >50 | 0.186 | -1.270 | X1193_c1 | G | 0.018 | >50 | 0.041 | -0.358 |
| HIV-001428-2.42 | C | 0.039 | 0.026 | 0.002 | 1.114 | P0402_c2_11 | G | 0.025 | 0.007 | 1.352 | -2.286 |
| HIV-0013095-2.11 | C | 0.002 | >50 | 0.024 | -1.079 | X1254_c3 | G | 0.023 | >50 | 0.183 | -0.901 |
| HIV-16055-2.3 | C | 0.17 | >50 | 0.013 | 1.117 | X2131_C1_B5 | G | 0.024 | >50 | 0.039 | -0.211 |
| HIV-16845-2.22 | C | 3.126 | 0.181 | 5.096 | -1.450 | P1981_C5_3 | G | 0.376 | 0.019 | 0.544 | -1.457 |
| Ce0393_C3 | C (T/F) | 0.002 | >50 | 0.009 | -0.653 | X1632_S2_B10 | G | 0.012 | >50 | 0.074 | -0.790 |
| Ce1176_A3 | C (T/F) | 0.003 | 0.009 | 0.011 | -0.564 | 3016.v5.c45 | D | >50 | >50 | >50 | ND |
| Ce0682_E4 | C (T/F) | 0.026 | >50 | 0.080 | -0.488 | A07412M1.vrc12 | D | 0.343 | >50 | 2.317 | -0.830 |
| Ce1172_H1 | C (T/F) | 0.007 | 0.013 | 0.033 | -0.673 | 231965.c01 | D | 1.438 | >50 | 0.356 | 0.606 |
| Ce2060_G9 | C (T/F) | 0.075 | >50 | 0.404 | -0.731 | 231966.c02 | D | 0.007 | 3.197 | 0.030 | -0.632 |
| Ce703010054_2A2 | C (T/F) | 0.008 | >50 | 0.029 | -0.559 | 191821_E6_1 | D (T/F) | 9.6 | 0.010 | 12.670 | -3.110 |
| BF1266.431a | C (T/F) | 0.003 | >50 | 0.006 | -0.301 | 3817_v2.c59 | CD | 0.008 | 0.003 | 0.013 | -0.637 |
| 246F_C1G | C (T/F) | >50 | 0.005 | >40 | -3.903 | 6480.v4.c25 | CD | >50 | 0.003 | 7.987 | -3.425 |
| 249M_B10 | C (T/F) | 0.026 | 7.868 | 0.041 | -0.198 | 6952.v1.c20 | CD | 21.865 | >50 | 36.091 | -0.218 |
| ZM247v1(Rev-) | C (T/F) | 0.016 | 0.021 | 0.035 | -0.340 | 6811.v7.c18 | CD | >50 | 0.003 | >40 | -4.125 |
| 7030102001E5(Rev-) | C (T/F) | >50 | 0.007 | >40 | -3.757 | 89-F1_2_25 | CD | 47.612 | >50 | >40 | ND |
| 1394CG1(Rev-) | C (T/F) | 0.008 | 0.011 | 0.042 | -0.720 | 3301.v1.c24 | AC | 0.020 | 0.067 | 0.030 | -0.176 |
| Ce704809221_1B3 | C (T/F) | 0.021 | 0.026 | 0.027 | -0.109 | 6041.v3.c23 | AC | 0.048 | >50 | 0.100 | -0.319 |
| CNE19 | BC | 0.024 | >50 | 0.052 | -0.336 | 6540.v4.c1 | AC | 0.035 | 11.798 | 0.029 | 0.082 |
| CNE20 | BC | 3.633 | 0.001 | 0.256 | -2.408 | 6545.v4.c1 | AC | 0.044 | >50 | 0.135 | -0.487 |
| CNE21 | BC | 0.007 | 0.010 | 0.052 | -0.871 | 0815.v3.c3 | ACD | >50 | 0.030 | 24.937 | -2.920 |
| CNE17 | BC | 0.029 | 0.432 | 0.061 | -0.323 | 3103.v3.c10 | ACD | 25.391 | 0.014 | 5.523 | -2.596 |
| CNE30 | BC | >50 | 2.055 | >40 | -1.289 | | | | | | |
| CNE52 | BC | 0.009 | >50 | 0.038 | -0.626 | | | | | | |
| CNE53 | BC | >50 | 0.010 | 6.578 | -2.818 | | | | | | |
| CNE58 | BC | 0.044 | 13.768 | 0.044 | 0.000 | | | | | | |
| MS208.A1 | A | 0.002 | >50 | 0.050 | -1.398 | | | | | | |
| | | | | | | Total Viruses | | | | | |
| | | | | | | | 117 | 117 | 117 | | |
| | | | | | | %Breadth | | | | | |
| | | | | | | | 83.8 | 60.7 | 88.0 | | |
| | | | | | | Geometric mean IC50 | | | | | |
| | | | | | | | 0.071 | 0.043 | 0.167 | | |

In vitro neutralization activity was determined by standardized TZM-bl assay. IC₅₀ values are expressed as µg/ml. Fold change values were calculated by dividing the IC₅₀ titer of the most potent (lowest IC₅₀) of the two parental mAbs (PG16 or PGT128) by the IC₅₀ titer of the biNAb (PG16/PGT128). ND: not determined

Table S4: Comparison of the *in vitro* neutralization activity of human IgG1 PG16 and 10-1074 mAbs and PG16/10-1074 biNAb.

Related to Figure 2.

| Virus ID | Clade | PG16 | 10-1074 | PG16/ 10-1074 | log Fold Change |
|----------------------------|----------|--------------|--------------|------------------|--------------------|
| SC422661.8 | B | 0.858 | 0.072 | 0.224 | -0.493 |
| TRO.11 | B | 1.922 | 0.014 | 0.028 | -0.301 |
| THRO4156.18 | B | 6.825 | >50 | 21.692 | -0.502 |
| TRJO4551.58 | B | 1.008 | 0.459 | 0.120 | 0.583 |
| YU2.DG | B | 0.055 | 0.110 | 0.113 | -0.310 |
| Du422.1 | C | 0.261 | 0.082 | 0.018 | 0.659 |
| ZM249M.PL1 | C | 0.127 | >50 | 0.240 | -0.276 |
| ZM109F.PB4 | C | 7.033 | >50 | >40 | -0.755 |
| ZM135M.PL10a | C | >50 | 0.146 | 0.428 | -0.467 |
| CAP210.2.00.E8 | C | 0.010 | >50 | 0.575 | -1.760 |
| HIV-16845-2.22 | C | 3.126 | 1.930 | 0.402 | 0.681 |
| 249M B10 | C (T/F) | 0.026 | >50 | 0.146 | -0.749 |
| CNE30 | BC | >50 | 0.363 | 1.264 | -0.542 |
| MS208.A1 | A | 0.002 | 45.556 | 0.156 | -1.892 |
| Q23.17 | A | 0.008 | 0.006 | 0.001 | 0.778 |
| Q461.e2 | A | 1.755 | >50 | 26.032 | -1.171 |
| 0260.v5.c36 | A | 1.538 | 0.201 | 0.091 | 0.344 |
| T257-31 | CRF02_AG | 0.007 | >50 | 0.053 | -0.879 |
| 263-8 | CRF02_AG | 0.347 | 0.763 | 0.222 | 0.194 |
| T250-4 | CRF02_AG | 0.002 | 0.002 | 0.001 | 0.301 |
| T251-18 | CRF02_AG | 1.721 | 1.011 | 2.028 | -0.302 |
| 211-9 | CRF02_AG | 0.029 | 0.203 | 0.027 | 0.031 |
| 620345.c01 | CRF01_AE | >50 | >50 | >50 | ND |
| R1166.c01 | CRF01_AE | 0.280 | >50 | 41.588 | -2.172 |
| R3265.c06 | CRF01_AE | 0.016 | >50 | 0.424 | -1.423 |
| C2101.c01 | CRF01_AE | 0.012 | >50 | 0.164 | -1.136 |
| X1193_c1 | G | 0.018 | 0.091 | 0.039 | -0.336 |
| X2131_C1_B5 | G | 0.024 | 0.023 | 0.012 | 0.283 |
| 3016.v5.c45 | D | >50 | >50 | >50 | ND |
| 6952.v1.c20 | CD | 21.865 | 0.030 | 0.067 | -0.349 |
| 6041.v3.c23 | AC | 0.048 | 21.720 | 2.038 | -1.628 |
| 6540.v4.c1 | AC | 0.035 | >50 | 0.258 | -0.868 |
| Total Viruses | | 32 | 32 | 32 | |
| %Breadth | | 87.5 | 56.3 | 87.5 | |
| Geometric mean IC50 | | 0.139 | 0.183 | 0.192 | |

In vitro neutralization activity was determined by standardized TZM-bl assay.
IC₅₀ values are expressed as µg/ml.
Fold change values were calculated by dividing the IC₅₀ titer of the most potent (lowest IC₅₀) of the two parental mAbs (PG16 or 10-1074) by the IC₅₀ titer of the biNAb (PG16/10-1074).
ND: not determined

Table S5: Comparison of the *in vitro* neutralization activity of human IgG1 PGT151 and 35022 mAbs and PGT151/35022 biNAb. **Related to Figure 2.**

