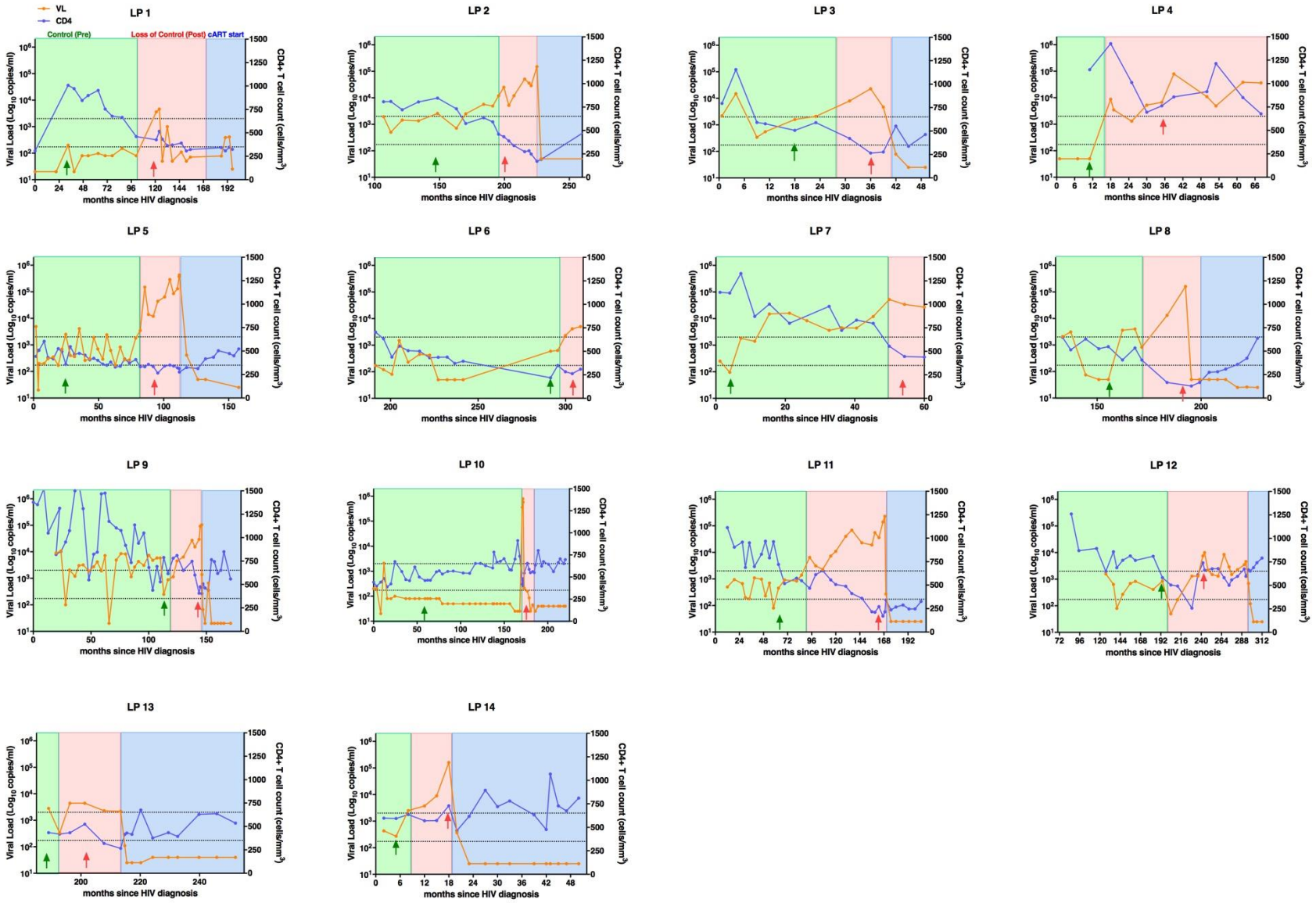


Supplementary figure 1: Evolution of viral load (orange lines) and CD4 counts (blue lines) of all individuals included in the study. Green area represents time with viral control, red area the loss of control and blue area the time during cART. Time points analyzed are marked with a green arrow for the time point with controlled infection and red for uncontrolled time point.

