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Supplementary information

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Long-term HIV-1 remission achieved through allogeneic haematopoietic stem cell transplant from a *CCR5*Δ32/Δ32 sibling donor

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Supplementary Table 1. HIV-related characteristics of cases of PWH receiving hematopoietic bone marrow transplantation and analytical treatment interruption of ART published in medical journals. The Oslo patient is marked in yellow. Characteristics similar to Oslo patient are marked in green, characteristics different from Oslo patient are marked in red. Characteristics not available (N/A) marked in grey.

Patient	Demographics, age at HSCT	Duration of HIV at HSCT, years	Duration of ART at ATI, years	Last ART regimen before ATI	Nadir CD4	Peak viral load in copies/mL	Viral resistance	Virus tropism	Time ATI initiated after HSCT	Viral rebound	Status at last publication
Oslo	Caucasian male, 58 years old	14	12	Tenofovir alafenamide, emtricitabine, rilpivirin	309	10^5	None	R5	24 months	No	Living
Berlin 1 (1-3)	Caucasian male, 40 years old	12	5	Tenofovir, emtricitabine, efavirenz	<100	10^7	N/A	R5 (traces of X4 and dual-tropic variants)	Day 0	No	Deceased (AML relapse)
London (4, 5)	Latino male, 37 years old	13	5	Lamivudine, rilpivirine, dolutegravir	290	N/A	K65R and M184V in reverse transcriptase, E157Q in integrase	R5	16 months	No	Living
Düsseldorf (6)	Caucasian male, 43 years old	5	8	Tenofovir, emtricitabine, raltegravir	503	35 303	N/A	R5 (traces of X4)	69 months	No	Living
Geneva (7)	Caucasian male, 46 years old	28	28	Tenofovir alafenamide, emtricitabine, dolutegravir	295	63 293	Multiresistance	R5	40 months	No	Living
IMPAACT P1107 (New York) (8)	Mixed race woman, middle-aged	4	7	Tenofovir alafenamide, emtricitabine, bictegravir	<250	>10^6	N/A	R5	37 months	No	Living
City of Hope (9)	Caucasian male, 63 years old	31	>20	Tenofovir alafenamide, emtricitabine, dolutegravir	<100	N/A	N/A	R5 (traces of X4)	25 months	No	Living
Berlin 2 (10)	Caucasian male, 51 years old	6	3	Lamivudine, abacavir, raltegravir	358	22 500	N/A	R5 (traces of X4)	3 years	No	Living
Boston A (11, 12)	Caucasian male	N/A	N/A	Tenofovir, emtricitabine, efavirenz	N/A	N/A	Protease inhibitors, Efavirenz (K103N) after ATI	R5	4.3 years	Yes, 12 weeks	N/A
Boston B (11, 12)	Caucasian male	27	10	Tenofovir, emtricitabine, raltegravir	481	60 000	Efavirenz	R5	2.6 years	Yes, 32 weeks	N/A
Essen (13, 14)	Male, 27 years	5	N/A	Tenofovir, emtricitabine, lopinavir–ritonavir	N/A	>10^5	N/A	Intermediate tropism (R5 and X4). Shift from R5-tropic to X4-tropic	Day -7	Yes, 20 days	Deceased (lymphoma relapse)

AML: acute myeloid leukemia: ART: antiretroviral treatment. ATI: antiretroviral treatment interruption. HSCT: hematopoietic stem cell transplantation N/A: not available. R5: CCR5/CXC chemokine receptor 5. PWH: people with HIV. X4: CXCR4 (Chemokine Receptor 4).

Supplementary Table 2. Transplant-related characteristics of cases of PWH receiving hematopoietic bone marrow transplantation and analytical treatment interruption of ART published in medical journals.