| Virus ID | Clade | PGT151 | 35022 | PGT151/35022 | log Fold Change | Virus ID | Clade | PGT151 | 35022 | PGT151/35022 | log Fold Change |
|--------------------|---------|--------|--------|--------------|-----------------|----------------------------|----------------|--------------|--------|--------------|-----------------|
| 6535.3 | B | 0.005 | >50 | 0.020 | -0.602 | Q769.d22 | A | >50 | >50 | >50 | ND |
| QH0692.42 | B | 0.078 | 9.621 | 0.150 | -0.284 | Q259.d2.17 | A | 50.000 | >50 | 5.890 | 0.929 |
| SC422661.8 | B | 0.012 | >50 | 0.032 | -0.426 | Q842.d12 | A | 0.024 | 11.580 | 0.045 | -0.273 |
| PVO.4 | B | 0.129 | >50 | 0.424 | -0.517 | Q260.v5.c36 | A | 0.355 | >50 | 0.680 | -0.282 |
| TRO.11 | B | >50 | >50 | >50 | ND | 3415.v1.c1 | A | 0.009 | >50 | 0.024 | -0.426 |
| AC10.0.29 | B | 0.007 | 8.782 | 0.028 | -0.602 | 3365.v2.c2 | A | 0.011 | >50 | 0.065 | -0.772 |
| RHPA4259.7 | B | 0.035 | >50 | 0.068 | -0.288 | 191955_A11 | A (T/F) | 0.016 | 20.351 | 0.043 | -0.429 |
| THRO4156.18 | B | >50 | >50 | >50 | ND | 191084_B7-19 | A (T/F) | 0.014 | >50 | 0.044 | -0.497 |
| REJO4541.67 | B | 0.096 | 0.355 | 0.075 | 0.107 | 9004SS_A3_4 | A (T/F) | 0.027 | >50 | 0.051 | -0.276 |
| TRJO4551.58 | B | 1.053 | 5.474 | 0.752 | 0.146 | T257-31 | CRF02_AG | 0.006 | >50 | 0.024 | -0.602 |
| WITO4160.33 | B | 0.005 | >50 | 0.024 | -0.681 | 928-28 | CRF02_AG | >50 | >50 | >50 | ND |
| CAAN5342.A2 | B | 0.013 | 1.591 | 0.058 | -0.649 | 263-8 | CRF02_AG | >50 | >50 | >50 | ND |
| YU2.DG | B | 11.373 | >50 | 41.362 | -0.561 | T250-4 | CRF02_AG | 0.011 | >50 | 0.024 | -0.339 |
| WEAU d15 410 787 | B (T/F) | 0.098 | >50 | 0.112 | -0.058 | 1751-18 | CRF02_AG | 0.782 | >50 | 1.504 | -0.284 |
| 1006 11 C3 1601 | B (T/F) | 3.367 | >50 | 6.427 | -0.281 | T278-50 | CRF02_AG | 0.260 | >50 | 0.460 | -0.248 |
| 1054_07_TC4_1499 | B (T/F) | 0.015 | >50 | 0.023 | -0.186 | 215-34 | CRF02_AG | 0.014 | >50 | 0.026 | -0.269 |
| 1056_10_TA11_1826 | B (T/F) | 0.023 | >50 | 0.188 | -0.912 | T25-9 | CRF02_AG | 0.006 | 12.641 | 0.022 | -0.564 |
| 1012_11_TC21_3257 | B (T/F) | >50 | >50 | >50 | ND | 235-47 | CRF02_AG | >50 | >50 | >50 | ND |
| 6240_08_TA5_4622 | B (T/F) | 0.112 | 4.100 | 0.406 | -0.559 | 620345.c01 | CRF01_AE | >50 | >50 | >50 | ND |
| 6244_13_B5_4576 | B (T/F) | >50 | >50 | >50 | ND | CNE8 | CRF01_AE | >50 | >50 | >50 | ND |
| 62357_14_D3_4589 | B (T/F) | 0.024 | 0.243 | 0.034 | -0.151 | C1080.c03 | CRF01_AE | >50 | 0.288 | 0.440 | -0.184 |
| SC05_8C11_2344 | B (T/F) | 0.153 | >50 | 1.320 | -0.936 | R2184.c04 | CRF01_AE | >50 | 16.954 | 45.045 | -0.424 |
| Du156.12 | C | 0.011 | >50 | 0.046 | -0.621 | R1166.c01 | CRF01_AE | >50 | >50 | >50 | ND |
| Du172.17 | C | 0.008 | >50 | 0.029 | -0.559 | R3265.c06 | CRF01_AE | >50 | >50 | >50 | ND |
| Du422.1 | C | 1.149 | 13.085 | 0.454 | 0.403 | C2101.c01 | CRF01_AE | 50.000 | >50 | 29.517 | 0.229 |
| ZM197M.PB7 | C | 0.011 | >50 | 0.095 | -0.936 | C3347.c11 | CRF01_AE | >50 | >50 | >50 | ND |
| ZM214M.PL15 | C | 0.034 | >50 | 0.038 | -0.048 | C4118.c09 | CRF01_AE | >50 | 0.097 | 0.173 | -0.251 |
| ZM233M.PB6 | C | 0.038 | 1.406 | 0.060 | -0.198 | CNE5 | CRF01_AE | >50 | >50 | >50 | ND |
| ZM249M.PL1 | C | 0.010 | 0.221 | 0.033 | -0.519 | BJOX009000.02.4 | CRF01_AE | >50 | >50 | >50 | ND |
| ZM53M.PB12 | C | >50 | >50 | >50 | ND | BJOX015000.11.5 | CRF01_AE (T/F) | >50 | >50 | >50 | ND |
| ZM109F.PB4 | C | 0.501 | >50 | 2.487 | -0.696 | BJOX010000.06.2 | CRF01_AE (T/F) | >50 | >50 | >50 | ND |
| ZM135M.PL10a | C | >50 | >50 | >50 | ND | BJOX025000.01.1 | CRF01_AE (T/F) | >50 | >50 | >50 | ND |
| CAP45.2.00.G3 | C | 0.103 | 2.224 | 0.120 | -0.066 | BJOX028000.10.3 | CRF01_AE (T/F) | 50.000 | >50 | 24.369 | 0.312 |
| CAP210.2.00.E8 | C | 0.020 | 0.422 | 0.095 | -0.677 | X1193_c1 | G | 0.027 | 5.092 | 0.058 | -0.332 |
| HIV-001428-2.42 | C | 0.078 | >50 | 0.329 | -0.625 | P0402_c2_11 | G | 0.012 | 41.444 | 0.030 | -0.398 |
| HIV-0013095-2.11 | C | 2.075 | >50 | 11.832 | -0.756 | X1254_c3 | G | 0.263 | >50 | 1.977 | -0.876 |
| HIV-16055-2.3 | C | 0.174 | >50 | 1.828 | -1.021 | X2088_c9 | G | >50 | >50 | >50 | ND |
| HIV-16845-2.22 | C | >50 | >50 | >50 | ND | X2131_C1_B5 | G | 0.019 | >50 | 0.076 | -0.602 |
| Ce1086_B2 | C (T/F) | 0.250 | >50 | 0.419 | -0.224 | P1981_C5_3 | G | 0.133 | 0.622 | 0.176 | -0.122 |
| Ce0393_C3 | C (T/F) | >50 | >50 | >50 | ND | X1632_S2_B10 | G | 1.207 | >50 | 0.714 | 0.228 |
| Ce1176_A3 | C (T/F) | 0.007 | 1.551 | 0.017 | -0.385 | 3016.v5.c45 | D | 0.641 | >50 | 1.785 | -0.445 |
| Ce2010_F5 | C (T/F) | >50 | 2.719 | 48.524 | -1.252 | A07412M1.vrc12 | D | 0.808 | >50 | 6.110 | -0.879 |
| Ce0682_E4 | C (T/F) | >50 | >50 | >50 | ND | 231965.c01 | D | 0.019 | >50 | 0.048 | -0.402 |
| Ce1172_H1 | C (T/F) | >50 | >50 | >50 | ND | 231966.c02 | D | 0.159 | >50 | 0.913 | -0.759 |
| Ce2060_G9 | C (T/F) | 0.902 | >50 | 2.570 | -0.455 | 191821_E6_1 | D (T/F) | 0.276 | >50 | 1.153 | -0.621 |
| Ce703010054_2A2 | C (T/F) | 0.047 | 17.054 | 0.137 | -0.465 | 3817.v2.c59 | CD | >50 | >50 | >50 | ND |
| BF1266.431a | C (T/F) | >50 | >50 | >50 | ND | 6480.v4.c25 | CD | >50 | >50 | >50 | ND |
| 246F_C1G | C (T/F) | >50 | 25.031 | 2.924 | 0.933 | 6952.v1.c20 | CD | >50 | >50 | >50 | ND |
| 249M_B10 | C (T/F) | 0.021 | 1.034 | 0.050 | -0.377 | 6811.v7.c18 | CD | >50 | >50 | >50 | ND |
| ZM247v1(Rev-) | C (T/F) | 0.068 | >50 | 0.248 | -0.562 | 89-F1_2_25 | CD | >50 | >50 | >50 | ND |
| 7030102001E5(Rev-) | C (T/F) | 0.009 | >50 | 0.032 | -0.551 | 3301.v1.c24 | AC | 0.036 | 24.840 | 0.077 | -0.330 |
| 1394C9G1(Rev-) | C (T/F) | 0.051 | >50 | 0.088 | -0.237 | 6041.v3.c23 | AC | 0.034 | >50 | 0.076 | -0.349 |
| Ce704809221_1B3 | C (T/F) | >50 | 0.565 | 2.460 | -0.639 | 6540.v4.c1 | AC | 0.024 | >50 | 0.065 | -0.433 |
| CNE19 | BC | 0.049 | 0.651 | 0.063 | -0.109 | 6545.v4.c1 | AC | 0.023 | >50 | 0.062 | -0.431 |
| CNE20 | BC | >50 | >50 | >50 | ND | 0815.v3.c3 | ACD | >50 | 10.664 | 0.102 | 2.019 |
| CNE21 | BC | 0.004 | >50 | 0.019 | -0.677 | 3103.v3.c10 | ACD | 0.115 | >50 | 0.311 | -0.432 |
| CNE17 | BC | 0.231 | >50 | 1.922 | -0.920 | Total Viruses | | | | | |
| CNE30 | BC | 39.348 | >50 | 6.218 | 0.801 | 120 | 120 | 120 | | | |
| CNE52 | BC | 0.022 | >50 | 0.049 | -0.348 | %Breadth | | | | | |
| CNE53 | BC | >50 | >50 | >50 | ND | 64.2 | 27.5 | 72.5 | | | |
| CNE58 | BC | 0.007 | 42.173 | 0.031 | -0.646 | Geometric mean IC50 | | | | | |
| MS208.A1 | A | 0.006 | >50 | 0.032 | -0.727 | 0.077 | 2.840 | 0.220 | | | |
| Q23.17 | A | 0.018 | 2.797 | 0.040 | -0.347 | | | | | | |
| Q461.e2 | A | 2.569 | 0.231 | 0.306 | -0.122 | | | | | | |

In vitro neutralization activity was determined by standardized TZM-bl assay. IC₅₀ values are expressed as µg/ml. Fold change values were calculated by dividing the IC₅₀ titer of the most potent (lowest IC₅₀) of the two parental mAbs (PGT151 or 35022) by the IC₅₀ titer of the biNAb (PGT151/35022). ND: not determined

Related to Figure 4.

