| Marker | $(5' \rightarrow 3')$ Primer Sequence |
|------------------------|---------------------------------------|
| ACTB (forward) | GAGAAAATCTGGCACCACACC |
| ACTB (reverse) | GGATAGCACAGCCTGGATAGCAA |
| NMNAT1 (forward) | CTGTGCCAAAGGTCAAGCTG |
| NMNAT1 (reverse) | GTGTTTCCACAGCACATCCG |
| NMNAT2 (forward) | CACGTTATCTTGCTCGCCTG |
| NMNAT2 (reverse) | AGGGTCCACCCTGATCCAAT |
| NMNAT3 (forward) | TAAGGGAGCGCAAGGTCAAG |
| NMNAT3 (reverse) | GCAGGATCTAGGCTGAAGCA |
| NAMPT (forward) | CCCAAGAGACTGCTGGCATA |
| NAMPT (reverse) | ATCGCTGACCACAGATACAGG |
| NAPRT (forward) | TGGACAGTGGTGACCTGCTA |
| NAPRT (reverse) | CCACCAGCTTATAGACGCCA |
| IL2RA (forward) | GGGACTGCTCACGTTCATCA |
| IL2RA (reverse) | TGCGGAAACCTCTCTTGCAT |
| <i>HIV-1</i> (forward) | TACTGACGCTCTCGCACC |
| <i>HIV-1</i> (reverse) | TCTCGACGCAGGACTCG |
| FOSL2 (forward) | GGCTCAGGCAGTGCATTCAT |
| FOSL2 (reverse) | CTCATCTCCTCCTGCGG |
| BTBD11 (forward) | CTCCAGCAAGCCGACAAATG |
| BTBD11 (reverse) | TCTCACAGTGTCGCTGCAAA |
| HCG27 (forward) | CCTCTGAGGGATGTCAAAGGC |
| HCG27 (reverse) | CAACACCTGCCTGAGCTTAC |
| IGSF9B (forward) | GAGATGTCAGAGATCACCCTGC |
| IGSF9B (reverse) | GCGTCTGTCCAAACACGTCC |
| NR4A2 (forward) | AGTCTGATCAGTGCCCTCGT |
| NR4A2 (reverse) | GATAGTCAGGGTTCGCCTGG |
| HMOX1 (forward) | ACTGCGTTCCTGCTCAACAT |
| HMOX1 (reverse) | TGGCATAAAGCCCTACAGCA |

Supplementary Table 1: Primers used in the SYBR green-based real-time PCR assay.

Supplementary Table 2: All reagents used in this study.

| REAGENT or RESOURCE | SOURCE | IDENTIFIER |
|--|----------------|------------------------------------|
| Antibodies | | |
| PE anti-human CCR5 (3A9), flow cytometry | BD Biosciences | Cat#556042; RRID: AB 396313 |
| BV711 anti-human CCR5 (J418F1), flow cytometry | BioLegend | Cat#359130; RRID:AB 2734388 |
| APC anti-human CD25 (M-A251), flow cytometry | BD Biosciences | Cat#555434; RRID:AB 398598 |
| PE/Cy7 anti-human CD25 (BC96), flow cytometry | BioLegend | Cat#302612; RRID:AB 314282 |
| PerCP/Cy5.5 anti-human CD25 (BC96), flow cytometry | BioLegend | Cat#302626; RRID:AB 2125478 |
| BV605 anti-human CD25 (BC96), flow cytometry | BioLegend | Cat#302632; RRID:AB 11218989 |
| PB anti-human CD3 (UCHT1), flow cytometry | BioLegend | Cat#300442; RRID:AB 2562048 |
| FITC anti-human CD3 (UCHT1), flow cytometry | BioLegend | Cat#300405; RRID:AB 314059 |
| BV785 anti-human CD3 (SK7), flow cytometry | BioLegend | Cat#344842; RRID: AB 2616891 |
| PE anti-human CD38 (HB-7), flow cytometry | BioLegend | Cat#356604; RRID:AB 2561900 |
| APC anti-human CD38 (HB-7), flow cytometry | BioLegend | Cat#356606; RRID:AB 2561902 |
| APC/Cy7 anti-human CD4 (OKT4), flow cytometry | BioLegend | Cat#317418; RRID: AB 571947 |
| PB anti-human CD4 (OKT4), flow cytometry | BioLegend | Cat#317429; RRID:AB 1595438 |
| PerCP/Cy5.5 anti-human CD4 (OKT4), flow cytometry | BioLegend | Cat#317428; RRID:AB 1186122 |
| FITC anti-human CD4 (OKT4), flow cytometry | BioLegend | Cat#317408; RRID:AB 571951 |
| APC anti-human CD45 (HI30), flow cytometry | BioLegend | Cat#304037; RRID:AB 2562049 |
| APC/Cy7 anti-human CD45 (2D1), flow cytometry | BioLegend | Cat#368516; RRID:AB 2566376 |
| PE anti-human CD45 (2D1), flow cytometry | BioLegend | Cat#368510; RRID:AB 2566370 |
| PE/Cy7 anti-human CD69 (FN50), flow cytometry | BioLegend | Cat#310912; RRID:AB 314847 |
| APC anti-human CD69 (FN50), flow cytometry | BD Biosciences | Cat#560711; RRID:AB 1727507 |
| PB anti-human CD69 (FN50), flow cytometry | BioLegend | Cat#310920; RRID:AB 493667 |
| PE/Cy7 anti-human CD8 (SK1), flow cytometry | BioLegend | Cat#344712; RRID:AB 2044008 |
| APC/Cy7 anti-human CXCR4 (12G5), flow cytometry | BioLegend | Cat#306527; RRID:AB 2565993 |
| PE/Cy7 anti-human HLA-DR (LN3), flow cytometry | eBioscience™ | Cat#25-9956-42; RRID:AB 1582284 |
| BV785 anti-human HLA-DR (L243), flow cytometry | BioLegend | Cat#307642; RRID:AB 2563461 |
| APC anti-human HLA-DR (L243), flow cytometry | BioLegend | Cat#307610; RRID:AB_314688 |

| PE anti-human HLA-DR (L243), flow cytometry | BioLegend | Cat#307606; PRID: A B 314684 |
|---|------------------------|---------------------------------|
| PerCP/Cy5 5 anti human HI A DP (I 242) flow | BioL agand | Cot#207620: |
| cytometry | DioLegenu | RRID AR 893567 |
| PE anti-human Ki-67 (20Rail) flow cytometry | eBioscienceTM | Cat#12-5699-42: |
| 1 E anti-numan Ki-07 (20Kaji), now cytometry | CDIOSCICIICC | RRID: AB 10688373 |
| FITC anti-HIV (KC57) flow cytometry | Beckman coulter | Cat#6604665: |
| The anti-my (Res7), now cytometry | Deckinali counci | RRID:AB 1575987 |
| PE anti-human Ki-67 (20Rail) flow cytometry | eBioscienceTM | Cat#12-5699-42 |
| 1 E anti-numan Ki-07 (20Raji), now cytometry | ebioselence | RRID [•] AB 10688373 |
| 164Dy anti-Human CD161 (HP-3G10) mass cytometry | Fluidigm | Cat# 3164009B |
| | i iuiuigiii | RRID:AB 2687651 |
| 175Lu anti-Human CD279/PD-1 (EH12 2H7) mass | Fluidigm | Cat# 3175008B |
| cytometry | 1 10101811 | RRID:AB 2687629 |
| 144Nd anti-Human CD195/CCR5 (NP-6G4), mass | Fluidigm | Cat# 3144007A: |
| cytometry | | RRID:AB 2892770 |
| 153Eu anti-Human CD45RA (HI100), mass cytometry | Fluidigm | Cat# 3153001B; |
| | 5 | RRID:AB 2802108 |
| 165Ho anti-Human CD45RO (UCHL1), mass cytometry | Fluidigm | Cat#3165011B; |
| | C | RRID:AB_2756423 |
| 169Tm anti-Human CD25 (2A3), mass cytometry | Fluidigm | Cat# 3169003; |
| | 0 | RRID:AB_2661806 |
| 156Gd anti-Human CD183/CXCR3 (G025H7), mass | Fluidigm | Cat# 3156004B; |
| cytometry | | RRID:AB_2687646 |
| 171Yb anti-Human CD185/CXCR5 (RF8B2), mass | Fluidigm | Cat# 3171014B; |
| cytometry | | RRID:AB_2858239 |
| 158Gd anti-Human CD194/CCR4 (205410), mass | Fluidigm | Cat# 3158006A; |
| cytometry | | RRID:AB_2687647 |
| 174Yb anti-Human CD4 (SK3), mass cytometry | Fluidigm | Cat# 3174004B; |
| | | RRID:AB_2687862 |
| 176Yb anti-Human CD127/IL-7RA (A019D5), mass | Fluidigm | Cat# 3176004B; |