Patient	Hematologic disease	Donor type	CCR5-status recipient	CCR5-status donor	Conditioning regimen	GvHD-prophylaxis	Time to full donor chimerism (≥95%)	GvHD	GvHD treatment	Other side effects or treatments
Oslo	Myelodysplastic syndrome	HLA-identical sibling	Δ32/ wt	Δ32/ Δ32	MAC fludarabine, treosulfan	ATG, cyclosporine, methotrexate	PB: 90 days	Acute grade III (gut, skin)	Corticosteroids, vedolizumab, ruxolitinib, ECP	CMV colitis, EBV
Berlin (1-3)	1. Acute myeloid leukemia. 2. Relapsed acute myeloid leukemia	1. MUD. 2. Same donor	Δ32/ wt	Δ32/ Δ32	1. Sequential RIC fludarabine/amsacrine/cytarabine, cyclophosphamide, TBI. 2. RIC cytarabine, gemtuzumab-ozogamicin, TBI	1. ATG, cyclosporine, MMF. 2. Cyclosporine, MMF	PB: 61 days/416 days (decreased to 15% at relapse)	Acute grade I (skin). Chronic ≥mild (liver)	Cyclosporine, methylprednisolone, MMF	Leukoencephalopathy
London (4, 5)	Hodgkins´s lymphoma	MMUD (9/10 HLA alleles)	wt/wt	Δ32/ Δ32	RIC lomustine, cytarabine, cyclophosphamide, etoposide	Alemtuzumab, cyclosporine, methotrexate	PB: 1 month	Acute grade I (gut)	None	EBV, CMV
Dusseldorf (6)	Acute myeloid leukemia	MUD	Δ32/ wt	Δ32/ Δ32	RIC Fludarabine, treosulfan	ATG, cyclosporine, MMF	PB: 34 days and 7 months (decreased to 72% at relapse). BM: 7 months	Chronic mild (eyes)	Tacrolimus	CMV duodenitis, HSV2, HHV8, EBV, azacitidine and DLI for relapse
Geneva (7)	Acute myeloid leukemia (myeloid sarcoma)	MMUD (9/10 HLA alleles)	wt/wt	wt/wt	Sequential RIC clofarabine and cyclophosphamide, fludarabine, TBI	Cyclophosphamide, tacrolimus, MMF	PB: <1 month. BM: <1 month	Acute grade ≥II (liver), chronic ≥moderate (liver, skin, neuro)	Corticosteroids, tacrolimus, cyclosporine, ruxolitinib	Azacitidine maintenance
IMPAACT P1107 (New York)(8)	Acute myeloid leukemia	UCB (5/8 HLA alleles)/haploidentical related	N/A	Δ32/ Δ32	RIC fludarabine, melphalan, TBI	ATG, tacrolimus, MMF	PB: 14 weeks	None	None	EBV, CMV
City of Hope (9)	Acute myeloid leukemia	MUD	wt/wt	Δ32/ Δ32	RIC fludarabine, melphalan	Tacrolimus, sirolimus	BM: 30 days	Chronic mild (oral)	Topical steroids, sirolimus	None
Berlin 2 (10)	Acute myeloid leukemia	MUD	Δ32/ wt	Δ32/ wt	RIC fludarabine, TBI	ATG, cyclosporine, methotrexate	PB: 28 days	Acute grade I (skin)	Topical steroids	None
Boston A (11, 12)	Hodgkins´s lymphoma	MMUD (7/8 HLA alleles)	Δ32/ wt	wt/wt	RIC fludarabine, busulfan	Tacrolimus, methotrexate, sirolimus	PB: 216 days	Chronic severe (skin, eyes, liver)	Prednisone, sirolimus, tacrolimus, ECP	None
Boston B (11, 12)	Myelodysplastic syndrome	HLA-identical sibling	Δ32/ wt	wt/wt	RIC fludarabine, busulfan	Tacrolimus, methotrexate, sirolimus	PB: 220 days	Chronic (skin, oral, liver)	Prednisone	DLI for poor graft function
Essen (13, 14)	T-cell lymphoma	MUD	N/A	Δ32/ Δ32	N/A	N/A	N/A	Acute grade I-II (skin)	N/A	N/A