```
HXB2      MGARASVLSG GELDRWEKIR LRPGGKKKYK LKHIVWASRE LERFAVNPGL LETSEGCRQI LGQLQPSLQT GSEELRSLYN TVATLYCVHQ
LP1 post  ---------- ----K----- ---------- ---------- ---------- -------K-- -E----A--- -----K---- ---------K
LP2 pre   ---------- -K--Q----- ---------- ---------- ---------- ---------- ---------- -----K---- ----------
LP2 post  ---------- -K--Q----- ---------- ---------- ---------- ---------- ---------- -----K---- ----------
LP3 pre   ---------- -K--K--R-- ---------R ---------- ---------- ---------- ---------- --------F- -I--------
LP3 post  ---------- -K--K--R-- ---------R ---------- ---------- ---------- ---------- --------F- -I--------
LP4 pre   ---------- -Q--K----- -------S-- ---------- ---------- ---------- ------A--- ---------- ---V------
LP4 post  ---------- -K-----R-- -------Q-R ---------- ---------- --------K- IE-------- --------F- ---------E
LP5 pre   ------I--- ---------- ---------- ---L------ --------S- ----D--K-- ---------- -----K-V-- -I------L-
LP5 post  ------I--- ---------Y -------R-- ---L------ ---------- ---AD----- ---------- -----K---- ---------R
LP6 post  ---------- ---------- ---------- ---------- ---------- --------K- ---------- -----K---- ---V------
LP7 post  ---------- ---------- -------Q-R ---------- -----L---- -------K-- ---------- --------F- ---V-----R
LP8 pre   ------I--- ---------- -------Q-R ---L------ ---------- -------K-- IR-------- ---------- ----------
LP8 post  ------I--- ---------- -------Q-R ---L------ ---------- -------K-- IR-------- ---------- ----------
LP9 pre   ---------- ----K----- -------Q-R ---------- ---------- -------KK- -K----A--- ---------- -I--------
LP9 post  ---------- ----K----- -------Q-R ---------- ---------- -------KK- -E----A--- ---------- -I-------R
LP10 post ---------- EK--S----- ---------R ---L------ -----L--D- ---A---Q-- M-----A--- -T------F- ---V-F---K
LP11 pre  ---------- -K--Q----- ---------R ---------- ---------- ---AG--A-- -T-------- -----K---- ----------
LP11 post ---------- -K--Q----- ---------R ---------- ---------- ---AK--A-- -T-------- -----K---- -I-V------
LP12 pre  ---------- -K--Q-GE-- ---------- ---------- ---------- I--------- ---------- -----K---- ----------
LP12 post ---------- -K--Q----- -----R---- ---------- ---------- I--------- ---------- -----K---- ----------
LP13 post ---------- ---------- --Q------- ---------- ---------- ---A------ ------A--- ---------- ---------K
LP14 pre  ---------- ---------- ---------- ---------- ------D--- ---------- IR-IP----- --------F- ---V------
LP14 post ---------- ---------- ---------- ---------- ------D--- ---------- IR-IP----- --------F- ---V------
```

```
HXB2       RIEIKDTKEA LDKIEEEQNK SKKKAQQAAA DTGHSNQVSQ NYPIVQNIQG QMVHQAISPR TLNAWVKVVE EKAFSPEVIP MFSALSEGAT
LP1 post   ---------- -E-L------ -------TT- --RN-S---- ---------- ------L--- ---------- ---------- ----------
LP2 pre    ---V------ -E-------- ----------AG--NNS---- ---------- ---------- ---------- ---------- ----------
LP2 post   ---------- -E-------- ----------AG--DNS---- -------L-- ---------- --------I- ---------- ----------
LP3 pre    G--V------ ---V------ ---------- N----S---- -------L-- ---------- --------I- ---------- --T-------
LP3 post   G--V------ ---V------ ---------- N----S---- -------L-- ------L--- --------I- ---------- --T-------