| cytometry | | RRID:AB_2687863 |
| 141Pr anti-Human CD196/CCR6 (G034E3), mass | Fluidigm | Cat# 3141003A; |
| cytometry | | RRID:AB_2687639 |
| 154Sm anti-Human CD3 (UCHT1), mass cytometry | Fluidigm | Cat# 3154003B; |
| | | RRID:AB_2811086 |
| 159Tb anti-Human CD197/CCR7 (G043H7), mass | Fluidigm | Cat# 3159003A; |
| | T1 ' 1' | RRID:AB_2/14155 |
| 1/3Yb anti-human CD184/CXCR4 (12G5), mass | Fluidigm | Cat# 31/3001B; |
| V20 arti human CD45 (1120) mana artamatra | Eluidian | KKID.N/A |
| Y 89 anti-numan CD45 (H130), mass cytometry | Fluidigm | Cal# 3089003B; |
| Pastarial and views strains | | KKID.AD_2001651 |
| Bacterial and virus strains | | G // + D D 00 G |
| HIV-1 _{JRFL} virus | NIH AIDS Reagent | Cat# ARP-395 |
| Distantiant secondar | Program | |
| Biological samples | | |
| Blood samples from healthy donors | Hong Kong Red Cross | N/A |
| Blood samples from HIV-infected individuals | Shenzhen third | N/A |
| · | People's Hospital | |
| | or Prince of Wales | |
| | Hospital | |
| Chemicals, peptides, and recombinant proteins | | |
| RPMI 1640 Medium, no glutamine | Gibco TM | Cat# 21870092 |
| Fetal Bovine Serum, qualified, Brazil | Gibco TM | Cat# 10270106 |
| GlutaMAX TM Supplement (L-glutamine) | Gibco TM | Cat# 35050061 |
| | | |

| HEPES Gibco™ Cat# 1530000 Recombinant Human IL-2 Protein R&D Systems Cat# 202-IL-050 Human IL-15 Miltenyi Biotech Cat# 203-093-955 Efavirenz Sigma-Aldrich Cat# 702-01-050 Maraviroc Sigma-Aldrich Cat# 702-01-050 RANiso Plus Takara Cat# 9108 TaqMan™ Universal PCR Master Mix, no AmpErase™ Applied Biosystems™ Maxpar® Cell Staining Burfer Fluidigm Cat# 4364343 Maxpar® Cell Staining Burfer Fluidigm Cat# 201068 Maxpar® Cell Acquisition Solution Fluidigm Cat# 201067 Maxpar® Cell Acquisition Solution Fluidigm Cat# 31985070 Critical commercial assays Cat# 15062 Cat# 130-092-355 Human CD4+ T Cell Enrichment Cocktail Stemcell™ Cat# 130-092-355 Human CD4+ T cell Isolation kit Miltenyi Biotec Cat# 130-092-355 Human CD4+ T cell Solation kit Miltenyi Biotec Cat# 130-092-355 Human CD4+ T cell Solation kit Miltenyi Biotec Cat# 130-092-355 Human CD4+ T cell Solation kit Miltenyi Biotec Cat# 130-092-355 Human CD4+ T cell Solation ki | Penicillin-Streptomycin | Gibco TM | Cat# 15140122 |
|--|--|-------------------------------------|---------------------------|
| Recombinant Human IL-2 Protein R&D Systems Cat# 202-IL-050 Human IL-15 Millenyi Biotech Cat# 130-093-955 Ffavirenz Sigma-Aldrich Cat# 920002 RNAiso Plus Takara Cat# 9108 TagMan TM Universal PCR Master Mix, no AmpErase TM Applied Cat# 4364343 UNG Takara Cat# 78820A Maxpar® Cell Staining Buffer Fluidigm Cat# 201068 Maxpar® Cell Acquisition Solution Fluidigm Cat# 201240 Hoechst 33342 Solution Thermo Cat# 15062 Critical commercial assays ScientificTM Cat# 15062 Technologies Thermo Cat# 15062 Technologies Miltenyi Biotee Cat# 130-096-533 Human CD69 MicroBead KH 11 Miltenyi Biotee Cat# 130-092-983 Human CD69 MicroBead SI II Miltenyi Biotee Cat# 130-092-983 Human CD69 MicroBead SI II Miltenyi Biotee Cat# 130-092-983 Human CD69 MicroBead SI II Miltenyi Biotee Cat# 15062 Cat# Grown tritic Quagen Cat# 67571 Cat# 67571 Nandofiofe | HEPES | Gibco ^{тм} | Cat# 15630080 |
| Human II15 Miltenyi Biotech Cat# 130-093-955 Efavirenz Sigma-Aldrich Cat# SML053-10MG Maraviroe Sigma-Aldrich Cat# 970002 RNAiso Plus Takara Cat# 9108 TaqMan™ Universal PCR Master Mix, no AmpErase™ Applied Cat# 4364343 UNG Cat# 201068 Cat# 201068 Maxpar® Cell Staining Buffer Fluidigm Cat# 201068 Maxpar® Cell Staining Buffer Fluidigm Cat# 201067 Maxpar® Cell Acquisition Solution Fluidigm Cat# 201067 Opti-MEM Scientifie™ Cat# 1062 Cotifical commercial assays Cat# 100 Cat# 100-096-533 Human CD4+ T cell Enrichment Cocktail Stemcell™ Cat# 130-096-533 Human CD4+ T cell Solation kit Miltenyi Biotec Cat# 130-096-533 Human CD4+ T cell Solation kit Miltenyi Biotec Cat# 130-096 | Recombinant Human IL-2 Protein | R&D Systems | Cat# 202-IL-050 |
| Fravienz Sigma-Aldrich Cat# SMI.0536-10MG Maraviroc Sigma-Aldrich Cat# SMI.0536-10MG Maraviroc Sigma-Aldrich Cat# SMI.0536-10MG TaqMan TM Universal PCR Master Mix, no AmpErase TM Applied Cat# 4364343 UNG Takara Cat# 4364343 DB Green® Premix Ex Taq TM II (Tli RNase H Plus) Takara Cat# 201066 Maxpar@ Cell Staining Buffer Fluidigm Cat# 201067 Maxpar@ Cell Staining Buffer Fluidigm Cat# 201067 Maxpar@ Cell Acquisition Solution Fluidigm Cat# 201067 Maxpar@ Trix and Perm Buffer Fluidigm Cat# 201067 Maxpar@ Trix and Perm Buffer ScientificTM Cat# 31985070 ScientificTM Cat# 31985070 ScientificTM Cat# 31985070 Critical commercial assays ScientificTM Cat# 130-096-533 Human CD4+ T cell Enrichment Cocktail Miltenyi Biotec Cat# 130-096-533 Human CD59 MicroBeads Kit II Miltenyi Biotec Cat# 130-092-385 Human CD69 MicroBeads Miltenyi Biotec Cat# 130-092-3983 Human Anti-HLA-D MicroBeads Miltenyi Biotec Cat# 130-092-3983 | Human II -15 | Miltenvi Biotech | Cat# 130-093-955 |
| Image: Second Secon | Ffavirenz | Sigma-Aldrich | Cat# SML0536-10MG |
| MAN iso Plus Cat# 71002 TakAria Cat# 3108 TakAria Cat# 3108 TakAria Cat# 3108 TB Green® Premix Ex Taq™ II (Tli RNase H Plus) Takara Cat# 201067 Maxpar® Cell Staining Buffer Fluidigm Cat# 201067 Maxpar® Tis and Perm Buffer Fluidigm Cat# 201067 Mermo Scientific™ Cat# 201067 Opti-MEM Technologies Cat# 130-092-355 Human CD4+ T cell Isolation kit Miltenyi Biotec Cat# 130-092-355 Human CD5 MicroBead Kit II Miltenyi Biotec Cat# 130-092-355 Human Immunodeficiency Virus type 1 (HIV-1) p24 / Capid Protein p24 ELSA Pair Set Cat# 60071 Cat# 60771 Calif Calof Assay Promega Cat# 60771 Cat# | Maraviroe | Sigma-Aldrich | Cat# P70002 |