Table S6: *In vitro* neutralization activity (IC₅₀ and IC₈₀ titers) of hinge variants of 3BNC117/10-1074 biNAb.

| Virus ID | Clade | IgG1 | | IgG3C- | | Fold Change log | | Virus ID | Clade | IgG1 | | IgG3C- | | Fold Change log | |
|--------------------|---------|-------|--------|--------|--------|-----------------|--------|-----------------|----------------|--------|--------|--------|-------|-----------------|--------|
| | | IC50 | IC80 | IC50 | IC80 | IC50 | IC80 | | | IC50 | IC80 | IC50 | IC80 | IC50 | IC80 |
| 6535.3 | B | 0.083 | 0.363 | 0.015 | 0.070 | 0.743 | 0.715 | Q769.d22 | A | 0.028 | 0.170 | 0.014 | 0.083 | 0.301 | 0.311 |
| QH0692.42 | B | 0.282 | 0.994 | 0.175 | 0.830 | 0.207 | 0.078 | Q259.d2.17 | A | 0.359 | 1.264 | 0.081 | 0.389 | 0.647 | 0.512 |
| SC422661.8 | B | 0.108 | 0.458 | 0.045 | 0.161 | 0.380 | 0.454 | Q842.d12 | A | 0.019 | 0.053 | 0.014 | 0.049 | 0.133 | 0.034 |
| PVO.4 | B | 0.067 | 0.218 | 0.023 | 0.096 | 0.464 | 0.356 | Q260.v5.c36 | A | 0.312 | 0.823 | 0.210 | 0.708 | 0.172 | 0.065 |
| TRO.11 | B | 0.060 | 0.162 | 0.025 | 0.088 | 0.380 | 0.265 | 3415.v1.c1 | A | 0.224 | 0.609 | 0.135 | 0.488 | 0.220 | 0.096 |
| AC10.0.29 | B | 0.248 | 1.121 | 0.051 | 0.318 | 0.687 | 0.547 | 3365.v2.c2 | A | 0.066 | 0.182 | 0.041 | 0.148 | 0.207 | 0.090 |
| RHPA4259.7 | B | 0.030 | 0.108 | 0.014 | 0.067 | 0.331 | 0.207 | 191955.A11 | A (T/F) | >20 | >20 | >20 | >20 | ND | ND |
| THRO4156.18 | B | 7.226 | >20 | 5.716 | 17.271 | 1.02 | 0.064 | 191084.B7-19 | A (T/F) | 0.121 | 0.334 | 0.060 | 0.209 | 0.305 | 0.204 |
| REJQ4541.67 | B | 0.129 | 0.450 | 0.043 | 0.209 | 0.477 | 0.333 | 9004SS.A3.4 | A (T/F) | 0.068 | 0.191 | 0.030 | 0.088 | 0.355 | 0.337 |
| TRJQ4551.58 | B | 0.270 | 0.905 | 0.168 | 0.571 | 0.206 | 0.200 | T257-31 | CRF02.AG | 0.369 | 1.753 | 0.285 | 1.424 | 0.112 | 0.090 |
| WITQ4160.33 | B | 0.066 | 0.233 | 0.023 | 0.120 | 0.458 | 0.288 | 928-28 | CRF02.AG | 0.424 | 1.615 | 0.338 | 1.709 | 0.098 | -0.025 |
| CAANS342.A2 | B | 0.115 | 0.395 | 0.020 | 0.101 | 0.760 | 0.592 | 263-9 | CRF02.AG | 0.053 | 0.194 | 0.029 | 0.149 | 0.262 | 0.115 |
| YU2.DG | B | 0.037 | 0.101 | 0.024 | 0.070 | 0.188 | 0.159 | T250-4 | CRF02.AG | 0.040 | 0.115 | 0.007 | 0.027 | 0.757 | 0.629 |
| WEAU.d15.410.787 | B (T/F) | 0.107 | 0.370 | 0.035 | 0.228 | 0.485 | 0.210 | T251-18 | CRF02.AG | 0.455 | 1.254 | 0.350 | 1.203 | 0.114 | 0.018 |
| 1006.11.C3.1601 | B (T/F) | 0.018 | 0.061 | 0.006 | 0.017 | 0.477 | 0.555 | T278-50 | CRF02.AG | >20 | >20 | 14.538 | >20 | 0.139 | ND |
| 1054.07.TC4.1499 | B (T/F) | 0.177 | 0.795 | 0.053 | 0.366 | 0.524 | 0.337 | T255-34 | CRF02.AG | 0.186 | 0.819 | 0.081 | 0.351 | 0.361 | 0.368 |
| 1055.10.TA11.1826 | B (T/F) | 0.240 | 0.808 | 0.062 | 0.342 | 0.588 | 0.373 | 211-9 | CRF02.AG | 0.680 | 2.430 | 0.232 | 1.104 | 0.467 | 0.343 |
| 1012.11.TC21.3257 | B (T/F) | 0.029 | 0.129 | 0.017 | 0.080 | 0.232 | 0.207 | 235-47 | CRF02.AG | 0.114 | 0.407 | 0.044 | 0.221 | 0.413 | 0.265 |
| 6240.08.TA5.4622 | B (T/F) | 0.225 | 0.638 | 0.095 | 0.349 | 0.374 | 0.282 | 620345.c01 | CRF01.AE | >20 | >20 | >20 | >20 | ND | ND |
| 6244.13.B5.4576 | B (T/F) | 0.107 | 0.368 | 0.064 | 0.286 | 0.223 | 0.109 | CNE8 | CRF01.AE | 0.406 | 1.468 | 0.237 | 1.212 | 0.234 | 0.083 |
| 62357.14.D3.4589 | B (T/F) | 0.120 | 0.394 | 0.056 | 0.255 | 0.331 | 0.189 | C1080.c03 | CRF01.AE | 0.400 | 1.947 | 0.241 | 1.552 | 0.220 | 0.098 |
| SC05.BC11.2344 | B (T/F) | 0.178 | 0.481 | 0.076 | 0.264 | 0.370 | 0.261 | R2184.c04 | CRF01.AE | 0.062 | 0.214 | 0.033 | 0.147 | 0.274 | 0.163 |
| Du156.12 | C | 0.059 | 0.261 | 0.012 | 0.058 | 0.692 | 0.653 | R1166.c01 | CRF01.AE | 0.354 | 1.232 | 0.305 | 1.458 | 0.065 | -0.073 |
| Du172.17 | C | 0.344 | 1.223 | 0.114 | 0.519 | 0.480 | 0.372 | R3265.c06 | CRF01.AE | 3.613 | >20 | 0.093 | 4.022 | 1.589 | 0.697 |
| Du422.1 | C | 0.964 | 3.662 | 0.162 | 0.609 | 0.775 | 0.779 | C2101.c01 | CRF01.AE | 0.131 | 0.446 | 0.058 | 0.387 | 0.354 | 0.062 |
| ZM197M.PB7 | C | 1.185 | 5.454 | 0.741 | 2.529 | 0.204 | 0.334 | C3347.c11 | CRF01.AE | 0.077 | 0.337 | 0.038 | 0.236 | 0.307 | 0.155 |
| ZM214M.PL15 | C | 0.299 | 1.972 | 0.045 | 0.797 | 0.822 | 0.393 | C4118.c09 | CRF01.AE | 0.462 | 1.013 | 0.205 | 0.811 | 0.353 | 0.097 |
| ZM233M.PB6 | C | 0.314 | 1.097 | 0.047 | 0.221 | 0.825 | 0.696 | CNE5 | CRF01.AE | 1.950 | 5.409 | 0.786 | 2.968 | 0.395 | 0.261 |
| ZM249M.PL.1 | C | 0.224 | 1.055 | 0.113 | 0.573 | 0.297 | 0.265 | BJOX009000.02.4 | CRF01.AE | 2.557 | 7.419 | 1.194 | 4.925 | 0.331 | 0.178 |
| ZM53M.PB12 | C | 0.811 | 2.810 | 0.293 | 0.997 | 0.442 | 0.450 | BJOX015000.11.5 | CRF01.AE (T/F) | 0.589 | 2.734 | 0.152 | 1.115 | 0.588 | 0.390 |
| ZM109F.PB4 | C | 2.252 | 10.124 | 0.569 | 4.565 | 0.597 | 0.346 | BJOX010000.06.2 | CRF01.AE (T/F) | 12.713 | >20 | 4.874 | >20 | 0.416 | ND |
| ZM135M.PL10a | C | 0.183 | 0.638 | 0.092 | 0.419 | 0.299 | 0.183 | BJOX025000.01.1 | CRF01.AE (T/F) | 0.286 | 1.727 | 0.145 | 1.184 | 0.295 | 0.164 |
| CAP45.2.00.G3 | C | >20 | >20 | 6.276 | >20 | 0.503 | ND | BJOX028000.10.3 | CRF01.AE (T/F) | 0.044 | 0.379 | 0.009 | 0.123 | 0.689 | 0.489 |
| CAP210.2.00.E8 | C | >20 | >20 | 12.977 | >20 | 0.188 | ND | X1193.c1 | G | 0.181 | 0.606 | 0.089 | 0.389 | 0.308 | 0.193 |
| HIV-001428-2.42 | C | 0.029 | 0.081 | 0.020 | 0.054 | 0.161 | 0.176 | P0402.c2.11 | G | 0.036 | 0.134 | 0.013 | 0.058 | 0.442 | 0.364 |
| HIV-0013095-2.11 | C | 4.045 | 16.833 | 0.705 | 5.412 | 0.759 | 0.493 | X1254.c3 | G | 0.320 | 1.065 | 0.133 | 0.445 | 0.381 | 0.371 |
| HIV-16055-2.3 | C | >20 | >20 | 11.930 | >20 | 0.224 | ND | X2088.c9 | G | 0.126 | 0.419 | 0.020 | 0.059 | 0.799 | 0.851 |
| HIV-16845-2.22 | C | 4.447 | >20 | 1.804 | 9.944 | 0.392 | 0.324 | X2131.C1.B5 | G | 0.171 | 0.722 | 0.055 | 0.184 | 0.493 | 0.594 |
| Ce1086.B2 | C (T/F) | 1.722 | 5.331 | 0.632 | 3.563 | 0.435 | 0.175 | P1981.C5.3 | G | 0.077 | 0.172 | 0.029 | 0.088 | 0.424 | 0.291 |
| Ce0393.C3 | C (T/F) | 0.916 | 2.024 | 0.836 | 1.958 | 0.040 | 0.014 | X1632.S2.B10 | G | >20 | >20 | 2.206 | >20 | 0.957 | ND |
| Ce1176.A3 | C (T/F) | 0.211 | 0.471 | 0.071 | 0.201 | 0.473 | 0.370 | 3016.v5.c45 | D | 17.306 | >20 | 2.627 | >20 | 0.819 | ND |
| Ce2010.F5 | C (T/F) | 0.288 | 0.943 | 0.235 | 0.816 | 0.088 | 0.063 | A07412M1.vrc12 | D | 0.104 | 0.333 | 0.041 | 0.117 | 0.404 | 0.454 |
| Ce0682.E4 | C (T/F) | 0.077 | 0.255 | 0.043 | 0.194 | 0.253 | 0.119 | Z31965.c01 | D | 0.275 | 0.755 | 0.127 | 0.453 | 0.336 | 0.222 |
| Ce1172.H1 | C (T/F) | 0.454 | 2.072 | 0.055 | 0.396 | 0.917 | 0.719 | Z31966.c02 | D | 4.740 | 18.123 | 1.263 | 6.726 | 0.574 | 0.430 |
| Ce2060.G9 | C (T/F) | 0.359 | 1.511 | 0.274 | 1.094 | 0.117 | 0.140 | 191821.E6.1 | D (T/F) | 0.902 | 3.110 | 0.448 | 3.137 | 0.304 | -0.004 |
| Ce703010054.2A2 | C (T/F) | 1.710 | 5.437 | 0.625 | 5.114 | 0.437 | 0.027 | 3817.v2.c59 | CD | 0.916 | 4.500 | 0.471 | 2.275 | 0.289 | 0.296 |
| BF1266.431a | C (T/F) | 0.358 | 1.233 | 0.098 | 0.705 | 0.563 | 0.243 | 6480.v4.c25 | CD | 0.034 | 0.111 | 0.014 | 0.049 | 0.385 | 0.355 |
| 246F.C1G | C (T/F) | 0.640 | 2.274 | 0.140 | 0.661 | 0.860 | 0.537 | 6952.v1.c20 | CD | 0.251 | 0.684 | 0.073 | 0.261 | 0.536 | 0.418 |
| 249M.B10 | C (T/F) | 0.355 | 1.155 | 0.184 | 0.863 | 0.285 | 0.127 | 6811.v7.c18 | CD | 0.029 | 0.104 | 0.009 | 0.026 | 0.508 | 0.602 |
| ZM247v1(Rev-) | C (T/F) | 1.538 | 4.174 | 0.236 | 1.041 | 0.814 | 0.603 | 89-F1.2.25 | CD | >20 | >20 | >20 | >20 | ND | ND |
| 7030102001E5(Rev-) | C (T/F) | 0.127 | 0.331 | 0.033 | 0.123 | 0.585 | 0.430 | 3301.v1.c24 | AC | 0.066 | 0.217 | 0.030 | 0.098 | 0.342 | 0.345 |
| 1394C9G1(Rev-) | C (T/F) | 0.592 | 1.986 | 0.123 | 0.479 | 0.682 | 0.618 | 6041.v3.c23 | AC | 0.197 | 1.241 | 0.046 | 0.223 | 0.632 | 0.745 |
| Ce704809221.1B3 | C (T/F) | 0.357 | 1.347 | 0.068 | 0.648 | 0.720 | 0.318 | 6540.v4.c1 | AC | >20 | >20 | >20 | >20 | ND | ND |
| CNE19 | BC | 0.124 | 0.765 | 0.041 | 0.261 | 0.481 | 0.467 | 6545.v4.c1 | AC | >20 | >20 | >20 | >20 | ND | ND |
| CNE20 | BC | 0.054 | 0.176 | 0.014 | 0.039 | 0.586 | 0.654 | 0815.v3.c3 | ACD | 0.029 | 0.083 | 0.012 | 0.046 | 0.383 | 0.256 |
| CNE21 | BC | 0.548 | 1.407 | 0.183 | 0.480 | 0.476 | 0.467 | 3103.v3.c10 | ACD | 0.265 | 0.716 | 0.085 | 0.296 | 0.494 | 0.384 |
| CNE17 | BC | 3.337 | 10.638 | 1.216 | 5.016 | 0.438 | 0.327 | IgG1 | | | | | | | |
| CNE30 | BC | 0.772 | 2.682 | 0.390 | 1.533 | 0.297 | 0.243 | Total Viruses | | | | 120 | 120 | 120 | 120 |
| CNE52 | BC | 0.174 | 0.590 | 0.086 | 0.418 | 0.306 | 0.150 | IC50 | | | | IC80 | IC50 | IC80 | |
| CNE53 | BC | 0.128 | 0.329 | 0.050 | 0.231 | 0.408 | 0.154 | %Breadth | | | | 91.7 | 87.5 | 95.8 | 90.0 |
| CNE58 | BC | 0.364 | 1.081 | 0.121 | 0.698 | 0.478 | 0.190 | Geometric mean | | | | 0.242 | 0.717 | 0.110 | 0.388 |
| MS208.A1 | A | 0.200 | 0.724 | 0.113 | 0.514 | 0.248 | 0.149 | | | | | | | | |
| Q23.17 | A | 0.020 | 0.069 | 0.011 | 0.031 | 0.260 | 0.347 | | | | | | | | |
| Q461.e2 | A | 0.167 | 0.464 | 0.142 | 0.684 | 0.070 | -0.169 | | | | | | | | |