LP4 pre    ---VK----- ---------- ---------- -----S---- -------L-- ---------- ---------- ---------- ----------
LP4 post   K---R---D- ---------- ---------- -A--R----- -------L-- -----P---- --------I- ---------- --T-------
LP5 pre    ---------- ---------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
LP5 post   ---------- ---------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
LP6 post   K--------- ---------- ---------- ---------- ---------- ------L--- --------I- ---------- ----------
LP7 post   --DI------ ---------- ---S-K---T ---NNS---- ---------- ------L--- --------I- ---------- ----------
LP8 pre    K---R----- ---------- ---------- ---------- ---------- -----PL--- ---------- ---------- ----------
LP8 post   K---R----- ---------- I--------- ---------- ---------- -----PL--- ---------- ---------- ----------
LP9 pre    --D------- -D------- ---G------ ---------- ---------- ---------- ---------- ---------- ----------
LP9 post   --D------- -D------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
LP10 post  -K-------- -E-V-KA-K- GQE-Q-A-MD EGS  --A-- -------A-- ---------- ---------- ---------- ----------
LP11 pre   --DV--Q--- -E-------- ---------- -----S-A-- -------M-- ------L--- --------I- ---------- ----------
LP11 post  --DV--Q--- -A-------- ---------- ---D-S-A-- -------M-- ------L--- --------I- ---------- --T-------
LP12 pre   K--V------ -E-------- ----- ---- -A-NNS---- -------LH- ------L--- --------I- ---------- ---------A
LP12 post  K--V------ -E-------- ----- ---- -T-NNS---- -------L-- -----PL--- --------I- ---------- ---------A
LP13 post  --I------- -E-------- ---------- --R------- --------I- ---------- ---------- ---------- ----------
LP14 pre   KV-------- -E-L----K- -QQMT----- -K-    --- -----K---- ------L--- --------I- ---------- ------D---
LP14 post  KV-------- -E-L----KE -QQTT----- -K-    --- ---------- ------L--- --------I- ---------- ------D---
```

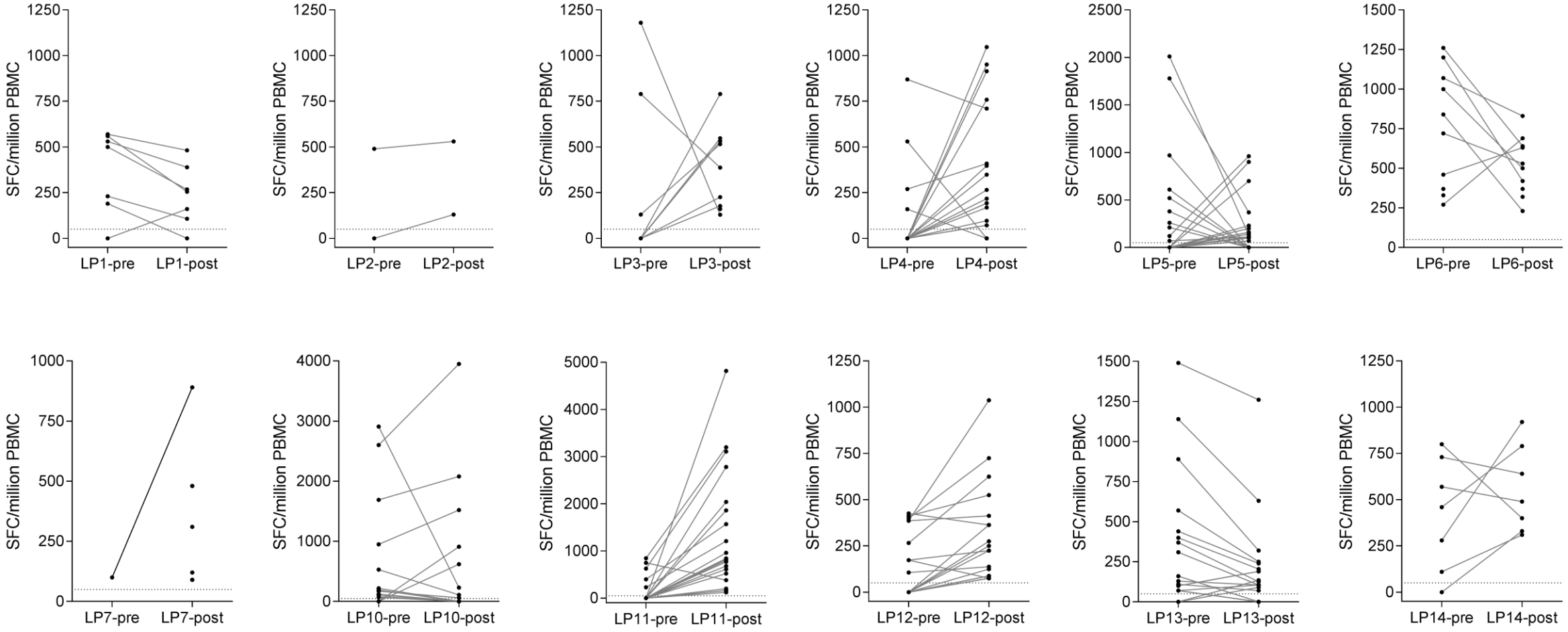
```
HXB2       PQDLNTMLNT VGGHQAAMQM LKETINEEAA EWDRVHPVHA GPIAPGQMRE PRGSDIAGTT STLQEQIGWM TNNPPIPVGE IYKRWIILGL
LP1 post   ---------- ---------- ---------- ---------- ---------- ---------- -N-----A-- ---------- ----------
LP2 pre    ---------- ---------- ---------- ---------- --V------- ---------- ---------- ---------- ----------
LP2 post   ---------- ---------- ---------- ---------- --V------- ---------- ---------- ---------- ----------
LP3 pre    ---------- ---------- --D------- ---------- --V------- ---------- ---------- -S-------- ----------
LP3 post   ---------- ---------- --D------- ---------- --V------- ---------- ---------- ---------- ----------
LP4 pre    ---------- ---------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
LP4 post   ---------- ---------- ---------- ---------- --V------- ---------- -------A-- -----V---- ----------
LP5 pre    ---------- ---------- ---------- ---------- --V------- ---------- ---------- ---------- ----------
LP5 post   ---------- ---------- ---------- ---------- --V------- ---------- ---------- ---------- ----------
LP6 post   ---------- ---------- ---------- --------Q- --L------- ---------- -N-A--VA-- -G-------- ----------
LP7 post   ---------- ---------- ---------- ---------- ---------- ---------- -N-----A-- ---------- ----------