| RNA130 Fuls Cat# 9108 TaqMan [™] Universal PCR Master Mix, no AmpErase [™] Applied Cat# 4364343 TB Green® Premix Ex Taq [™] II (Tli RNase H Plus) Takara Cat# 201067 Maxpar® E cell Staining Buffer Fluidigm Cat# 201067 Maxpar® E cell Acquisition Solution Fluidigm Cat# 201067 Maxpar® E cell Acquisition Solution Fluidigm Cat# 201240 Hoechst 33342 Solution Thermo Cat# 201067 Opti-MEM Thermo Cat# 31985070 Critical commercial assays Thermo Cat# 130-096-533 RosetteSep TM Human CD4+ T Cell Enrichment Cocktail Stemcell TM Cat# 130-096-533 Human CD59 MicroBeads Ri II Miltenyi Biotec Cat# 130-092-355 Human Anti-IL-A-DR MicroBeads Miltenyi Biotec Cat# 130-092-355 Human Anti-IL-A-DR MicroBeads Miltenyi Biotec Cat# 130-092-355 Human Anti-LA-DR MicroBeads Miltenyi Biotec Cat# 130-092-355 Human Anti-LA-DR MicroBeads Miltenyi Biotec Cat# 130-092-355 Human Anti-LA-DR MicroBeads Miltenyi Biotec Cat# 130-092-355 Muman Anti-LA-DR MicroBeads Miltenyi Biotec Cat# 130-046-101 </td <td>DNA iso Dhu</td> <td>Takara</td> <td>Cat# 120002</td> | DNA iso Dhu | Takara | Cat# 120002 |
| HagMan ¹⁴ Universal PCR Master MIX, no AmpErase ¹⁴⁴ Applied Cat# 434343 H3 Green® Premix Ex Taq ¹⁴⁴ II (TI) RNase H Plus) Takara Cat# R820A Maxpar® Cell Staining Buffer Fluidigm Cat# 201068 Maxpar® Cell Acquisition Solution Fluidigm Cat# 201240 Hoechst 33342 Solution Thermo Cat# 201240 Hoechst 33342 Solution Thermo Cat# 31985070 Scientific TM Scientific TM Cat# 130-096-533 Human CD4+ T cell Isolation kit Miltenyi Biotec Cat# 130-096-533 Human CD55 MicroBead Kit II Miltenyi Biotec Cat# 130-092-983 Human CD55 MicroBead Kit II Miltenyi Biotec Cat# 130-046-101 Human Anti-HLA-DR MicroBeads Miltenyi Biotec Cat# 130-046-101 Human Immunodeficiency Virus type 1 (HIV-1) p24 / Sino Biological Cat# 60771 CelfTiter-Gibe Luminescent Cell Viability Assay Promega Cat# 60771 CelfTiter-Gibe Luminescent Cell Viability Assay Promega Cat# 51306 Qilaamp DNA Mini Kit Qiagen Cat# 52906 BD Cytofix/Cytoperm ¹⁴⁴ Fixation/Permeabilization Kit BD Biosciences Cat# 6210A Lipfofetamine ¹⁴⁴ RNiMAX Tran | | | |
| TB Green& Premix Ex Taq [™] II (Tli RNase H Plus) Takara Cat# 201068 Maxpar® Cell Staining Buffer Fluidigm Cat# 201067 Maxpar® Cell Acquisition Solution Fluidigm Cat# 201240 Hoechst 33342 Solution Thermo Cat# 201240 Hoechst 33342 Solution Thermo Cat# 201240 Opti-MEM Thermo Cat# 31985070 Scientifie™ Cat# 15062 Human CD4+ T cell Isolation kit Miltenyi Biotec Cat# 130-092-355 Human CD59 MicroBead Kit II Miltenyi Biotec Cat# 130-092-983 Human Anti-ILA-DR MicroBeads Miltenyi Biotec Cat# 130-092-983 Human Anti-ILA-DR MicroBeads Miltenyi Biotec Cat# 130-092-983 Human Anti-ILA-DR MicroBeads Miltenyi Biotec Cat# 30-046-101 Human Anti-ILA-DR MicroBeads Promega Cat# 69071 CellTiter-Glo® Lawinescent Cell Viability Assay Promega Cat# 7130-46101 Stemotifem Cat# 7571< | I aqMan ^{1M} Universal PCR Master Mix, no AmpErase ^{1M} | Applied Biosystems TM | Cat# 4364343 |
| Maxpar® Cell Staining Buffer Fluidigm Cat# 201065 Maxpar® Eix and Perm Buffer Fluidigm Cat# 201240 Maxpar® Cell Acquisition Solution Fluidigm Cat# 201240 Hoechst 33342 Solution Thermo Cat# 62249 Opti-MEM Thermo Cat# 62249 Critical commercial assays Cat# 130-096-533 RosetteSep™ Human CD4+ T Cell Enrichment Cocktail Stemcell™ Cat# 130-096-533 Human CD69 MicroBead Kit II Miltenyi Biotec Cat# 130-092-933 Human CD59 MicroBead Kit II Miltenyi Biotec Cat# 130-092-933 Human CD59 MicroBead Kit II Miltenyi Biotec Cat# 130-092-983 Human CD59 MicroBead Kit II Miltenyi Biotec Cat# 130-092-983 Human CD69 MicroBeads II Miltenyi Biotec Cat# 130-092-983 Human CD60 MicroBeads Kit II Miltenyi Biotec Cat# 130-092-983 Human CD60 MicroBeads Kit II Miltenyi Biotec Cat# 130-092-983 Human CD60 MicroBeads Kit II Miltenyi Biotec Cat# 60071 CellTiter-Glo® Luminescent Cell Viability Assay Promega Cat# 6071 CellTiter-Glo® Luminescent Cell Viability Assay Promega Cat# 60204 | TB Green® Premix Ex Tag TM II (Tli RNase H Plus) | Takara | Cat# RR820A |
| Maxpar® Fix and Perm Buffer Fluidigm Cat# 201067 Maxpar® Cell Acquisition Solution Fluidigm Cat# 201240 Hoechst 33342 Solution Thermo Cat# 201240 Opti-MEM Thermo Cat# 31985070 ScientifieTM Cat# 31985070 Critical commercial assays Cat# 15062 ResetteSepTM Human CD4+ T Cell Enrichment Cocktail StemcellTM Cat# 130-096-533 Human CD4+ T cell Isolation kit Miltenyi Biotee Cat# 130-096-533 Human CD59 MicroBeads II Miltenyi Biotee Cat# 130-092-355 Human CD25 MicroBeads II Miltenyi Biotee Cat# 130-092-355 Human CD50 MicroBeads II Miltenyi Biotee Cat# 130-046-101 Human Inmunodeficiency Virus type 1 (HIV-1) p24 / Sino Biological Cat# 69071 CellTiter-Glo® Luminescent Cell Viability Assay Promega Cat# 69071 CellTiter-Glo® Luminescent Cell Viability Assay Promega Cat# 51306 QlAamp DNA/RNA Mini Kit Qiagen Cat# 51306 QlAamp DNA/RNA Mini Kit Qiagen Cat# 51306 QlAamp Viral RNA Mini Kit Qiagen Cat# 51306 Deposited data NCBI GSE234308 Experimental models: Cell lines Milt AIDS Reagent MOLT-4 CCR5 ⁺ cell line NIH AIDS Reagent </td <td>Maxnar® Cell Staining Buffer</td> <td>Fluidigm</td> <td>Cat# 201068</td> | Maxnar® Cell Staining Buffer | Fluidigm | Cat# 201068 |
| Maxpar® Cell Acquisition Solution Fluidigim Cat# 201240 Hoechst 33342 Solution Thermo Scientific™ Cat# 201240 Opti-MEM Thermo Scientific™ Cat# 31985070 Critical commercial assays Cat# 130-096-533 RosetteSep™ Human CD4+ T Cell Enrichment Cocktail Human CD69 MicroBead Kit II Miltenyi Biotec Cat# 130-092-355 Human CD69 MicroBead Kit II Miltenyi Biotec Cat# 130-092-983 Human CD69 MicroBead Kit II Miltenyi Biotec Cat# 130-092-983 Human CD69 MicroBead Kit II Miltenyi Biotec Cat# 130-046-101 Human Inmunodeficiency Virus type 1 (HIV-1) p24 / Capsid Protein p24 ELISA Pair Set Sino Biological Cat# 6071 NAD/NADIt-Glo™ Assay Promega Cat# 6071 Cat# 6071 CellTiter-Glo® Luminescent Cell Viability Assay Promega Cat# 6071 Clo@b Luniescent Cell Viability Assay Promega Cat# 5106 QlAamp DNA/RNA Mini Kit Qiagen Cat# 5206 BD Cytoffx/Cytoperm™ Fixation/Permeabilization Kit BD Biosciences Cat# 6210A Clamp Scientific™ I stata capate Cat# 6210A Lipofectamine™ RNAiMAX Transfection Reagent Thermo NCH ARP-4984; RRID:N/A Cat# ARP-4984; RRID:N/A MOLT-4 CCR5* cell line NIH AIDS Reagent Program Cat# CRL-3216; RRID:N/A MOLT-4 | Maxpar® Fix and Perm Buffer | Fluidigm | Cat# 201067 |