In vitro neutralization activity was determined by standardized TZM-bl assay.

IC₅₀ and IC₈₀ values are expressed as μg/ml.

Fold change values were calculated by dividing the IC₅₀ or IC₈₀ titer of the

IgG3C- with that of IgG1 hinge variant biNAb.

ND: not determined

Table S8: Comparison of the *in vitro* neutralization activity of IgG3C- hinge variants of 8ANC195 and PGT128 mAbs and 8ANC195/PGT128 biNab. **Related to Figure 5.**

| Virus ID | Clade | 8ANC195 | | PGT128 | | 8ANC195/ PGT128 | | log Fold Change | | Virus ID | Clade | 8ANC195 | | PGT128 | | 8ANC195/ PGT128 | | log Fold Change | |
|---------------------|---------|---------|--------|--------|--------|-----------------|--------|-----------------|--------|---|----------------|---------|--------|--------|--------|-----------------|--------|-----------------|--------|
| | | IC50 | IC80 | IC50 | IC80 | IC50 | IC80 | IC50 | IC80 | | | IC50 | IC80 | IC50 | IC80 | IC50 | IC80 | IC50 | IC80 |
| 6535_3 | B | 0.093 | 0.664 | 0.007 | 0.032 | 0.008 | 0.036 | -0.058 | -0.051 | Q259_d2.17 | A | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND |
| QH0692_42 | B | 1.229 | 5.089 | 0.016 | 0.051 | 0.018 | 0.062 | -0.051 | -0.085 | Q842_d12 | A | >30 | >30 | 0.049 | 0.179 | 0.080 | 0.297 | -0.213 | -0.220 |
| SC422661.8 | B | 0.173 | 1.199 | 1.772 | 13.645 | 0.025 | 0.115 | 0.840 | 1.018 | 3415.v1.c1 | A | 0.687 | 2.513 | 0.012 | 0.036 | 0.025 | 0.076 | -0.319 | -0.325 |
| PVO_4 | B | 0.095 | 0.606 | 0.010 | 0.037 | 0.011 | 0.054 | -0.041 | -0.164 | 3365.v2.c2 | A | >30 | >30 | >30 | >30 | 25.057 | >30 | 0.078 | ND |
| TRO.11 | B | 0.103 | 0.434 | 0.026 | 0.089 | 0.014 | 0.047 | 0.269 | 0.277 | 191955_A11 | A (T/F) | >30 | >30 | 10.896 | >30 | 3.948 | 22.226 | 0.441 | 0.130 |
| AC10.0.29 | B | 0.544 | 2.180 | 0.006 | 0.025 | 0.009 | 0.044 | -0.176 | -0.246 | 191084_B7-19 | A (T/F) | 0.994 | 6.140 | 0.041 | 0.195 | 0.048 | 0.223 | -0.068 | -0.058 |
| RHPA4259.7 | B | 0.231 | 1.167 | 0.019 | 0.108 | 0.011 | 0.056 | 0.237 | 0.285 | 9004SS_A3_4 | A (T/F) | 0.219 | 0.978 | 0.013 | 0.037 | 0.019 | 0.065 | -0.165 | -0.245 |
| THRO4156.18 | B | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND | T257-31 | CRF02_AG | 0.245 | 1.089 | 29.833 | >30 | 0.056 | 0.154 | 0.641 | 0.850 |
| REJO451.67 | B | 0.127 | 0.581 | >30 | >30 | 0.076 | 0.366 | 0.223 | 0.201 | 928-28 | CRF02_AG | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND |
| TRJO451.58 | B | 0.319 | 1.091 | 0.034 | 0.098 | 0.049 | 0.113 | -0.159 | -0.062 | 263-8 | CRF02_AG | >30 | >30 | 0.231 | 2.171 | 0.187 | 1.664 | 0.092 | 0.116 |
| WITO4160.33 | B | >30 | >30 | >30 | >30 | 0.316 | 12.866 | 1.977 | 0.368 | T250-4 | CRF02_AG | >30 | >30 | 0.003 | 0.012 | 0.012 | 0.037 | 0.602 | -0.489 |
| CAPAN5342.A2 | B | >30 | >30 | 0.145 | >30 | 0.088 | 0.945 | 0.217 | 1.502 | T251-18 | CRF02_AG | 0.173 | 0.947 | 18.585 | >30 | 0.057 | 0.171 | 0.482 | 0.743 |
| WEAU_d15_410_787 | B (T/F) | >30 | >30 | 0.016 | 0.074 | 0.030 | 0.229 | -0.273 | -0.491 | T278-50 | CRF02_AG | 22.511 | >30 | 0.013 | 0.037 | 0.024 | 0.109 | -0.266 | -0.469 |
| 1006_11_C3_1601 | B (T/F) | 0.157 | 1.812 | 0.009 | 0.035 | 0.006 | 0.029 | 0.176 | 0.082 | T255-34 | CRF02_AG | 0.730 | 4.339 | >30 | >30 | 0.475 | 4.951 | 0.187 | -0.057 |
| 1054_07_TC4_1499 | B (T/F) | 0.205 | 5.572 | 0.043 | 0.267 | 0.013 | 0.081 | 0.520 | 0.518 | 211-9 | CRF02_AG | 1.329 | 5.628 | 0.069 | 0.236 | 0.106 | 0.320 | -0.186 | -0.132 |
| 1056_10_TA11_1826 | B (T/F) | >30 | >30 | 0.004 | 0.019 | 0.008 | 0.035 | -0.301 | -0.265 | 235-47 | CRF02_AG | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND |
| 1012_11_TC21_3257 | B (T/F) | >30 | >30 | 0.011 | 0.040 | 0.017 | 0.118 | -0.189 | -0.470 | 620345.c01 | CRF01_AE | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND |
| 6240_08_TA5_4622 | B (T/F) | >30 | >30 | 0.020 | 0.060 | 0.024 | 0.099 | -0.079 | -0.217 | CNE8 | CRF01_AE | 0.415 | 2.121 | 0.011 | 0.037 | 0.023 | 0.069 | -0.320 | -0.271 |
| 6244_13_B5_4576 | B (T/F) | >30 | >30 | 0.033 | 0.119 | 0.045 | 0.163 | -0.135 | -0.137 | C1080.c03 | CRF01_AE | 0.228 | 0.968 | 0.128 | 0.939 | 0.029 | 0.096 | 0.645 | 0.990 |
| 62357_14_D3_4589 | B (T/F) | >30 | >30 | 0.731 | 7.088 | 0.053 | 0.441 | 1.140 | 1.206 | R2194.c04 | CRF01_AE | 0.017 | 0.088 | 1.775 | 26.750 | 0.015 | 0.054 | 0.054 | 0.212 |
| SC05_8C11_2344 | B (T/F) | 0.242 | 1.117 | 0.025 | 0.070 | 0.018 | 0.052 | 0.143 | 0.129 | R1166.c01 | CRF01_AE | 1.143 | 5.965 | >30 | >30 | 1.348 | 6.441 | 0.421 | -0.033 |
| Du172.17 | C | 5.923 | 24.128 | 0.032 | 0.148 | 0.035 | 0.125 | -0.039 | 0.073 | C2101.c01 | CRF01_AE | 0.757 | 4.627 | 0.018 | 0.062 | 0.019 | 0.049 | -0.023 | 0.102 |
| Du422.1 | C | >30 | >30 | 0.063 | 0.189 | 0.043 | 0.196 | 0.166 | -0.018 | C3347.c11 | CRF01_AE | >30 | >30 | 0.003 | 0.017 | 0.018 | 0.083 | 0.775 | -0.689 |
| ZM197M.PB7 | C | 7.711 | >30 | >30 | >30 | 6.715 | >30 | 0.060 | ND | C4118.c09 | CRF01_AE | 0.054 | 0.378 | >30 | >30 | 0.071 | 0.466 | -0.119 | -0.091 |
| ZM1214M.PL15 | C | 0.487 | 6.454 | 1.057 | 9.008 | 0.040 | 0.256 | 1.085 | 1.402 | CNE5 | CRF01_AE | 0.741 | 3.642 | 0.045 | 0.377 | 0.027 | 0.098 | 0.222 | 0.585 |
| ZM233M.PB6 | C | 4.871 | 19.132 | >30 | >30 | 2.403 | 9.770 | 0.307 | 0.292 | BJOX009000.02.4 | CRF01_AE | 0.507 | 2.034 | 0.014 | 0.031 | 0.020 | 0.052 | -0.155 | -0.225 |
| ZM249M.PL1 | C | >30 | >30 | 1.786 | 16.796 | 0.097 | 0.937 | 1.265 | 1.253 | BJOX015000.11.5 | CRF01_AE (T/F) | 0.123 | 1.759 | 0.009 | 0.039 | 0.016 | 0.077 | 0.250 | -0.295 |