LP8 pre    ---------- ---------- ---------- D--------- ---------- ---------- ---------- ---------- ----------
LP8 post   ---------- ---------- ---------- D--------- ---------- ---------- ---------- -H-------- ----------
LP9 pre    ---------- ---------- ---------- ---------- --V------- ---------- ---------- ---------- -------M--
LP9 post   ---------- ---------- ---------- ---------- --V------- ---------- ---------- ---------- -------M--
LP10 post  ---------- ---------- --D------- ----M--PQ- ---P---I-- ---------- -N-----T-- ---------- ----------
LP11 pre   ---------- ---------- ---------- ---------- --V------- ---------- -N-------- ---------- ----------
LP11 post  ---------- ---------- ---------- --------Q- --V------- ---------- -N-------- -H-------- ----------
LP12 pre   ---------- ---------- ---------- ---------- --V------- ---------- ---------- ---------- ----------
LP12 post  ---------- ---------- ---------- ---------- --A------- ---------- ---------- ---------- ----------
LP13 post  ---------- ---------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
LP14 pre   ----------S ---------- --D---D--- D---T----- ---P------ ---------- ---N---Q-- -S---V---- ----------
LP14 post  ----------S ---------- --D------- ----T----- ---P------ ---------- -N-N---Q-- -S---V---- ----------
```

HXB2	NKIVRMYSPT	SILDIRQGPK	EPFRDYVDRF	YKTLRAEQAS	QEVKNWMTET	LLVQNANPDC	KTILKALGPA	ATLEEMMTAC	QGVGGPGHKA
LP1 post	----------	----------	-S--------	----------	----------	----------	----------	----------	----------
LP2 pre	-------C-V	----------	----------	-**R**-------	----------	----------	----------	----------	----------
LP2 post	-------S-V	-----**K**----	----------	--**V**-------	----------	----------	---------G	----------	------S---
LP3 pre	----------	----------	----------	----------	-D--------	----------	---------G	----------	----------
LP3 post	----------	-----**K**----	----------	----------	-D--------	----------	---------G	----------	------**S**---
LP4 pre	----------	-----K----	----------	-R--------	----------	-----S----	----------	----------	----------
LP4 post	---------V	----------	----------	----------	-**D**--A-----	----------	--------S**G**	-------S--	----------
LP5 pre	---------V	----------	----------	----------	----------	----------	----------	----------	------S---
LP5 post	---------V	----------	----------	----------	----------	----------	-N--------	----------	----------
LP6 post	----------	-----K----	----------	---------**T**	----------	----------	----------	----------	------S---
LP7 post	---------V	----------	----------	----------	----------	----------	----------	----------	----------
LP8 pre	---------V	-----K----	----------	----------	-D--------	----------	----------	----------	----------
LP8 post	----------	-----K----	----------	----------	----------	----------	----------	----------	----------
LP9 pre	----------	-----K----	----------	----------	----------	----------	----------	----------	----------
LP9 post	----------	-----K----	----------	----------	----------	----------	----------	----------	----------
LP10 post	---------V	----------	----------	---------T	----G---D-	----------	----R----G	-S--------	----------
LP11 pre	---------V	----V-----	----------	--I-------	-**D**-------	----------	----------	----------	----------
LP11 post	---------V	----VK----	----------	--I-------	-**D**-------	----------	----------	----------	----------