ART: antiretroviral treatment. ATG antithymocyte globulin. BM: Bone marrow. CMV: cytomegalovirus. EBV: Epstein-Barr-virus. DLI: Donor lymphocyte infusion. ECP: extracorporeal photopheresis. GvHD: Graft-versus-host disease. HLA: Human leukocyte antigen. HHV8: Human herpesvirus 8. MAC: Myeloablative conditioning. HSV2: Herpes simplex virus 2. MMF: mycophenolate mofetil. MMUD: Mismatched unrelated donor. MUD: 10/10 HLA-matched unrelated donor. N/A: not available PB: Peripheral blood. PWH: peoplewith HIV. RIC: Reduced intensity conditioning. TBI: Total body irradiation. UCB: Umbilical cord blood.

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Supplementary table 3. Oligonucleotide sequences

Assay/Target	Primer or probe name	Sequence (5′–3′)	Region	Application	Reference
HIV-1 *pol* nested PCR (outer)	JA17_IF	TACAGGAGCAGATGATACAG	HIV-1 *pol*	Qualitative HIV DNA PCR	36. Albert & Fenyö, 1990
HIV-1 *pol* nested PCR (outer)	JA20_IR	CCTGGCTTTAATTTTACTGG	HIV-1 *pol*	Qualitative HIV DNA PCR	36. Albert & Fenyö, 1990
HIV-1 *pol* nested PCR (inner)	JA18_IIF	GGAAACCAAAAATGATAGGG	HIV-1 *pol*	Qualitative HIV DNA PCR	36. Albert & Fenyö, 1990
HIV-1 *pol* nested PCR (inner)	JA19_IIR	ATTATGTTGACAGGTGTAGG	HIV-1 *pol*	Qualitative HIV DNA PCR	36. Albert & Fenyö, 1990
HIV-1 *vif* nested PCR (outer)	OG462_IF	GGAAAACAGATGGCAGGTGAT	HIV-1 *vif*	Qualitative HIV DNA PCR	37. Grankvist et al., 1996
HIV-1 *vif* nested PCR (outer)	OG502_IR	CCTACCTTGTTATGTCCTGCTTGA	HIV-1 *vif*	Qualitative HIV DNA PCR	37. Grankvist et al., 1996
HIV-1 *vif* nested PCR (inner)	OG465_IIF	GCAAGTAGACAGGATGAGGATT	HIV-1 *vif*	Qualitative HIV DNA PCR	37. Grankvist et al., 1996
HIV-1 *vif* nested PCR (inner)	OG483_IIR	TTTCTCCTGTATGCAGACCCCA	HIV-1 *vif*	Qualitative HIV DNA PCR	37. Grankvist et al., 1996
Human *RB1* qPCR (forward)	RB1-2672F	CCAGAAAATAAATCAGATGGTATGTAACA	Human *RB1*	Cellular DNA quantification / extraction control	38. Andréasson et al., 2002
Human *RB1* qPCR (reverse)	RB1-2750R	TGGTTTAGGAGGGTTGCTTCC	Human *RB1*	Cellular DNA quantification / extraction control	38. Andréasson et al., 2002
Human *RB1* probe	RB1-2727_FAM	FAM-CAGCACTTCTTTTGAGCACACGGTCG	Human *RB1*	Cellular DNA quantification / extraction control	38. Andréasson et al., 2002
HIV-1 LTR/*gag* ddPCR (forward)	LTR/gag (forward)	GGTCTCTCTGGTTAGACCAGAT	5' LTR/ *gag*	Viral reservoir measurement PBMC	15. Leth et al., 2016
HIV-1 LTR/*gag* ddPCR (reverse)	LTR/gag (reverse)	CTGCTAGAGATTTTCCACACTG	5' LTR/ *gag*	Viral reservoir measurement PBMC	15. Leth et al., 2016