| Mackal & Ch Acquisation Johnson Thermo Cat# 62249 Opti-MEM Thermo Cat# 62249 Opti-MEM Thermo Cat# 62249 Critical commercial assays Cat# 15062 Cat# 62249 RosetteSepTM Human CD4+ T Cell Enrichment Cocktail StemetIffet Cat# 130-096-533 Human CD4+ T cell Isolation kit Miltenyi Biotec Cat# 130-096-533 Human CD59 MicroBead Kit II Miltenyi Biotec Cat# 130-096-533 Human CD55 MicroBead Kit II Miltenyi Biotec Cat# 130-096-533 Human CD55 MicroBead Kit II Miltenyi Biotec Cat# 130-092-983 Human DD55 MicroBead Kit II Miltenyi Biotec Cat# 130-046-101 Human Immunodeficiency Virus type 1 (HIV-1) p24 / Sino Biological Cat# 69071 Capsid Protein p24 ELISA Pair Set Promega Cat# 69071 NAD/NADH-Glo TM Assay Promega Cat# 7571 Nano-Glo@ Luciferase Assay System Promega Cat# 80204 QlAamp DNA Mini Kit Qiagen Cat# 82496 QlAamp Viral RNA Mini Kit Qiagen Cat# 6210A Lipofectamine TM RNAiMAX Transfection Reagent Thermo Cat# 7778-030 ScientifieT | Maxpar® Cell Acquisition Solution | Fluidiam | $C_{at#} 201240$ |
| Internition Cat# 62249 Opti-MEM ScientificTM Critical commercial assays Cat# 31985070 RosetteSepTM Human CD4+ T Cell Enrichment Cocktail StemcellTM Cat# 130-096-533 Human CD4+ T cell Isolation kit Miltenyi Biotec Cat# 130-096-533 Human CD59 MicroBead Kit II Miltenyi Biotec Cat# 130-092-355 Human CD25 MicroBeads II Miltenyi Biotec Cat# 130-092-355 Human Anti-HLA-DR MicroBeads Miltenyi Biotec Cat# 130-092-983 Human Anti-HLA-DR MicroBeads Miltenyi Biotec Cat# 130-046-101 Human CD4F-Glo TM Assay Promega Cat# 69071 CellTiter-Glo® Luminescent Cell Viability Assay Promega Cat# 69071 CellTiter-Glo® Luminescent Cell Viability Assay Promega Cat# 80204 QlAamp DNA Mini Kit Qiagen Cat# 5306 QlAamp DNA Mini Kit Qiagen Cat# 54714 PrimeScriptTM II 1st Strand cDNA Synthesis Kit Takara Cat# 6210A LipofectamineTM RNAMAX Transfection Reagent Thermo Cat# ARP-4984; MOLT-4 CCR5* cell line NIH AIDS Reagent Cat# ARP-4984; MOLT-4 CCR5* cell line NIH AIDS Reagent | Hooshot 22242 Solution | Thorme | Cat# 201240 |
| Opti-MEM Thermo Scientific TM Cat# 31985070 Critical commercial assays RosetteSepTM Human CD4+ T Cell Enrichment Cocktail Technologies Cat# 130-096-533 Human CD4+ T cell Isolation kit Miltenyi Biotee Cat# 130-092-533 Human CD5 MicroBead Kit II Miltenyi Biotee Cat# 130-092-355 Human CD5 MicroBeads II Miltenyi Biotee Cat# 130-092-383 Human Anti-HLA-DR MicroBeads Miltenyi Biotee Cat# 130-046-101 Human Immunodeficiency Virus type 1 (HIV-1) p24 / Capsid Protein p24 ELISA Pair Sct Sino Biological Cat# SEX11695-15 Capsid Protein p24 ELISA Pair Sct ND/NADH-Glo TM Assay Promega Cat# G7571 Nano-Glo® Luciferase Assay System Promega Cat# 7511.0 AllPrep DNA/RNA Mini Kit Qiagen Cat# 51306 QlAamp Viral RNA Mini Kit Qiagen Cat# 5206 DB D Cytofix/Cytoperm TM Fixation/Permeabilization Kit BD Biosciences Cat# 5206 BD Cytofix/Cytoperm TM Fixation/Permeabilization Kit BD Biosciences Cat# 470.0 Scientific TM Deposited data NCBI GSE234308 Experimental models: Cell lines RRID:N/A MOLT-4 CCR5" cell line NIH AIDS Reagent Program Cat# ARP-4984; RTD:N/A RRID: | Hoechsi 33342 Solution | I nermo ScientificTM | Cal# 62249 |
| Optimizint Catif 31930/0 ScientificTM ScientificTM RosetteSepTM Human CD4+ T Cell Enrichment Cocktail StemcellTM Cat# 130-092-535 Human CD59 MicroBead Kit II Miltenyi Biotec Cat# 130-092-355 Human CD25 MicroBead Kit II Miltenyi Biotec Cat# 130-092-355 Human Anti-HLA-DR MicroBeads Miltenyi Biotec Cat# 130-092-983 Human Anti-HLA-DR MicroBeads Miltenyi Biotec Cat# 60071 Capsid Protein p24 ELISA Pair Set NaD/NADH-Glo TM Assay Promega Cat# 6071 CellTiter-Glo@ Luminescent Cell Viability Assay Promega Cat# 6104 Qiagen Cat# 51306 QlAamp DNA Mini Kit Qiagen Cat# 51306 Qiagen Cat# 51306 Qiagen Cat# 51306 QlAamp DNA Mini Kit Qiagen Cat# 51306 Cat# 51306 Qiagen Cat# 51306 QlAamp Viral RNA Mini Kit Qiagen Cat# 51306 Cat# 51306 Qiaf# 52906 BD Cytofix/CytopermTM Fixation/Permeabilization Kit BD Biosciences Cat# 52906 Cat# 51306 BD Ageript*II 1 st Strand cDNA Synthesis Kit Takara Cat# 6210A Cat# 6210A Lipofectamine TM RNAiMAX Transfection | Opti MEM | Thermo | Cat# 31985070 |
| (Determine (Determ | | ScientificTM | Cat# 51985070 |
| Childer Gummer Charles Says Rosette Sep TM Human CD4+ T Cell Enrichment Cocktail Stemcell TM Cat# 15062 Human CD4+ T cell Isolation kit Miltenyi Biotec Cat# 130-096-533 Human CD25 MicroBeads II Miltenyi Biotec Cat# 130-092-355 Human CD25 MicroBeads II Miltenyi Biotec Cat# 130-046-101 Human Immunodeficiency Virus type 1 (HIV-1) p24 / Sino Biological Cat# G9071 Capsid Protein p24 ELISA Pair Set Nitenyi Biotec Cat# 09071 CellTiter-Glo® Luminescent Cell Viability Assay Promega Cat# 09071 CellTiter-Glo® Luciferase Assay System Promega Cat# 0204 QlAamp DNA Mini Kit Qiagen Cat# 80204 QlAamp DNA Mini Kit Qiagen Cat# 51306 QlAamp DNA Mini Kit Qiagen Cat# 52906 BD Cytofix/Cytoperm TM Fixation/Permeabilization Kit BD Biosciences Cat# 6210A Lipofectamine TM RNAiMAX Transfection Reagent Thermo Cat# 13778-030 Scientific TM Cat# ARP-4984; RRD:N/A ACH-2 cell line NCBI GSE234308 Experimental models: Cell lines MOLT-4 CCR5 ⁺ cell line NIH AIDS Reagent Program Cat# ARP-4984; RID:N/A | Critical commercial assays | Scientific | |