LP12 pre	---------V	----------	----------	----------	----------	----------	----------	----------	----------
LP12 post	---------V	----------	----------	----------	----------	----------	----------	----------	----------
LP13 post	---------**S**	----------	----------	----------	----------	----------	----------	----------	----------
LP14 pre	---------V	----------	----------	F--------T	----------	----------	----------	----------	----------
LP14 post	---------V	----------	----------	F--------T	----------	----------	----------	----------	----------

```
HXB2       RVLAEAMSQV TNSA·TIMMQR GNFRNQRKIV KCFNCGKEGH TARNCRAPRK KGCWKCGKEG HQMKDCTERQ ANFLGKIWPS YKGRPGNFLQ
LP1 post   ---------- -G--A------ ---------- ---------- --R------- ---------- ---------- ---------- ----------
LP2 pre    ---------- -S--·N----- ---------- ---------- I--------- ---------- ---------- ---------- H-------H-
LP2 post   ---------- -S--·NV---- ----G---S- ---------- I--------- ---------- ---------- ---------- H-------H-
LP3 pre    ---------- --TP·N----- --Y------  ---------- L-K------- ---------- ---------- ---------- NR--------
LP3 post   ---------- --TP·N----- --Y------  ---------- L-K------- ---------- ---------- ---------- HR--------
LP4 pre    ---------- ----·-V---- ---------- ---------- ---------- ---------- ---------- ---------- -R--------
LP4 post   ---------- ----·-----G ---K--G-T- -------V-- --K------- ---------- ------I--- ------V-S- -R--------
LP5 pre    ---------- ----·-V---- ---------- ---------- I-R--K---- R--------- ---------- ---------- ----------
LP5 post   ---------- ----·-V---- ---------- ---------- I-R--K---- R--------- ---------- ---------- ----------
LP6 post   ---------A ----·-V---- ----S----- ---------- ---------- R--------- ---------- ---------- ----------
LP7 post   ---------- ----·-----K --S-----SI ------R--- ---------- ---------- ---------- ---------- HR--------
LP8 pre    ---------- ----·------ ---R------ ---------- I-R------- ---------- ---------- ---------- ----------
LP8 post   ---------- ----·------ ---R------ ---------- I-R------- ---------- ---------- ---------- ----------
LP9 pre    ---------- -S--·------ --------M- ---------- I-R------- ---------- ---------- ---------- ----------
LP9 post   ---------- ----·------ --------M- ---------- I-R------- ---------- ---------- ---------- ----------
LP10 post  ---------A - K ·AT---K S--KGP-RQI ---------- L--------- ---------- ---------- ---------- H---------
LP11 pre   ---------- ---P·------ ---------- ---------- I--------- R--------- ---------- ---------- --------P-
LP11 post  ---------- ---S·A----K ---------- ---------- I--------- R--------- ---------- ---------- --------P-
LP12 pre   ---------- ---S·------ ---------- ---------- I-R------- ---------- ---------- ---------- --------P-
LP12 post  ---------- ---S·------ --------P- ---------- I-R------- ---------- ---------- ---------- --------P-
LP13 post  ---------- ----·------ ---------- ------R--- ---------- ---------- ---------- ---------- H---------
LP14 pre   ---------- -STN· ----- S--KS--RM- -------D-- ---------- ---------- ---------- ---------- N---------
LP14 post  ---------- -STN· ----- S--KS--RM- -------V-- ---------- ---------- ---------- ---------- N---------
```

```