| ZM53M.PB12 | C | 12.846 | >30 | >30 | >30 | 18.396 | >30 | -0.156 | ND | BJOX010000.06.2 | CRF01_AE (T/F) | 0.320 | 2.477 | 24.629 | >30 | 0.122 | 0.585 | 0.419 | 0.627 |
| ZM109F.PB4 | C | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND | BJOX025000.01.1 | CRF01_AE (T/F) | 2.811 | 19.046 | >30 | >30 | 2.086 | >30 | 0.130 | -0.197 |
| ZM135M.PL10a | C | >30 | >30 | 1.981 | 15.180 | 0.134 | 0.864 | 1.170 | 1.245 | BJOX028000.10.3 | CRF01_AE (T/F) | 0.316 | 2.134 | 0.018 | 0.121 | 0.015 | 0.107 | 0.079 | 0.053 |
| CAP45.2.00.G3 | C | >30 | >30 | >30 | >30 | 1.947 | 26.265 | 1.188 | 0.058 | X1193_c1 | G | 0.141 | 0.790 | 0.026 | 0.078 | 0.025 | 0.114 | 0.017 | -0.165 |
| CAP210.2.00.E8 | C | >30 | >30 | >30 | >30 | 4.888 | >30 | 0.788 | ND | R0402_c2_11 | G | 0.197 | 0.936 | 0.013 | 0.040 | 0.014 | 0.043 | -0.032 | -0.031 |
| HIV-001428-2.42 | C | >30 | >30 | 0.037 | 0.125 | 0.034 | 0.119 | 0.037 | 0.021 | X1254_c3 | G | 3.331 | 12.566 | 0.033 | 0.094 | 0.043 | 0.118 | -0.115 | -0.099 |
| HIV-0013095-2.11 | C | 0.168 | 0.612 | >30 | >30 | 0.192 | 0.694 | -0.058 | -0.055 | X2088_c9 | G | >30 | >30 | >30 | >30 | 5.092 | >30 | 0.770 | ND |
| HIV-16055-2.3 | C | 10.158 | >30 | >30 | >30 | 7.924 | >30 | 0.108 | ND | X2131_C1_B5 | G | 0.382 | 2.544 | 0.027 | 0.099 | 0.022 | 0.081 | 0.089 | 0.087 |
| HIV-16845-2.22 | C | 2.223 | 14.223 | 0.183 | 0.670 | 0.089 | 0.332 | 0.313 | 0.305 | P1981_C5_3 | G | 0.261 | 0.878 | 0.027 | 0.182 | 0.025 | 0.069 | 0.033 | 0.421 |
| Ce1086_B2 | C (T/F) | 4.899 | >30 | >30 | >30 | 0.468 | 4.293 | 1.020 | 0.844 | X1632_S2_B10 | G | 0.194 | 1.440 | >30 | >30 | 0.280 | 2.218 | -0.159 | -0.188 |
| Ce0393_C3 | C (T/F) | 4.574 | >30 | >30 | >30 | 8.026 | >30 | -0.244 | ND | 3016.v5.c45 | D | 0.175 | 0.843 | >30 | >30 | 0.347 | 1.745 | 0.297 | -0.316 |
| Ce1176_A3 | C (T/F) | 2.411 | 10.873 | 0.019 | 0.047 | 0.024 | 0.070 | -0.101 | -0.173 | A07412M1.vrc12 | D | 1.117 | 9.467 | 24.920 | >30 | 0.125 | 0.818 | 0.851 | 1.063 |
| Ce2010_F5 | C (T/F) | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND | 231965.c01 | D | 0.371 | 1.369 | >30 | >30 | 0.342 | 1.241 | 0.035 | 0.049 |
| Ce0682_E4 | C (T/F) | 0.077 | 0.565 | >30 | >30 | 0.077 | 0.520 | 0.000 | 0.036 | 231966.c02 | D | 0.646 | 2.304 | 5.107 | 29.181 | 0.071 | 0.314 | 0.959 | 0.866 |
| Ce1172_H1 | C (T/F) | 25.431 | >30 | 0.015 | 0.044 | 0.029 | 0.079 | -0.286 | -0.254 | 191821_E6_1 | D (T/F) | 0.099 | 0.571 | 0.016 | 0.068 | 0.016 | 0.075 | 0.000 | -0.043 |
| Ce2060_G9 | C (T/F) | 1.695 | 11.108 | >30 | >30 | 0.483 | 2.275 | 0.545 | 0.689 | 3817.v2.c59 | CD | 0.379 | 1.471 | 0.023 | 0.094 | 0.039 | 0.118 | -0.229 | -0.099 |
| Ce703010054_2A2 | C (T/F) | 8.789 | >30 | >30 | >30 | 9.749 | >30 | 0.045 | ND | 6480.v4.c25 | CD | 0.156 | 1.000 | 0.012 | 0.061 | 0.020 | 0.091 | -0.222 | -0.174 |
| BF1266.431a | C (T/F) | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND | 6952.v1.c20 | CD | 0.556 | 3.141 | >30 | >30 | 0.500 | 2.616 | 0.046 | 0.079 |
| 246F_C1G | C (T/F) | 21.211 | >30 | 0.007 | 0.020 | 0.011 | 0.033 | -0.198 | -0.217 | 6811.v7.c18 | CD | 4.808 | 19.816 | 0.018 | 0.079 | 0.016 | 0.052 | 0.051 | 0.182 |
| 249M_B10 | C (T/F) | 1.599 | 7.988 | 0.032 | 0.092 | 0.020 | 0.085 | 0.204 | 0.151 | 89-F1_2_25 | CD | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND |
| ZM247v1 (Rev.) | C (T/F) | 1.079 | 5.380 | 0.014 | 0.034 | 0.011 | 0.042 | 0.105 | -0.092 | 3301.v1.c24 | AC | >30 | >30 | 0.224 | 1.296 | 0.097 | 0.359 | 0.363 | 0.558 |
| T030102001E3 (Rev.) | C (T/F) | >30 | >30 | 0.033 | 0.085 | 0.020 | 0.087 | 0.217 | -0.010 | 6041.v3.c23 | AC | >30 | >30 | >30 | >30 | 13.831 | >30 | 0.336 | ND |
| 1394C931 (Rev.) | C (T/F) | >30 | >30 | 0.027 | 0.082 | 0.030 | 0.114 | -0.046 | -0.143 | 6540.v4.c1 | AC | >30 | >30 | 6.596 | >30 | 0.257 | 1.661 | 1.409 | 1.257 |
| Ce704809221_1B3 | C (T/F) | 0.367 | 3.003 | 0.036 | 0.136 | 0.024 | 0.117 | 0.176 | 0.065 | 6545.v4.c1 | AC | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND |
| CNE19 | BC | 0.280 | 1.889 | >30 | >30 | 0.150 | 1.059 | 0.271 | 0.251 | 0815.v3.c3 | ACD | 0.746 | 9.202 | 0.038 | 0.170 | 0.036 | 0.234 | 0.023 | -0.139 |
| CNE20 | BC | 0.833 | 3.879 | 0.005 | 0.011 | 0.007 | 0.017 | -0.146 | -0.189 | 3103.v3.c10 | ACD | >30 | >30 | 0.014 | 0.053 | 0.045 | 0.126 | -0.507 | -0.376 |
| CNE21 | BC | 0.311 | 2.260 | 0.009 | 0.028 | 0.013 | 0.041 | -0.160 | -0.166 | Total Viruses 116 116 116 116 116 116 | | | | | | | | | |
| CNE17 | BC | 2.555 | 9.747 | 0.456 | 1.618 | 0.227 | 0.742 | 0.303 | 0.339 | %Breadth 65.5 56.9 65.5 58.6 90.5 81.9 | | | | | | | | | |
| CNE30 | BC | 7.120 | >30 | 0.927 | 8.819 | 0.161 | 0.736 | 0.760 | 1.079 | Geometric mean 0.645 2.373 0.068 0.164 0.084 0.237 | | | | | | | | | |
| CNE52 | BC | 0.879 | 8.534 | >30 | >30 | 0.198 | 1.685 | 0.647 | 0.705 | | | | | | | | | | |
| CNE53 | BC | >30 | >30 | 0.027 | 0.082 | 0.030 | 0.114 | -0.046 | -0.143 | | | | | | | | | | |
| CNE58 | BC | >30 | >30 | 5.236 | >30 | 0.320 | 1.621 | 1.214 | 1.267 | | | | | | | | | | |
| MS208_A1 | A | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND | | | | | | | | | | |
| Q23.17 | A | 0.291 | 1.405 | 0.018 | 0.050 | 0.016 | 0.045 | 0.051 | 0.046 | | | | | | | | | | |
| Q481.e2 | A | 0.925 | 3.292 | >30 | >30 | 0.128 | 0.441 | 0.859 | 0.873 | | | | | | | | | | |
| Q769.d22 | A | 0.083 | 0.600 | >30 | >30 | 0.111 | 1.081 | -0.077 | -0.256 | | | | | | | | | | |

In vitro neutralization activity was determined by standardized TZM-bl assay.

IC₅₀ and IC₈₀ values are expressed as µg/ml.