| Rosettesep ^{1-se} Human CD4+ 1 Cell Enrichment Cocktail Stemcell ^{1AA} Ca# 15062 Human CD4+ T cell Isolation kit Miltenyi Biotec Ca# 130-096-533 Human CD59 MicroBead Kit II Miltenyi Biotec Ca# 130-092-983 Human CD25 MicroBeads II Miltenyi Biotec Ca# 130-092-983 Human Ant-HLA-DR MicroBeads Miltenyi Biotec Ca# 30-092-983 Human Ant-HLA-DR MicroBeads Miltenyi Biotec Ca# 30-046-101 Human Ant-HLA-DR MicroBeads Promega Ca# 69071 CellTiter-Glo® Luminescent Cell Viability Assay Promega Ca# 69071 CellTiter-Glo® Luminescent Cell Viability Assay Promega Ca# 69071 CellTiter-Glo® Luminescent Cell Viability Assay Promega Ca# 6071 CellTiter-Glo® Luminescent Cell Viability Assay Promega Ca# 6071 CellTiter-Glo® Luminescent Cell Viability Assay Promega Ca# 617571 Nano-Glo® Luciferase Assay System Promega Ca# 80204 QlAamp DNA/RNA Mini Kit Qiagen Ca# 80204 QlAamp Viral RNA Mini Kit Qiagen Ca# 52906 BD Cytofix/Cytoperm TM Fixation/Permeabilization Kit BD Biosciences Ca# 6210A Lipofectamine TM RNAiM | Desette Continuer (DD4) Tr Coll Francisco (DD4) Tr | Champer 11TM | Cat# 150(2 |
| Human CD4+ T cell Isolation kitMiltenyi BiotecCat# 130-096-533Human CD69 MicroBeads Kit IIMiltenyi BiotecCat# 130-092-355Human CD25 MicroBeads IIMiltenyi BiotecCat# 130-092-983Human Imunodeficiency Virus type 1 (HIV-1) p24 /Sino BiologicalCat# SEK11695-15Capsid Protein p24 ELISA Pair SetCat# G9071CellTiter-Glo@ Luminescent Cell Viability AssayPromegaCat# SEK11695-15NAD/NADH-Glo™ AssayPromegaCat# 7130-046-101Nano-Glo@ Luciferase Assay SystemPromegaCat# 7130-046-101Nano-Glo@ Luciferase Assay SystemPromegaCat# 7130-046-101Cat# 80204QIAamp DNA Mini KitQiagenCat# 51306QIAamp DNA Mini KitQiagenCat# 51306Cat# 51306QIAamp Viral RNA Mini KitQiagenCat# 52906BD Cytofix/Cytoperm™ Fixation/Permeabilization KitBD BiosciencesCat# 5210ACat# 6210ALipofectamine™ RNAiMAX Transfection ReagentThermoCat# 13778-030Scientific™Deposited dataNCBIGSE234308Experimental models: Cell linesMOLT-4 CCR5* cell lineNIH AIDS ReagentCat# ARP-4984; RRID:N/AHEX293T cell lineATCCCat# CL-3216; RRID:N/ANDD.Cg-Prkdescid II2rgtm1Wjl/SzJ mouseLaboratory Animal Unit of the University of Hong KongN/A | RosetteSep ¹ ^M Human CD4+ 1 Cell Enrichment Cocktall | Stemcell ^{1M} | Cat# 15062 |
| Human CD4+ 1 Cell isolation Rt Millenyi Biolec Cat# 130-092-355 Human CD25 MicroBeads II Millenyi Biolec Cat# 130-092-983 Human CD25 MicroBeads II Millenyi Biolec Cat# 130-092-983 Human Anti-HLA-DR MicroBeads Millenyi Biolec Cat# 130-092-983 Human Immunodeficiency Virus type 1 (HIV-1) p24 / Capsid Protein p24 ELISA Pair Set Sino Biological Cat# G9071 CellTiter-Glo® Luminescent Cell Viability Assay Promega Cat# G7571 Nano-Glo® Luciferase Assay System Promega Cat# 51306 QIAamp DNA/RNA Mini Kit Qiagen Cat# 51306 QIAamp Viral RNA Mini Kit Qiagen Cat# 52906 BD Cytofix/Cytoperm™ Fixation/Permeabilization Kit BD Biosciences Cat# 52906 BD Cytofix/Cytoperm™ Fixation/Permeabilization Kit BD Biosciences Cat# 4210A Lipofectamine™ RNAiMAX Transfection Reagent Thermo Cat# 4210A Lipofectamine™ RNAiMAX Transfection Reagent Thermo Cat# ARP-4984; RNA-seq data NCB1 GSE234308 Cat# ARP-349; Experimental models: Cell line NIH AIDS Reagent Program RRID:N/A MOLT-4 CCR5 ⁺ cell line ATCC Cat# ARP-349; RR | Human CD4+ T call Isolation kit | Miltonyi Diotoo | Cat# 120 006 522 |
| Human CD69 MicroBead KIT II Miltenyi Biotec Cat# 130-092-355 Human Anti-HLA-DR MicroBeads II Miltenyi Biotec Cat# 130-092-383 Human Anti-HLA-DR MicroBeads Miltenyi Biotec Cat# 130-092-983 Human Anti-HLA-DR MicroBeads Miltenyi Biotec Cat# 130-046-101 Human Immunodeficiency Virus type 1 (HIV-1) p24 / Capsid Protein p24 ELISA Pair Set NAD/NADH-Glo TM Assay Promega Cat# G9071 CellTiter-Glo® Luminescent Cell Viability Assay Promega Cat# G7571 Nano-Glo® Luciferase Assay System Promega Cat# N1130 AllPrep DNA/RNA Mini Kit Qiagen Cat# 80204 QIAamp Via RNA Mini Kit Qiagen Cat# 51306 QIAamp Via RNA Mini Kit Qiagen Cat# 554714 PrimeScript TM II 1st Strand cDNA Synthesis Kit Takara Cat# 52906 BD Cytofix/Cytoperm TM Fixation/Permeabilization Kit BD Biosciences Cat# 554714 PrimeScript TM II 1st Strand cDNA Synthesis Kit Takara Cat# 6210A Lipofectamine TM RNAiMAX Transfection Reagent Thermo Cat# 13778-030 Scientific TM Deposited data RNA-seq data NCBI GSE234308 Experimental models: Cell lines MOLT-4 CCR5 ⁺ cell line NIH AIDS Reagent Provided by Linqi Zhang (source from NIH AIDS Reagent Provided by Linqi Zhang (source from NIH AIDS Reagent Program) HEK293T cell line ATCC Cat# CRL-3216; RRID:N/A NOD.Cg-Prkdescid Il2rgtm1Wjl/SzJ mouse Laboratory Animal Unit of the University of Hong Kong Oligonucleotides Lists of primers seen in Supplementary Table 1 BGI Genomics N/A | Human CD4+ 1 cen Isolation kit | Milten i Distas | Cat# 130-090-333 |
| Human CD25 MicroBeads II Miltenyi Biotec Cat# 130-092-983 Human Anti-HLA-DR MicroBeads Miltenyi Biotec Cat# 130-046-101 Human Immunodeficiency Virus type 1 (HIV-1) p24 / Sino Biological Cat# SEK11695-15 Capsid Protein p24 ELISA Pair Set NAD/NADH-Glo TM Assay Promega Cat# G9071 CellTiter-Glo® Luminescent Cell Viability Assay Promega Cat# R0204 QlAamp DNA Mini Kit Qiagen Cat# \$1306 QlAamp DNA Mini Kit Qiagen Cat# 51306 QlAamp DNA Mini Kit Qiagen Cat# 52906 BD Cytofix/Cytoperm TM Fixation/Permeabilization Kit BD Biosciences Cat# 554714 PrimeScript TM II st Strand cDNA Synthesis Kit Takara Cat# 6210A Lipofectamine TM RNAiMAX Transfection Reagent Thermo Cat# 13778-030 Scientific TM GSE234308 Esperimental models: Cell lines MOLT-4 CCR5 ⁺ cell line NIH AIDS Reagent Cat# CRL-3216; RRID:N/A ACH-2 cell line Provided by Linqi Cat# CRL-3216; RRID:N/A MOD.Cg-Prkdcscid II2rgtm1Wjl/SzJ mouse Laboratory Animal N/A University of Hong Kong N/A | Human CD69 MicroBead Kit II | Miltenyi Biotec | Cat# 130-092-355 |
| Human Anti-HLA-DR MicroBeads Miltenyi Biotec Cat# 130-046-101 Human Immunodeficiency Virus type 1 (HIV-1) p24 / Sino Biological Cat# SEk11695-15 Capsid Protein p24 ELISA Pair Set Promega Cat# G9071 NAD/NADH-Glo TM Assay Promega Cat# G7571 CellTiter-Glo® Luminescent Cell Viability Assay Promega Cat# G7571 Nano-Glo® Luciferase Assay System Promega Cat# N1130 AllPrep DNA/RNA Mini Kit Qiagen Cat# 51306 QIAamp Dial RNA Mini Kit Qiagen Cat# 51306 QIAamp Viral RNA Mini Kit Qiagen Cat# 52906 BD Cytofix/Cytoperm™ Fixation/Permeabilization Kit BD Biosciences Cat# 52906 BD Cytofix/Cytoperm™ Fixation/Permeabilization Kit BD Biosciences Cat# 52906 Deposited data Takara Cat# 6210A Cat# 13778-030 RNA-seq data NCBI GSE234308 Experimental models: Cell lines MOLT-4 CCR5 ⁺ cell line NIH AIDS Reagent Program Cat# ARP-4984; RRID:N/A RRID:N/A ACH-2 cell line ATCC Cat# CRL-3216; RRID:CVCL 0063 RRID:N/A HEK293T cell line ATCC Cat# CRL-3216; RRID:CVCL 0063 RR | Human CD25 MicroBeads II | Miltenyi Biotec | Cat# 130-092-983 |