HXB2       SRPEPTAPPE ESFRSGVETT TPPQKQEPID KELYP·LTSLR SLFGNDPSSQ
LP1 post   G--------- ----F-E--- --S---GQ-- ---S-·-A--- ----------
LP2 pre    --L------- ----F-E--- --S------- -----·----- ----------
LP2 post   --L------- ----F-E--A ---------- --M--·-A--- ----------
LP3 pre    -----P---- ----F-E--- --S---GQ-- --V--·----- ----------
LP3 post   -----P---- ----F-E--- --S---GQ-- --V--·----- ----------
LP4 pre    ---------- ---GF-G--- --S------- --N--·----- ----------
LP4 post   N--------- ----F-E--- --S----T-- --K--·----- ----------
LP5 pre    ---------- ---------P --S------- -----·----- ----------
LP5 post   ---------- ---------P --S------- -----·----- ----------
LP6 post   --L------- --------M- --S------- -----·----- ----------
LP7 post   ---------- ----F-E--- --S-----K- Q-K--·-A--- ----------
LP8 pre    N--------- ----F-E--- --S------- -----·----- ----------
LP8 post   N--------- ----F-E--- --S------- -----·----- ----------
LP9 pre    ---------- ----F-E--A --S------- -----·----- ----------
LP9 post   ---------- ----F-E--A --S------- -----·----- ----------
LP10 post  ---------A ---GF-E-IA P- L---TKK E----·-A--K ----S-----
LP11 pre   --L------- ----F-E--- --SR-P-L-- -D-S-·-A--- ----------
LP11 post  --L------- ----F-EG-- --SR-P-L-- -D-S-·-A--- ----------
LP12 pre   --L------- ----F-E--- --S------- --M--·----- ----------
LP12 post  --L------- ----F-EG-- --S------- --M--·----- ----------
LP13 post  --L------- ------E--- --S------- ---H-·----- ----------
LP14 pre   N--------A ---GF-E- I ---P---QKT EG---P-A--- R---------
LP14 post  N--------A ---GF-E- I ---P---QKT EG---P-A--- R---------
```

Supplementary figure 2: Alignment of Gag sequences obtained for each individual (pre and post LoC) to HXB2 sequence. HLA-associated footprints are marked in read.



Supplementary Figure 3: Individual HIV-specific responses. Magnitude of CD8+ T cell HIV-specific responses expressed as SFC/ million PBMC is shown longitudinally before and after progression (n=12).

Supplementary table 1: Clinical characteristics of patients with persistent HIV control (long-term controllers).

ID (EC/VC)	Age, years*	Gender	Time since known HIV-1 infection (years)*	Log10 of viral load at 1st Follow-up timepoint studied	Log_{10} of viral load at 2nd Follow-up timepoint studied	CD4 cells/mm^3 at 1st Follow-up timepoint studied	CD4 cells/mm^3 at 2nd Follow-up timepoint studied	HLA A	HLA B	HLA C	HLA DRB	HLA DQB
VC-2515	49	Male	16	UD	2,95	777 (29%)	979 (29%)	0101/3201	4002/5701	0202/0602	0701/1301	0303/0603
VC-9540	63	Female	27	UD	2,83	529 (25%)	503 (29%)	0101/2902	4403/5701	0401/0602	0701/1101	0202/0301
EC-1668	42	Female	15	UD	UD	1201 (40%)	785 (44%)	0201/0205	3905/5701	0602/1203	1301/1601	0502/0609
EC-2143	55	Female	20	UD	UD	717 (33%)	454 (27%)	1101/2402	3501/5201	0401/1202	1301/1502	0601/0603
EC-3901	47	Female	17	UD	UD	1201 (44%)	689 (37%)	0101/0201	0801/5701	0602/0701	0301/0701	0201/0303
EC-1530	50	Male	28	UD	1,68	564 (22%)	706 (31%)	0201/3303	1302/5801	0302/0602	0701/1302	0202/0609
EC-9079	55	Female	24	UD	2,30	645 (43%)	450 (36%)	0301/1101	0702/2705	0102/0702	0301/1101	0201/0301
EC-9080	53	Male	22	UD	UD	440 (25%)	493 (29%)	0205/3101	4901/5101	0701/1502	1201/1301	0301/0603

**Age and HIV duration is shown for the latest timepoint analyzed. EC: elite controller. VC: viremic controller*