Fold change values were calculated by dividing the IC

Table S9: Comparison of the *in vitro* neutralization activity of IgG3C- hinge variants of PGT151 and 10-1074 mAbs and PGT151/10-1074 biNAb. **Related to Figure 5.**

| Virus ID | Clade | PGT151/ 10-1074 | | | | | | | | Fold Change | Log | Virus ID | Clade | PGT151/ 10-1074 | | | | | | | | Fold Change | Log |
|--------------------|---------|-----------------|--------|---------|--------|-----------------|-------|-------------|--------|-----------------|----------------|----------|-------|-----------------|-------|---------|--------|-----------------|--------|-------------|-----|-------------|-----|
| | | PGT151 | | 10-1074 | | PGT151/ 10-1074 | | Fold Change | Log | | | | | PGT151 | | 10-1074 | | PGT151/ 10-1074 | | Fold Change | Log | | |
| | | IC50 | IC80 | IC50 | IC80 | IC50 | IC80 | | | | | | | IC50 | IC80 | IC50 | IC80 | IC50 | IC80 | | | | |
| 6535.3 | B | 0.007 | 0.017 | 0.010 | 0.030 | 0.003 | 0.017 | 0.368 | 0.000 | Q461.e2 | A | 5.020 | >30 | >30 | >30 | 0.471 | 6.895 | 1.028 | 0.639 | | | | |
| QH0692.42 | B | 0.029 | 0.572 | 0.090 | 0.346 | 0.019 | 0.079 | 0.184 | 0.641 | Q769.d22 | A | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND | | | | |
| SC422661.8 | B | 0.013 | 0.044 | 0.053 | 0.263 | 0.014 | 0.058 | -0.032 | -0.120 | Q259.d2.17 | A | 1.547 | >30 | >30 | >30 | 0.237 | 8.243 | 0.815 | 0.561 | | | | |
| PVQ.4 | B | 0.029 | 6.403 | 0.050 | 0.236 | 0.020 | 0.094 | 0.161 | 0.400 | Q842.d12 | A | 0.008 | 0.028 | >30 | >30 | 0.028 | 0.075 | -0.544 | -0.428 | | | | |
| TRQ.11 | B | >30 | >30 | 0.024 | 0.099 | 0.042 | 0.121 | -0.243 | -0.087 | 3415.v1.c1 | A | 0.004 | 0.014 | >30 | >30 | 0.010 | 0.037 | -0.398 | -0.422 | | | | |
| AC10.0.29 | B | 0.008 | 0.036 | 0.018 | 0.093 | 0.016 | 0.055 | -0.301 | -0.184 | 3365.v2.c2 | A | 0.012 | 0.042 | 0.118 | 0.339 | 0.025 | 0.090 | -0.319 | -0.331 | | | | |
| RHPA4259.7 | B | 0.012 | 0.058 | 0.031 | 0.115 | 0.014 | 0.061 | -0.067 | -0.022 | 191955.A11 | A (T/F) | 0.005 | 0.016 | >30 | >30 | 0.025 | 0.111 | -0.699 | -0.841 | | | | |
| THRO4156.18 | B | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND | 191084.B7.19 | A (T/F) | 0.004 | 0.019 | 0.045 | 0.176 | 0.006 | 0.026 | -0.176 | -0.136 | | | | |
| REJO4541.67 | B | 0.043 | 0.355 | >30 | >30 | 0.071 | 0.367 | -0.218 | -0.014 | 9004SS.A3.4 | A (T/F) | 0.008 | 0.020 | 0.019 | 0.062 | 0.011 | 0.034 | -0.138 | -0.230 | | | | |
| TRJO4551.58 | B | 0.951 | 7.935 | 0.493 | 2.332 | 0.366 | 1.579 | 0.129 | 0.169 | T257.31 | CRF02.AG | 0.005 | 0.019 | >30 | >30 | 0.015 | 0.052 | -0.477 | -0.437 | | | | |
| WITO4160.33 | B | 0.007 | 0.061 | 0.178 | 1.858 | 0.014 | 0.053 | -0.301 | 0.061 | 928-28 | CRF02.AG | >30 | >30 | 0.419 | 2.743 | 0.164 | 2.231 | 0.407 | 0.090 | | | | |
| CAAN5342.A2 | B | 0.008 | 0.031 | 0.013 | 0.043 | 0.004 | 0.020 | 0.301 | 0.190 | 263-8 | CRF02.AG | >30 | >30 | 0.409 | 2.693 | 1.941 | 10.999 | -0.676 | -0.611 | | | | |
| YU2.DG | B | >30 | >30 | 0.121 | 0.568 | 0.100 | 0.464 | 0.083 | 0.088 | T250.4 | CRF02.AG | 0.004 | 0.012 | 0.002 | 0.007 | 0.002 | 0.007 | 0.000 | 0.000 | | | | |
| WEAU.d15.410.787 | B (T/F) | 0.032 | >30 | 0.054 | 0.239 | 0.010 | 0.037 | 0.505 | 0.810 | T251.18 | CRF02.AG | 0.101 | 1.716 | 0.284 | 1.412 | 0.055 | 0.196 | 0.264 | 0.858 | | | | |
| 1006.11.C3.1601 | B (T/F) | 1.467 | >30 | 0.001 | 0.005 | 0.007 | 0.028 | -0.845 | -0.748 | 19185-50 | CRF02.AG | 0.085 | 2.496 | 1.228 | 5.624 | 0.096 | 0.423 | -0.053 | 0.771 | | | | |
| 1054.07.TC4.1499 | B (T/F) | 0.004 | 0.029 | 0.023 | 0.161 | 0.010 | 0.043 | -0.398 | -0.171 | T255.34 | CRF02.AG | 0.006 | 0.017 | 11.186 | >30 | 0.009 | 0.027 | -0.176 | -0.201 | | | | |
| 1056.10.TA11.1826 | B (T/F) | 0.012 | 0.058 | 0.034 | 0.244 | 0.019 | 0.070 | -0.200 | -0.082 | 211-9 | CRF02.AG | 0.005 | 0.022 | 0.173 | 0.595 | 0.014 | 0.037 | -0.447 | -0.226 | | | | |
| 1012.11.TC21.3257 | B (T/F) | >30 | >30 | 0.013 | 0.059 | 0.078 | 0.276 | -0.778 | -0.670 | 235-47 | CRF02.AG | 0.057 | >30 | 0.065 | 0.221 | 0.032 | 0.116 | 0.308 | 0.280 | | | | |
| 6240.08.TA5.4622 | B (T/F) | 0.101 | 1.199 | 0.102 | 0.353 | 0.077 | 0.210 | 0.113 | 0.226 | B20345.c01 | CRF01.AE | >30 | >30 | >30 | >30 | 0.605 | 14.553 | 1.695 | 0.314 | | | | |
| 6244.13.B5.4576 | B (T/F) | >30 | >30 | 0.240 | 0.782 | 0.095 | 0.418 | 0.402 | 0.272 | CNE8 | CRF01.AE | >30 | >30 | >30 | >30 | 1.816 | >30 | 1.218 | ND | | | | |
| 62357.14.D3.4589 | B (T/F) | 0.005 | 0.031 | 1.290 | 26.818 | 0.011 | 0.044 | -0.342 | -0.152 | C1080.c03 | CRF01.AE | >30 | >30 | >30 | >30 | 8.094 | >30 | 0.569 | ND | | | | |
| SC05.8C11.2344 | B (T/F) | 0.022 | 0.246 | 0.037 | 0.112 | 0.031 | 0.112 | -0.149 | 0.000 | R2184.c04 | CRF01.AE | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND | | | | |
| Du156.12 | C | 0.010 | 0.030 | 0.022 | 0.100 | 0.019 | 0.052 | -0.279 | -0.298 | R1166.c01 | CRF01.AE | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND | | | | |
| Du172.17 | C | 0.003 | 0.020 | 0.086 | 0.303 | 0.013 | 0.038 | -0.637 | -0.273 | R3265.c06 | CRF01.AE | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND | | | | |
| Du1422.1 | C | 0.185 | >30 | 0.078 | 0.203 | 0.051 | 0.178 | 0.185 | 0.057 | C2101.c01 | CRF01.AE | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND | | | | |
| ZM197M.PB7 | C | 0.001 | 0.021 | >30 | >30 | 0.026 | 0.115 | -1.416 | -0.730 | C3347.c11 | CRF01.AE | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND | | | | |
| ZM144M.PL15 | C | 0.009 | 0.118 | 0.077 | 0.066 | 0.011 | 0.074 | -0.087 | 0.203 | C4118.c09 | CRF01.AE | >30 | >30 | >30 | >30 | 5.957 | >30 | 0.732 | ND | | | | |
| ZM233M.PB6 | C | 0.015 | 0.225 | 0.054 | 0.202 | 0.012 | 0.049 | 0.097 | 0.615 | CNE5 | CRF01.AE | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND | | | | |
| ZM249M.PL1 | C | 0.008 | 0.025 | >30 | >30 | 0.021 | 0.063 | -0.419 | -0.401 | BJOX009000.02.4 | CRF01.AE | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND | | | | |
| ZM53M.PB12 | C | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND | BJOX015000.11.5 | CRF01.AE (T/F) | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND | | | | |
| ZM109F.PB4 | C | 0.744 | >30 | >30 | >30 | 0.358 | >30 | 0.318 | ND | BJOX010000.06.2 | CRF01.AE (T/F) | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND | | | | |
| ZM135M.PL10a | C | 0.004 | 0.017 | >30 | >30 | 0.024 | 0.078 | -0.778 | -0.662 | BJOX025000.01.1 | CRF01.AE (T/F) | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND | | | | |
| CAP45.2.00.G3 | C | 0.005 | 0.033 | >30 | >30 | 0.026 | 0.166 | -0.716 | -0.702 | BJOX028000.10.3 | CRF01.AE (T/F) | >30 | >30 | >30 | >30 | 4.719 | >30 | 0.803 | ND | | | | |
| CAP210.2.00.E8 | C | 0.022 | 0.488 | 20.730 | >30 | 0.042 | 0.242 | -0.281 | 0.305 | X1193.c1 | G | 0.013 | 0.049 | 0.114 | 0.354 | 0.020 | 0.053 | -0.187 | -0.034 | | | | |
| HIV-001428-2.42 | C | 0.058 | >30 | 0.056 | 0.189 | 0.024 | 0.079 | 0.368 | 0.379 | P0402.c2.11 | G | 0.005 | 0.020 | 0.015 | 0.067 | 0.007 | 0.022 | -0.146 | -0.041 | | | | |
| HIV-0013095-2.11 | C | 0.025 | >30 | 5.293 | >30 | 0.033 | 0.287 | -0.121 | 2.019 | X1254.c3 | G | 2.142 | >30 | 0.220 | 0.690 | 0.040 | 0.152 | 0.740 | 0.657 | | | | |
| HIV-16055-2.3 | C | 0.096 | >30 | >30 | >30 | 0.104 | 0.846 | -0.035 | 1.550 | X2088.c9 | G | >30 | >30 | 0.004 | 0.017 | 0.031 | 0.085 | -0.889 | -0.699 | | | | |
| HIV-16845-2.22 | C | >30 | >30 | 0.862 | 3.053 | 0.105 | 0.792 | 0.914 | 0.586 | X2131.C1.B5 | G | 0.012 | 0.050 | 0.029 | 0.062 | 0.010 | 0.033 | 0.079 | 0.180 | | | | |
| Ce1086.B2 | C (T/F) | 0.069 | 11.107 | >30 | >30 | 0.093 | 0.881 | -0.130 | 1.101 | P1981.C5.3 | G | 0.075 | >30 | 0.008 | 0.023 | 0.008 | 0.031 | 0.000 | -0.130 | | | | |
| Ce0393.C3 | C (T/F) | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND | X1632.S2.B10 | G | 0.092 | >30 | >30 | >30 | 0.113 | 3.154 | 0.089 | 0.978 | | | | |
| Ce1176.A3 | C (T/F) | 0.003 | 0.016 | 0.026 | 0.094 | 0.007 | 0.022 | -0.368 | -0.138 | 3016.v5.c45 | D | 0.478 | >30 | >30 | >30 | 0.800 | >30 | -0.224 | ND | | | | |
| Ce2010.F5 | C (T/F) | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND | A07412M1.vrc12 | D | 0.098 | 2.708 | 0.014 | 0.052 | 0.024 | 0.088 | -0.234 | -0.228 | | | | |
| Ce0682.E4 | C (T/F) | >30 | >30 | >30 | >30 | 6.882 | >30 | 0.639 | ND | 231965.c01 | D | 0.011 | 0.042 | >30 | >30 | 0.021 | 0.074 | 0.281 | -0.246 | | | | |
| Ce1172.H1 | C (T/F) | >30 | >30 | 0.060 | 0.210 | 0.632 | 1.642 | -1.023 | -0.893 | 231966.c02 | D | 0.077 | 0.333 | >30 | >30 | 0.181 | 0.688 | -0.371 | -0.315 | | | | |
| Ce2060.G9 | C (T/F) | 0.120 | >30 | 13.310 | >30 | 0.079 | 0.772 | 0.182 | 1.590 | 191821.E6.1 | D (T/F) | 0.203 | 1.768 | >30 | >30 | 0.197 | 1.523 | 0.013 | 0.065 | | | | |
| Ce703010054.2A2 | C (T/F) | 0.023 | 0.157 | >30 | >30 | 0.051 | 0.304 | -0.346 | -0.287 | 3817.v2.c59 | CD | >30 | >30 | 1.255 | 6.718 | 6.171 | >30 | -0.692 | -0.650 | | | | |
| BF1266.431a | C (T/F) | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND | 6480.v4.c25 | CD | >30 | >30 | 0.011 | 0.058 | 0.035 | 0.120 | -0.503 | -0.316 | | | | |
| 246F.C1G | C (T/F) | 13.267 | >30 | 0.051 | 0.144 | 0.056 | 0.269 | -0.041 | -0.271 | 6952.v1.c20 | CD | 1.076 | >30 | 0.009 | 0.042 | 0.043 | 0.195 | -0.679 | -0.667 | | | | |
| 249M.B10 | C (T/F) | 0.007 | 0.029 | >30 | >30 | 0.019 | 0.068 | -0.434 | -0.370 | 6811.v7.c18 | CD | >30 | >30 | 0.002 | 0.009 | 0.005 | 0.025 | -0.398 | -0.444 | | | | |
| ZM247v1(Rev-) | C (T/F) | 0.013 | >30 | 0.037 | 0.110 | 0.010 | 0.045 | 0.114 | 0.388 | 89-F1.2.25 | CD | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND | | | | |
| 7030102001E5(Rev-) | C (T/F) | 0.003 | 0.016 | 0.008 | 0.028 | 0.008 | 0.016 | -0.301 | 0.000 | 3301.v1.c24 | AC | 0.018 | 0.083 | 0.021 | 0.069 | 0.014 | 0.042 | 0.109 | 0.216 | | | | |
| 1394C9G1(Rev-) | C (T/F) | 0.023 | 0.252 | 0.041 | 0.143 | 0.020 | 0.073 | 0.061 | 0.310 | 6041.v3.c23 | AC | 0.011 | 0.044 | >30 | >30 | 0.026 | 0.094 | -0.374 | -0.340 | | | | |
| Ce704809221.1B3 | C (T/F) | >30 | >30 | 0.079 | 0.687 | 0.192 | 0.670 | -0.388 | 0.011 | 6545.v4.c1 | AC | 0.008 | 0.039 | >30 | >30 | 0.022 | 0.086 | -0.439 | -0.333 | | | | |
| CNE19 | BC | 0.008 | 0.167 | 0.078 | >30 | 0.008 | 0.036 | 0.000 | 0.666 | 0815.v3.c3 | ACD | 13.652 | >30 | 0.038 | 0.231 | 0.061 | 0.254 | -0.206 | -0.041 | | | | |
| CNE20 | BC | >30 | >30 | 0.003 | 0.010 | 0.010 | 0.032 | -0.523 | -0.505 | 3103.v3.c10 | ACD | 0.055 | 1.232 | 0.051 | 0.141 | 0.027 | 0.096 | 0.276 | 0.167 | | | | |
| CNE21 | BC | 0.004 | 0.012 | 0.050 | 0.198 | 0.008 | 0.032 | -0.301 | -0.428 | | | | | | | | | | | | | | |
| CNE17 | BC | 0.019 | 13.704 | 1.279 | 6.471 | 0.030 | 0.150 | -0.198 | 1.639 | | | | | | | | | | | | | | |
| CNE30 | BC | >30 | >30 | 0.356 | 1.243 | 0.086 | 0.430 | 0.617 | 0.461 | | | | | | | | | | | | | | |
| CNE52 | BC | 0.013 | 0.064 | 1.534 | 9.005 | 0.014 | 0.075 | -0.032 | -0.069 | | | | | | | | | | | | | | |
| CNE53 | BC</ | | | | | | | | | | | | | | | | | | | | | | |