HIV-1 LTR/*gag* ddPCR (probe)	LTR/gag (probe)	6FAM-AGTAGTGTGTGCCCGTCTGTT-MGB	5' LTR/ *gag*	Viral reservoir measurement PBMC	15. Leth et al., 2016
Human *RPP30* ddPCR (forward)	RPP30-F	GATTTGGACCTGCGAGCG	Human *RPP30*	Cellular input normalization	15. Leth et al., 2016
Human RPP30 ddPCR (reverse)	RPP30-R	GCGGCTGTCTCCACAAGT	Human *RPP30*	Cellular input normalization	15. Leth et al., 2016
Human RPP30 ddPCR Probe	RPP30 Probe	CTGACCTGAAGGCTCT	Human *RPP30*	Cellular input normalization	15. Leth et al., 2016
HIV-1 LTR/*gag* ddPCR (forward) CS-IPDA	5' LTR/ *gag* Forward	GACTAGCGGAGGCTAGAAGGAGAGA	5' LTR/ *gag*	Viral reservoir measurement PBMC	39. Fish et al., 2022
HIV-1 LTR/*gag* ddPCR (reverse) CS-IPDA	5' LTR/ *gag* Reverse	CTAATTTTCCSCCDCTTAATAYTGACG	5' LTR/ *gag*	Viral reservoir measurement PBMC	39. Fish et al., 2022
HIV-1 LTR/*gag* ddPCR (probe) CS-IPDA	5' LTR/ *gag* Probe	HEX-AT+G+GGT+GC+GAGA	5' LTR/ *gag*	Viral reservoir measurement PBMC	39. Fish et al., 2022
HIV-1 *pol* ddPCR (forward) CS-IPDA	5' *pol* Forward	WCCYTTARYTTCCCTCARATCACTCT	5' *pol*	Viral reservoir measurement PBMC	39. Fish et al., 2022
HIV-1 *pol* ddPCR (reverse) CS-IPDA	5' *pol* Reverse	TACTGTATCATCTGCTCCTGTRTCTAAKAGAGCYTC	5' *pol*	Viral reservoir measurement PBMC	39. Fish et al., 2022
HIV-1 *pol* ddPCR (probe) CS-IPDA	5' *pol* Probe	FAM-TTG+G+CARC+GA+CC	5' *pol*	Viral reservoir measurement PBMC	39. Fish et al., 2022
HIV-1 *env* ddPCR (forward) CS-IPDA	5' *env* Forward	TVTTCMTTGGGTTCTTRGGAGCAGCAGG	5' *env*	Viral reservoir measurement PBMC	39. Fish et al., 2022
HIV-1 *env* ddPCR (reverse) CS-IPDA	5' *env* Reverse	GCACTATRCCAGACAATAVYTGTCTGGCCTGTACC	5' *env*	Viral reservoir measurement PBMC	39. Fish et al., 2022
HIV-1 *env* ddPCR (probe) CS-IPDA	5' *env* Probe	HEX-A+G+CA+CKA+T+G+GG	5' *env*	Viral reservoir measurement PBMC	39. Fish et al., 2022
5' *RPP30* ddPCR (forward) CS-IPDA	5' *RPP30* Forward	GCATATCAGGGTACAGCATAGG	5' *RPP30*	Cellular quantification and input normalization	39. Fish et al., 2022
5' *RPP30* ddPCR (reverse) CS-IPDA	5' *RPP30* Reverse	CTTCCCTCACGGCATATACTTC	5' *RPP30*	Cellular quantification and input normalization	39. Fish et al., 2022
5' *RPP30* ddPCR (probe) CS-IPDA	5' *RPP30* Probe	FAM-TCTGCTCGTTGTTAGTCACCAGCT	5' *RPP30*	Cellular quantification and input normalization	39. Fish et al., 2022
3' *RPP30* ddPCR (forward) CS-IPDA	3' *RPP30* Forward	GCTGTGTTTGCTCTCTTGATTT	3' *RPP30*	Cellular quantification and input normalization	39. Fish et al., 2022
3' *RPP30* ddPCR (reverse) CS-IPDA	3' *RPP30* Reverse	GGTCTGTCCATGGCATCTTAT	3' *RPP30*	Cellular quantification and input normalization	39. Fish et al., 2022