| Human Immunodeficiency Virus type 1 (HIV-1) p24 / Sino Biological Cat# SEK11695-15 Capsid Protein p24 ELISA Pair Set NAD/NADH-Glo TM Assay Promega Cat# G9071 CellTiter-Glo® Luminescent Cell Viability Assay Promega Cat# G7571 Nano-Glo® Luciferase Assay System Promega Cat# 80204 QIAamp DNA Mini Kit Qiagen Cat# 51306 QIAamp DNA Mini Kit Qiagen Cat# 52906 BD Cytofix/Cytoperm TM Fixation/Permeabilization Kit BD Biosciences Cat# 554714 PrimeScript TM II 1st Strand cDNA Synthesis Kit Takara Cat# 6210A Lipofectamine TM RNAiMAX Transfection Reagent Thermo Cat# 13778-030 Scientific TM Deposited data NCBI GSE234308 Experimental models: Cell lines NIH AIDS Reagent Cat# ARP-4984; MOLT-4 CCR5 ⁺ cell line Provided by Linqi Cat# ARP-4984; Program RRID:N/A RRID:N/A HEK293T cell line ATCC Cat# Cat# CRL-3216; NDD.Cg-Prkdcscid II2rgtm1WjI/SzJ mouse Laboratory Animal Unit of the University of Hong Kong N/A Oligonucleotides Lists of primers seen in Supplementary Table 1 BGI Genomics <t< td=""><td>Human Anti-HLA-DR MicroBeads</td><td>Miltenyi Biotec</td><td>Cat# 130-046-101</td></t<> | Human Anti-HLA-DR MicroBeads | Miltenyi Biotec | Cat# 130-046-101 |
| Capsid Protein p24 ELISA Pair Set Promega Cat# G9071 NAD/NADH-Glo™ Assay Promega Cat# G9071 CellTiter-Glo® Luminescent Cell Viability Assay Promega Cat# G7571 Nano-Glo® Luciferase Assay System Promega Cat# N130 AllPrep DNA/RNA Mini Kit Qiagen Cat# S1306 QIAamp DNA Mini Kit Qiagen Cat# 52906 BD Cytofix/Cytoperm™ Fixation/Permeabilization Kit BD Biosciences Cat# 52906 BD Cytofix/Cytoperm™ Fixation/Permeabilization Kit BD Biosciences Cat# 6210A Lipofectamine™ RNAiMAX Transfection Reagent Thermo Cat# 13778-030 Deposited data NCBI GSE234308 Experimental models: Cell lines NIH AIDS Reagent Cat# ARP-4984; MOLT-4 CCR5 ⁺ cell line Provided by Linqi Cat# ARP-4984; Program RRID:N/A RRID:N/A NHEK293T cell line ATCC Cat# CRL-3216; NOD.Cg-Prkdcscid II2rgtm1Wjl/SzJ mouse Laboratory Animal University of Hong Kong N/A Oligonucleotides Lists of primers seen in Supplementary Table 1 BGI Genomics N/A | Human Immunodeficiency Virus type 1 (HIV-1) p24 / | Sino Biological | Cat# SEK11695-15 |
| NAD/NADH-Glo TM Assay Promega Cat# G90/1 CellTiter-Glo TM Assay Promega Cat# G7571 Nano-Glo [®] Luciferase Assay System Promega Cat# N1130 AllPrep DNA/RNA Mini Kit Qiagen Cat# 80204 QIAamp DNA Mini Kit Qiagen Cat# 51306 QIAamp Viral RNA Mini Kit Qiagen Cat# 52906 BD Cytofix/Cytoperm TM Fixation/Permeabilization Kit BD Biosciences Cat# 6210A Lipofectamine TM RNAiMAX Transfection Reagent Thermo Cat# 13778-030 Scientific TM Deposited data NCBI GSE234308 Experimental models: Cell lines NIH AIDS Reagent Cat# ARP-4984; RRID:N/A MOLT-4 CCR5 ⁺ cell line Provided by Linqi Cat# ARP-349; RRID:N/A ACH-2 cell line ATCC Cat# CRL-3216; RRID:N/A HEK293T cell line ATCC Cat# CRL-3216; RRID:CVCL 0063 Experimental models: Organisms/strains N/A NOD.Cg-Prkdcscid ll2rgtm1Wjl/SzJ mouse Laboratory Animal Unit of the University of Hong Kong N/A | Capsid Protein p24 ELISA Pair Set | D | |
| CellTiter-Glo® Luminescent Cell Viability Assay Promega Cat# G7571 Nano-Glo® Luciferase Assay System Promega Cat# N1130 AllPrep DNA/RNA Mini Kit Qiagen Cat# 80204 QIAamp DNA Mini Kit Qiagen Cat# 51306 QIAamp Viral RNA Mini Kit Qiagen Cat# 52906 BD Cytofix/Cytoperm™ Fixation/Permeabilization Kit BD Biosciences Cat# 52906 BD Cytofix/Cytoperm™ Fixation/Permeabilization Kit BD Biosciences Cat# 6210A Lipofectamine™ RNAiMAX Transfection Reagent Thermo Cat# 13778-030 Scientific™M Cat# act Cat# 13778-030 Scientific™ GSE234308 Experimental models: Cell lines MOLT-4 CCR5* cell line NIH AIDS Reagent Cat# ARP-4984; RRID:N/A ACH-2 cell line Provided by Linqi Cat# ARP-349; RRID:N/A ATCC Cat# CRL-3216; RRID:N/A HEK293T cell line ATCC Cat# CRL-3216; RRID:CVCL 0063 Experimental models: Organisms/strains N/A N/A NOD.Cg-Prkdcscid Il2rgtm1Wjl/SzJ mouse Laboratory Animal Unit of the University of Hong Kong N/A | NAD/NADH-Glo TM Assay | Promega | Cat# G9071 |
| Nano-Glo® Luciferase Assay SystemPromegaCat# N1130AllPrep DNA/RNA Mini KitQiagenCat# 80204QIAamp DNA Mini KitQiagenCat# 51306QIAamp Viral RNA Mini KitQiagenCat# 52906BD Cytofix/Cytoperm™ Fixation/Permeabilization KitBD BiosciencesCat# 52906BD Cytofix/Cytoperm™ Fixation/Permeabilization KitBD BiosciencesCat# 6210ALipofectamine™ RNAiMAX Transfection ReagentThermoCat# 6210ADeposited dataNCBIGSE234308Experimental models: Cell linesNIH AIDS ReagentCat# ARP-4984; RRID:N/AMOLT-4 CCR5⁺ cell lineNIH AIDS Reagent ProgramCat# ARP-4984; RRID:N/AACH-2 cell lineProvided by Linqi Zhang (source from NIH AIDS Reagent Program)Cat# CRL-3216; RRID:N/AHEK293T cell lineATCCCat# CRL-3216; RRID:CVCL 0063NOD.Cg-Prkdcscid Il2rgtm1Wjl/SzJ mouseLaboratory Animal Unit of the University of Hong KongN/A | CellTiter-Glo® Luminescent Cell Viability Assay | Promega | Cat# G7571 |
| AllPrep DNA/RNA Mini Kit Qiagen Cat# 80204 QIAamp DNA Mini Kit Qiagen Cat# 51306 QIAamp Viral RNA Mini Kit Qiagen Cat# 52906 BD Cytofix/Cytoperm™ Fixation/Permeabilization Kit BD Biosciences Cat# 554714 PrimeScript™ II 1st Strand cDNA Synthesis Kit Takara Cat# 6210A Lipofectamine™ RNAiMAX Transfection Reagent Thermo Cat# 13778-030 Scientific™ Cat# act Cat# 308 Experimental models: Cell lines NCBI GSE234308 MOLT-4 CCR5⁺ cell line NIH AIDS Reagent Cat# ARP-4984; RRID:N/A ACH-2 cell line Provided by Linqi Cat# ARP-349; RRID:N/A MCL-2 cell line ATCC Cat# CRL-3216; RRID:N/A HEK293T cell line ATCC Cat# CRL-3216; RRID:CVCL 0063 Experimental models: Organisms/strains N/A N/A NOD.Cg-Prkdcscid Il2rgtm1Wjl/SzJ mouse Laboratory Animal Unit of the University of Hong Kong N/A | Nano-Glo® Luciferase Assay System | Promega | Cat# N1130 |