Table S10: Comparison of the *in vitro* neutralization activity of IgG3C- hinge variants of 3BNC117 and PGT135 mAbs and 3BNC117/PGT135 biNAb. **Related to Figure 5.**

| Virus ID | Clade | 3BNC117/ PGT135 | | | | Fold Change | | | |
|--------------------|---------|-----------------|--------|--------|--------|-------------|-------|--------|--------|
| | | 3BNC117 | | PGT135 | | Log | | IC50 | |
| | | IC50 | IC80 | IC50 | IC80 | IC50 | IC80 | IC50 | IC80 |
| 6535.3 | B | 0.599 | 5.030 | >30 | >30 | 0.051 | 0.405 | 1.070 | 1.094 |
| QH0692.42 | B | 0.146 | 0.514 | >30 | >30 | 0.017 | 0.218 | 0.934 | 0.373 |
| SC422661.8 | B | 0.056 | 0.251 | 7.753 | >30 | 0.009 | 0.063 | 0.786 | 0.600 |
| PV04 | B | 0.027 | 0.125 | >30 | >30 | 0.015 | 0.093 | 0.255 | 0.128 |
| TRO.11 | B | 0.072 | 0.203 | 0.049 | 0.143 | 0.018 | 0.067 | 0.435 | 0.329 |
| AC10.0.29 | B | >30 | >30 | >30 | >30 | 3.149 | >30 | 0.979 | ND |
| RHPA4259.7 | B | 0.023 | 0.069 | >30 | >30 | 0.009 | 0.045 | 0.407 | 0.186 |
| THRO4156.18 | B | 3.909 | 16.176 | >30 | >30 | 0.249 | 0.203 | 1.196 | 0.903 |
| REJO4541.67 | B | 0.040 | 0.228 | >30 | >30 | 0.015 | 0.093 | 0.426 | 0.389 |
| TRJO4551.58 | B | 0.193 | 0.676 | >30 | >30 | 0.019 | 0.154 | 1.007 | 0.642 |
| WITO4160.33 | B | 0.027 | 0.104 | >30 | >30 | 0.016 | 0.057 | 0.227 | 0.261 |
| CAANS42A.2 | B | 0.646 | 2.512 | 3.421 | 26.634 | 0.061 | 0.313 | 1.025 | 0.904 |
| YU2.DG | B | 0.031 | 0.086 | 16.810 | >30 | 0.014 | 0.074 | 0.345 | 0.089 |
| WEAU_d15_410_787 | B (T/F) | 0.065 | 0.335 | 0.208 | 1.782 | 0.017 | 0.084 | 0.582 | 0.601 |
| 1006_11_C3_1601 | B (T/F) | 0.048 | 0.173 | >30 | >30 | 0.016 | 0.068 | 0.477 | 0.406 |
| 1054_07_TC4_1499 | B (T/F) | 0.127 | 0.534 | >30 | >30 | 0.019 | 0.098 | 0.825 | 0.736 |
| 1056_10_TA11_1826 | B (T/F) | 0.196 | 3.113 | >30 | >30 | 0.050 | 0.349 | 0.593 | 0.950 |
| 1072_11_TC21_3257 | B (T/F) | 0.016 | 0.084 | 26.241 | >30 | 0.009 | 0.048 | 0.250 | 0.243 |
| 6240_08_TA5_4622 | B (T/F) | 0.688 | 1.814 | >30 | >30 | 0.053 | 0.237 | 1.113 | 0.884 |
| 6244_13_B5_4576 | B (T/F) | 0.109 | 0.342 | 0.530 | 2.397 | 0.020 | 0.073 | 0.366 | 0.671 |
| 62357_14_D3_4589 | B (T/F) | 0.066 | 0.438 | >30 | >30 | 0.019 | 0.099 | 0.541 | 0.646 |
| SC05_8C11_2344 | B (T/F) | 0.225 | 0.752 | 5.363 | >30 | 0.015 | 0.523 | 0.173 | 0.158 |
| Du156.12 | C | 0.114 | 0.459 | >30 | >30 | 0.067 | 0.290 | 0.231 | 0.199 |
| Du172.17 | C | 1.348 | 12.316 | >30 | >30 | 0.375 | 1.354 | 0.556 | 0.959 |
| Zu422.1 | C | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND |
| Dm197M.PB7 | C | 0.527 | 1.810 | >30 | >30 | 0.039 | 0.196 | 1.131 | 0.965 |
| ZM214M.PL15 | C | 0.119 | 0.785 | >30 | >30 | 0.024 | 0.113 | 0.695 | 0.842 |
| ZM233M.PB6 | C | 0.445 | 1.570 | 0.439 | 9.943 | 0.033 | 0.118 | 1.124 | 1.124 |
| ZM249M.PL1 | C | 0.079 | 0.363 | >30 | >30 | 0.026 | 0.127 | 0.483 | 0.456 |
| ZM53M.PB12 | C | 0.363 | 1.738 | >30 | >30 | 0.063 | 0.310 | 0.761 | 0.749 |
| ZM109F.PB4 | C | 0.250 | 1.459 | >30 | >30 | 0.031 | 0.231 | 0.907 | 0.800 |
| ZM135M.PL10a | C | 0.121 | 0.538 | >30 | >30 | 0.021 | 0.075 | 0.761 | 0.856 |
| CAP45.2.00.G3 | C | 16.693 | >30 | >30 | >30 | 0.031 | 0.676 | 2.729 | 1.647 |
| CAP210.2.00.E8 | C | >30 | >30 | >30 | >30 | 0.368 | 3.729 | 1.911 | 0.906 |
| HIV-001428.2.42 | C | 0.009 | 0.026 | 0.051 | 0.228 | 0.003 | 0.015 | 0.477 | 0.239 |
| HIV-001305.2.11 | C | 0.830 | 7.653 | >30 | >30 | 0.024 | 0.131 | 1.539 | 1.767 |
| HIV-18055.2.3 | C | >30 | >30 | >30 | >30 | 0.063 | >30 | 2.678 | ND |
| HIV-18845.2.22 | C | >30 | >30 | 10.984 | >30 | 0.176 | 2.873 | 1.795 | 1.019 |
| Ce1086_B2 | C (T/F) | 0.190 | 0.888 | >30 | >30 | 0.037 | 0.242 | 0.711 | 0.565 |
| Ce0393_C3 | C (T/F) | 0.267 | 1.260 | >30 | >30 | 0.032 | 0.155 | 0.921 | 0.810 |
| Ce1176_A3 | C (T/F) | 0.246 | 1.236 | 11.617 | >30 | 0.022 | 0.109 | 1.049 | 1.055 |
| Ce2010_F5 | C (T/F) | 0.076 | 0.272 | >30 | >30 | 0.014 | 0.067 | 0.735 | 0.608 |
| Ce0682_E4 | C (T/F) | 0.050 | 0.145 | >30 | >30 | 0.014 | 0.061 | 0.553 | 0.376 |
| Ce1172_H1 | C (T/F) | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND |
| Ce2060_G9 | C (T/F) | 0.235 | 0.815 | >30 | >30 | 0.029 | 0.108 | 0.909 | 0.878 |
| Ce703010054_2A2 | C (T/F) | 0.306 | 1.547 | >30 | >30 | 0.029 | 0.144 | 1.023 | 1.031 |
| BF1266.431a | C (T/F) | 0.057 | 0.161 | >30 | >30 | 0.011 | 0.044 | 0.714 | 0.563 |
| 246F_C1G | C (T/F) | >30 | >30 | >30 | >30 | 0.108 | >30 | 2.444 | ND |
| 249M_B10 | C (T/F) | 0.077 | 0.402 | >30 | >30 | 0.024 | 0.084 | 0.506 | 0.680 |
| MS247v1(Rev-) | C (T/F) | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND |
| 7030102001E8(Rev-) | C (T/F) | 0.436 | 2.073 | >30 | >30 | 0.047 | 0.210 | 0.967 | 0.994 |
| 1394C9G1(Rev-) | C (T/F) | >30 | >30 | 0.300 | 4.429 | 0.519 | 3.264 | -0.238 | 0.133 |
| Ce704809221_1B3 | C (T/F) | 0.119 | 0.566 | >30 | >30 | 0.027 | 0.094 | 0.644 | 0.780 |
| CNE19 | BC | 0.042 | 0.175 | 0.010 | 0.047 | 0.009 | 0.023 | 0.046 | 0.310 |
| CNE20 | BC | >30 | >30 | 0.007 | 0.020 | 0.051 | 0.145 | -0.862 | -0.860 |
| CNE21 | BC | >30 | >30 | 0.054 | 0.253 | 0.093 | 0.443 | -0.236 | -0.243 |
| CNE17 | BC | 12.003 | >30 | >30 | >30 | 0.166 | 0.982 | -1.859 | 1.485 |
| CNE30 | BC | 0.934 | 3.007 | >30 | >30 | 0.082 | 0.288 | 1.057 | 1.019 |
| CNE52 | BC | 0.060 | 0.177 | >30 | >30 | 0.017 | 0.065 | 0.548 | 0.435 |
| CNE53 | BC | 0.463 | 4.250 | 0.140 | 0.580 | 0.039 | 0.128 | 0.555 | 0.656 |
| CNE58 | BC | 2.196 | 8.574 | >30 | >30 | 0.054 | 0.267 | -1.809 | -1.507 |
| MS208.A1 | A | 0.111 | 0.480 | 0.771 | 8.551 | 0.027 | 0.092 | 0.614 | 0.717 |
| O23.17 | A | 0.040 | 0.137 | 20.418 | >30 | 0.014 | 0.040 | 0.456 | 0.535 |