3' *RPP30* ddPCR (probe) CS-IPDA	3' *RPP30* Probe	HEX-AATGTCTGTGACTGGGTTCTGGCT	3' *RPP30*	Cellular quantification and input normalization	39. Fish et al., 2022
deltaD (forward)	deltaD Forward	GCTGGCTGTAATGGGAATGT	deltaD region in *RPP30*	Cellular quantification and input normalization	39. Fish et al., 2022
deltaD (reverse)	deltaD Reverse	TAATGGCTTGATAAAGATAAGTGATCAT	deltaD region in *RPP30*	Cellular quantification and input normalization	39. Fish et al., 2022
deltaD (probe)	deltaD Probe	FAM-TGTGAAGATGTCTGTAGCCATCTTAT	deltaD region in *RPP30*	Cellular quantification and input normalization	39. Fish et al., 2022
HIV-1 U5′–LTR ddPCR (forward)	LTR-U5 integrated Forward	GTTCGGGCGCCACTGCTAG	HIV-1 U5′-LTR	Viral reservoir measurement tissue	43. Morón-López et al., 2017
HIV-1 U5′–LTR ddPCR (reverse)	LTR-R integrated Reverse	TTAAGCCTCAATAAAGCTTGCC	HIV-1 U5′-LTR	Viral reservoir measurement tissue	43. Morón-López et al., 2017
HIV-1 U5′–LTR ddPCR Probe	New integrated-2 Probe	FCCAGAGTCACACAACAGACGGGCA	HIV-1 U5′-LTR	Viral reservoir measurement tissue	43. Morón-López et al., 2017
HIV-1 *gag* ddPCR (forward)	HIV_F (SCA)	CATGTTTTCAGCATTATCAGAAGGA	HIV-1 *gag*	Viral reservoir measurement tissue	43. Morón-López et al., 2017
HIV-1 gag ddPCR (reverse)	HIV_R (SCA)	TGCTTGATGTCCCCCCACT	HIV-1 *gag*	Viral reservoir measurement tissue	43. Morón-López et al., 2017
HIV-1 gag ddPCR (probe)	HIV Probe (SCA)	CCACCCCACAAGATTTAAACACCATGCTAA	HIV-1 *gag*	Viral reservoir measurement tissue	43. Morón-López et al., 2017
Human *RPP30* ddPCR (forward)	RPP30-F	GATTTGGACCTGCGAGCG	Human *RPP30*	Cellular input normalization	43. Morón-López et al., 2017
Human RPP30 ddPCR (reverse)	RPP30-R	GCGGCTGTCTCCACAAGT	Human *RPP30*	Cellular input normalization	43. Morón-López et al., 2017
Human RPP30 ddPCR Probe	RPP30 Probe	CTGACCTGAAGGCTCT	Human *RPP30*	Cellular input normalization	43. Morón-López et al., 2017
Viral co-receptor tropism analysis (outer)	V3-forward	GTCAGCACAGTACAATGYACACATGG	*env* V3-loop mRNA	Coreceptor tropism analysis	44. Paar et al., 2011
Viral co-receptor tropism analysis (outer)	V3-reverse	AGTGCTTCCTGCTGCTCCYAAGAACCC	*env* V3-loop mRNA	Coreceptor tropism analysis	44. Paar et al., 2011
Viral co-receptor tropism analysis (inner)	V3-nested-for	TGTTAAATGGCAGYCTAGCAG	*env* V3-loop mRNA	Coreceptor tropism analysis	44. Paar et al., 2011
Viral co-receptor tropism analysis (inner)	V3-nested-rev	TGGGAGGGGCATACATTG	*env* V3-loop mRNA	Coreceptor tropism analysis	44. Paar et al., 2011