| QIAamp DNA Mini KitQiagenCat# 51306QIAamp Viral RNA Mini KitQiagenCat# 52906BD Cytofix/Cytoperm™ Fixation/Permeabilization KitBD BiosciencesCat# 554714PrimeScript™ II 1st Strand cDNA Synthesis KitTakaraCat# 6210ALipofectamine™ RNAiMAX Transfection ReagentThermoCat# 13778-030Scientific™Scientific™Cat# 482308 Experimental models: Cell lines MOLT-4 CCR5⁺ cell lineNIH AIDS Reagent ProgramCat# ARP-4984; RRID:N/AACH-2 cell lineProvided by Linqi Zhang (source from NIH AIDS Reagent Program)Cat# CRL-3216; RRID:N/AHEK293T cell lineATCCCat# CRL-3216; RRID:CVCL 0063NOD.Cg-Prkdcscid Il2rgtm 1Wjl/SzJ mouseLaboratory Animal University of Hong KongN/A | AllPrep DNA/RNA Mini Kit | Qiagen | Cat# 80204 |
| QIAamp Viral RNA Mini Kit Qiagen Cat# 52906 BD Cytofix/Cytoperm™ Fixation/Permeabilization Kit BD Biosciences Cat# 554714 PrimeScript™ II 1st Strand cDNA Synthesis Kit Takara Cat# 6210A Lipofectamine™ RNAiMAX Transfection Reagent Thermo Cat# 13778-030 Deposited data RNA-seq data NCBI GSE234308 Experimental models: Cell lines NIH AIDS Reagent Cat# ARP-4984; RRID:N/A ACH-2 cell line Provided by Linqi Cat# ARP-349; Zhang (source from NIH AIDS Reagent Program) RRID:N/A HEK293T cell line ATCC Cat# CRL-3216; RRID:CVCL_0063 RRID:CVCL_0063 Experimental models: Organisms/strains Laboratory Animal Unit of the University of Hong Kong N/A | QIAamp DNA Mini Kit | Qiagen | Cat# 51306 |
| BD Cytofix/Cytoperm™ Fixation/Permeabilization Kit BD Biosciences Cat# 554714 PrimeScript™ II 1st Strand cDNA Synthesis Kit Takara Cat# 6210A Lipofectamine™ RNAiMAX Transfection Reagent Thermo Cat# 13778-030 Deposited data RNA-seq data NCBI GSE234308 Experimental models: Cell lines MOLT-4 CCR5 ⁺ cell line NIH AIDS Reagent Program Cat# ARP-4984; RRID:N/A ACH-2 cell line Provided by Linqi Zhang (source from NIH AIDS Reagent Program) Cat# ARP-349; RRID:N/A HEK293T cell line ATCC Cat# CRL-3216; RRID:CVCL 0063 Experimental models: Organisms/strains Laboratory Animal Unit of the University of Hong Kong N/A | QIAamp Viral RNA Mini Kit | Qiagen | Cat# 52906 |
| PrimeScriptTM II 1st Strand cDNA Synthesis KitTakaraCat# 6210ALipofectamineTM RNAiMAX Transfection ReagentThermo ScientificTMCat# 13778-030Deposited dataRNA-seq dataNCBIGSE234308Experimental models: Cell linesMOLT-4 CCR5 ⁺ cell lineNIH AIDS Reagent ProgramCat# ARP-4984; RRID:N/AACH-2 cell lineProvided by Linqi Zhang (source from NIH AIDS Reagent Program)Cat# ARP-349; RRID:N/AHEK293T cell lineATCCCat# CRL-3216; RRID:CVCL 0063Experimental models: Organisms/strainsLaboratory Animal Unit of the University of Hong KongN/A | BD Cytofix/Cytoperm TM Fixation/Permeabilization Kit | BD Biosciences | Cat# 554714 |
| Lipofectamine™ RNAiMAX Transfection Reagent Thermo Scientific™ Cat# 13778-030 Deposited data RNA-seq data NCBI GSE234308 Experimental models: Cell lines NIH AIDS Reagent Program Cat# ARP-4984; RRID:N/A ACH-2 cell line Provided by Linqi Zhang (source from NIH AIDS Reagent Program) Cat# ARP-349; RRID:N/A HEK293T cell line ATCC Cat# CRL-3216; RRID:CVCL 0063 Experimental models: Organisms/strains NOD.Cg-Prkdcscid II2rgtm1Wjl/SzJ mouse Laboratory Animal Unit of the University of Hong Kong N/A | PrimeScript [™] II 1st Strand cDNA Synthesis Kit | Takara | Cat# 6210A |
| Scientific™ Deposited data RNA-seq data NCBI GSE234308 Experimental models: Cell lines NIH AIDS Reagent Cat# ARP-4984; RRID:N/A MOLT-4 CCR5 ⁺ cell line NIH AIDS Reagent Cat# ARP-4984; RRID:N/A ACH-2 cell line Provided by Linqi Cat# ARP-349; RRID:N/A MIH AIDS Reagent Cat# ARP-349; RRID:N/A RID:N/A HEK293T cell line ATCC Cat# CRL-3216; RRID:CVCL 0063 Experimental models: Organisms/strains NOD.Cg-Prkdcscid Il2rgtm1Wjl/SzJ mouse Laboratory Animal Unit of the University of Hong Kong N/A Oligonucleotides Lists of primers seen in Supplementary Table 1 BGI Genomics N/A | Lipofectamine TM RNAiMAX Transfection Reagent | Thermo | Cat# 13778-030 |
| Deposited data NCBI GSE234308 RNA-seq data NCBI GSE234308 Experimental models: Cell lines NIH AIDS Reagent Cat# ARP-4984; RRID:N/A MOLT-4 CCR5 ⁺ cell line Provided by Linqi Cat# ARP-349; RAID:N/A ACH-2 cell line Provided by Linqi Cat# ARP-349; RRID:N/A HEK293T cell line ATCC Cat# CRL-3216; RRID:CVCL_0063 Experimental models: Organisms/strains NOD.Cg-Prkdcscid II2rgtm1Wjl/SzJ mouse Laboratory Animal Unit of the University of Hong Kong N/A Oligonucleotides Lists of primers seen in Supplementary Table 1 BGI Genomics N/A | r | Scientific™ | |
| RNA-seq data NCBI GSE234308 Experimental models: Cell lines NIH AIDS Reagent Program Cat# ARP-4984; RRID:N/A ACH-2 cell line Provided by Linqi Zhang (source from NIH AIDS Reagent Program) Cat# ARP-349; RRID:N/A HEK293T cell line ATCC Cat# CRL-3216; RRID:CVCL_0063 Experimental models: Organisms/strains NOD.Cg-Prkdcscid Il2rgtm1Wjl/SzJ mouse Laboratory Animal Unit of the University of Hong Kong N/A | Deposited data | | |
| Experimental models: Cell lines NIH AIDS Reagent Cat# ARP-4984; MOLT-4 CCR5 ⁺ cell line Program RRID:N/A ACH-2 cell line Provided by Linqi Cat# ARP-349; RRID:N/A Zhang (source from RRID:N/A HEK293T cell line ATCC Cat# CRL-3216; RRID:CVCL_0063 Experimental models: Organisms/strains RRID:CVCL_0063 NOD.Cg-Prkdcscid Il2rgtm1Wjl/SzJ mouse Laboratory Animal Unit of the University of Hong Kong N/A Oligonucleotides Lists of primers seen in Supplementary Table 1 BGI Genomics N/A | RNA-seq data | NCBI | GSE234308 |
| Experimental models: Centimes MOLT-4 CCR5 ⁺ cell line NIH AIDS Reagent Program Cat# ARP-4984; RRID:N/A ACH-2 cell line Provided by Linqi Zhang (source from NIH AIDS Reagent Program) Cat# ARP-349; RRID:N/A HEK293T cell line ATCC Cat# CRL-3216; RRID:CVCL_0063 Experimental models: Organisms/strains NOD.Cg-Prkdcscid Il2rgtm1Wjl/SzJ mouse Laboratory Animal Unit of the University of Hong Kong N/A Oligonucleotides Lists of primers seen in Supplementary Table 1 BGI Genomics N/A | Experimental models: Call lines | ПСЫ | 002231300 |