| Virus ID | Clade | 3BNC117 | | PGT135 | | 3BNC117/ PGT135 | | Fold Change | |
|-----------------|----------------|---------|--------|--------|-------|-----------------|--------|-------------|--------|
| | | IC50 | IC80 | IC50 | IC80 | IC50 | IC80 | IC50 | IC80 |
| Q461.e2 | A | 0.133 | 0.445 | >30 | >30 | 0.026 | 0.091 | 0.709 | 0.689 |
| Q769.d22 | A | 0.023 | 0.095 | >30 | >30 | 0.011 | 0.052 | 0.320 | 0.262 |
| Q259.d2.17 | A | 0.064 | 0.208 | >30 | >30 | 0.022 | 0.105 | 0.464 | 0.297 |
| Q842.d12 | A | 0.024 | 0.068 | >30 | >30 | 0.007 | 0.028 | 0.335 | 0.370 |
| 3415.v1.e1 | A | 0.092 | 0.568 | 0.315 | 2.032 | 0.017 | 0.064 | 0.733 | 0.948 |
| 3365.v2.e2 | A | 0.062 | 0.170 | 0.222 | 0.837 | 0.017 | 0.065 | 0.562 | 0.418 |
| 191955_A11 | A (T/F) | >30 | >30 | >30 | >30 | 2.149 | >30 | 1.145 | ND |
| 191084_B7-19 | A (T/F) | 0.111 | 0.539 | 0.157 | 1.288 | 0.008 | 0.060 | 1.142 | 0.953 |
| 6004S5_A3_4 | A (T/F) | 0.121 | 0.545 | >30 | >30 | 0.014 | 0.071 | 0.937 | 0.885 |
| T257-31 | CRF02_AG | 0.270 | 1.251 | >30 | >30 | 0.028 | 0.171 | 0.984 | 0.864 |
| 928-28 | CRF02_AG | 0.234 | 1.121 | >30 | >30 | 0.036 | 0.188 | 0.789 | 0.775 |
| 263-8 | CRF02_AG | 0.071 | 0.212 | >30 | >30 | 0.009 | 0.041 | 0.897 | 0.714 |
| T250-4 | CRF02_AG | >30 | >30 | >30 | >30 | 8.963 | 28.034 | 0.526 | 0.014 |
| T251-18 | CRF02_AG | 0.279 | 0.948 | >30 | >30 | 0.028 | 0.113 | 0.998 | 0.924 |
| T276-30 | CRF02_AG | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND |
| T276-24 | CRF02_AG | 0.132 | 0.455 | >30 | >30 | 0.016 | 0.074 | 0.916 | 0.789 |
| T11-9 | CRF02_AG | 0.826 | 4.135 | >30 | >30 | 0.115 | 0.520 | 0.856 | 0.900 |
| 235-47 | CRF02_AG | 0.153 | 1.276 | 6.511 | >30 | 0.010 | 0.050 | 1.009 | 1.293 |
| B20345.c01 | CRF01_AE | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND |
| CNE8 | CRF01_AE | 0.215 | 0.730 | >30 | >30 | 0.034 | 0.171 | 0.801 | 0.630 |
| C1080.c03 | CRF01_AE | 0.160 | 0.967 | >30 | >30 | 0.023 | 0.140 | 0.842 | 0.839 |
| R2184.c04 | CRF01_AE | 0.035 | 0.120 | >30 | >30 | 0.009 | 0.047 | 0.590 | 0.407 |
| R1166.c01 | CRF01_AE | 0.151 | 2.787 | >30 | >30 | 0.044 | 0.272 | 0.536 | 1.011 |
| R3285.c06 | CRF01_AE | 0.248 | 0.847 | >30 | >30 | 0.027 | 0.122 | 0.963 | 0.842 |
| C2101.c01 | CRF01_AE | 0.033 | 0.235 | >30 | >30 | 0.007 | 0.058 | 0.673 | 0.608 |
| C3347.c11 | CRF01_AE | 0.023 | 0.104 | >30 | >30 | 0.007 | 0.050 | 0.517 | 0.318 |
| C4118.c09 | CRF01_AE | 0.068 | 0.457 | >30 | >30 | 0.028 | 0.141 | 0.385 | 0.511 |
| CNE5 | CRF01_AE | 0.482 | 1.728 | >30 | >30 | 0.077 | 0.377 | 0.797 | 0.661 |
| BJOX009000.02.4 | CRF01_AE | 0.894 | 3.167 | >30 | >30 | 0.086 | 0.412 | 1.017 | 0.866 |
| BJOX015000.11.5 | CRF01_AE (T/F) | 2.722 | 16.450 | >30 | >30 | 0.297 | 2.561 | 0.962 | 0.808 |
| BJOX010000.06.2 | CRF01_AE (T/F) | 0.130 | 0.608 | >30 | >30 | 0.036 | 0.242 | 0.558 | 0.400 |
| BJOX025000.01.1 | CRF01_AE (T/F) | 0.042 | 0.249 | >30 | >30 | 0.012 | 0.090 | 0.544 | 0.442 |
| BJOX028000.10.3 | CRF01_AE (T/F) | 0.010 | 0.054 | >30 | >30 | 0.008 | 0.049 | 0.097 | 0.042 |
| X1193_c1 | G | 0.066 | 0.325 | 0.055 | 0.249 | 0.017 | 0.065 | 0.510 | 0.583 |
| P0402_c2_11 | G | 0.110 | 0.392 | >30 | >30 | 0.029 | 0.151 | 0.579 | 0.414 |
| X1254_c3 | G | 0.204 | 0.560 | 4.107 | >30 | 0.037 | 0.186 | 0.741 | 0.479 |
| X2088_c9 | G | >30 | >30 | 0.042 | 0.140 | 0.431 | 1.222 | -1.011 | -1.181 |
| X2131_C1_B5 | G | 0.399 | 2.263 | 0.023 | 0.097 | 0.025 | 0.161 | -0.036 | -0.220 |
| P1981_C5_3 | G | 1.080 | 6.349 | >30 | >30 | 0.060 | 0.298 | 1.255 | 1.328 |
| X1632_S2_B10 | G | >30 | >30 | >30 | >30 | 0.020 | 3.078 | 3.176 | 0.989 |
| 3016.v5.e45 | D | 4.672 | >30 | >30 | >30 | 0.146 | 1.983 | 1.523 | ND |
| A07412M1.vrc12 | D | 0.057 | 0.291 | 11.815 | >30 | 0.017 | 0.088 | 0.525 | 0.519 |
| 231965.c01 | D | 0.122 | 0.556 | >30 | >30 | 0.032 | 0.218 | 0.581 | 0.407 |
| 231966.c02 | D | 0.643 | 6.279 | >30 | >30 | 0.025 | 0.243 | 1.410 | 1.412 |
| 191821_E6_1 | D (T/F) | 0.334 | 2.256 | >30 | >30 | 0.033 | 0.152 | 1.005 | 1.171 |
| 3817.v2.c59 | CD | 0.617 | 2.055 | >30 | >30 | 0.066 | 0.299 | 0.971 | 0.837 |
| 6480.v4.c25 | CD | 0.042 | 0.197 | 3.782 | >30 | 0.012 | 0.064 | 0.544 | 0.488 |
| 6952.v1.c20 | CD | 0.203 | 0.889 | 0.043 | 0.288 | 0.044 | 0.213 | -0.010 | 0.131 |
| 6811.v7.e18 | CD | 0.091 | 0.297 | 0.285 | 4.842 | 0.018 | 0.062 | 0.704 | 0.680 |
| 89-F1_2_25 | CD | >30 | >30 | >30 | >30 | >30 | >30 | ND | ND |
| 3301.v1.c24 | AC | 0.066 | 0.185 | >30 | >30 | 0.016 | 0.054 | 0.615 | 0.535 |
| 6041.v3.c23 | AC | 0.031 | 0.204 | >30 | >30 | 0.007 | 0.029 | 0.6 | |

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