| MOL1-4 CCRS* cell line NIH AIDS Reagent Program Cat# ARP-4984; RRID:N/A ACH-2 cell line Provided by Linqi Zhang (source from NIH AIDS Reagent Program) Cat# ARP-349; RRID:N/A HEK293T cell line ATCC Cat# CRL-3216; RRID:CVCL_0063 Experimental models: Organisms/strains RRID:CVCL_0063 NOD.Cg-Prkdcscid Il2rgtm1Wjl/SzJ mouse Laboratory Animal Unit of the University of Hong Kong N/A Oligonucleotides Exts of primers seen in Supplementary Table 1 BGI Genomics N/A | Experimental models: Cen mes | | |
| ProgramKRID:N/AACH-2 cell lineProvided by Linqi Zhang (source from NIH AIDS Reagent Program)Cat# ARP-349; RRID:N/AHEK293T cell lineATCCCat# CRL-3216; RRID:CVCL_0063Experimental models: Organisms/strainsNOD.Cg-Prkdcscid Il2rgtm1Wjl/SzJ mouseLaboratory Animal Unit of the University of Hong KongN/AOligonucleotidesLists of primers seen in Supplementary Table 1BGI GenomicsN/A | MUL1-4 CCK5 cell line | NIH AIDS Reagent | Cat# AKP-4984; |
| ACH-2 cell line Provided by Linqi Cat# AKP-349, Zhang (source from RRID:N/A NIH AIDS Reagent Program) HEK293T cell line ATCC Experimental models: Organisms/strains NOD.Cg-Prkdcscid Il2rgtm1Wjl/SzJ mouse Laboratory Animal Unit of the University of Hong Kong Oligonucleotides Lists of primers seen in Supplementary Table 1 BGI Genomics N/A | ACIL 2 coll line | Program Provided by Lingi | RRID:N/A |
| Ending (source from NIH AIDS Reagent Program) RKID.IV/A HEK293T cell line ATCC Cat# CRL-3216; RRID:CVCL_0063 Experimental models: Organisms/strains RRID:CVCL_0063 NOD.Cg-Prkdcscid Il2rgtm1Wjl/SzJ mouse Laboratory Animal Unit of the University of Hong Kong N/A Oligonucleotides Experimentary Table 1 BGI Genomics N/A | ACH-2 cen line | Zhang (source from | Cal# ARF-549, RRID:N/A |
| HIM ADD Redgent Program) HEK293T cell line ATCC Cat# CRL-3216; RRID:CVCL_0063 Experimental models: Organisms/strains NOD.Cg-Prkdcscid Il2rgtm1Wjl/SzJ mouse Laboratory Animal Unit of the University of Hong Kong Oligonucleotides Lists of primers seen in Supplementary Table 1 BGI Genomics N/A | | NIH AIDS Reagent | KKID:N/A |
| HEK293T cell line ATCC Cat# CRL-3216; RRID:CVCL_0063 Experimental models: Organisms/strains NOD.Cg-Prkdcscid Il2rgtm1Wjl/SzJ mouse Laboratory Animal Unit of the University of Hong Kong N/A Oligonucleotides Lists of primers seen in Supplementary Table 1 BGI Genomics N/A | | Program) | |
| Experimental models: Organisms/strains RRID:CVCL_0063 NOD.Cg-Prkdcscid Il2rgtm1Wjl/SzJ mouse Laboratory Animal Unit of the University of Hong Kong Oligonucleotides Lists of primers seen in Supplementary Table 1 | HEK293T cell line | ATCC | Cat# CRL-3216: |
| Experimental models: Organisms/strains NOD.Cg-Prkdcscid Il2rgtm1Wjl/SzJ mouse Laboratory Animal Unit of the University of Hong Kong Oligonucleotides Lists of primers seen in Supplementary Table 1 BGI Genomics | | | RRID:CVCL 0063 |
| NOD.Cg-Prkdcscid Il2rgtm1Wjl/SzJ mouse Laboratory Animal Unit of the University of Hong Kong N/A Oligonucleotides Image: N/A Lists of primers seen in Supplementary Table 1 BGI Genomics N/A | Experimental models: Organisms/strains | | |
| Unit of the University of Hong Kong Oligonucleotides Lists of primers seen in Supplementary Table 1 BGI Genomics N/A | NOD.Cg-Prkdcscid Il2rgtm1Wil/SzJ mouse | Laboratory Animal | N/A |
| University of Hong Kong Oligonucleotides Lists of primers seen in Supplementary Table 1 BGI Genomics N/A | | Unit of the | |
| Kong Oligonucleotides Lists of primers seen in Supplementary Table 1 BGI Genomics N/A | | University of Hong | |
| Oligonucleotides Lists of primers seen in Supplementary Table 1 BGI Genomics N/A | | Kong | |
| Lists of primers seen in Supplementary Table 1 BGI Genomics N/A | Oligonucleotides | | |
| | Lists of primers seen in Supplementary Table 1 | BGI Genomics | N/A |

| HCG27 Silencer® Select pre-designed siRNA | Thermo Scientific™ | Cat# S48397 |
|---|-----------------------|---------------|
| Silencer® Select Negative Control #1 siRNA | Thermo Scientific™ | Cat# 4404021 |
| Recombinant DNA | | |
| HIV-1 NL4-3 ΔEnv Vpr Luciferase Reporter Vector | NIH AIDS Reagent | Cat# ARP-3418 |
| | Program | |

| Supplementary Table 3: | Author checklist based on ARRIVE gui | delines. |
|------------------------|--------------------------------------|----------|
| | | |

| Item | | Recommendation | Section/line number, or reason for not reporting |
|---------------|----|--|---|
| Study design | 1 | For each experiment, provide brief details of study design including: | a. Line 259 & |
| Study design | - | a. The groups being compared, including control groups. If no control | Fig. 6a |
| | | group has been used, the rationale should be stated. | _ |
| | | b. The experimental unit (e.g. a single animal, litter, or cage of | b. Line 241 |
| | | animals). | |
| Sample size | 2 | a. Specify the exact number of experimental units allocated to each | a. Line 252-253, |
| | | group, and the total number in each experiment. Also indicate the total | Fig. 6a |
| | | number of animals used. | h I in 252 254 |
| | | b. Explain now the sample size was decided. Provide details of any a priori sample size calculation if done | D. Line 255-254 |
| Inclusion and | 3 | a Describe any criteria used for including and excluding animals (or | a No criteria |
| avelusion | 5 | experimental units) during the experiment and data points during the | were set |
| aritorio | | analysis. Specify if these criteria were established a priori. If no criteria | |
| criteria | | were set, state this explicitly. | b. No exclusions |
| | | b. For each experimental group, report any animals, experimental units | |
| | | or data points not included in the analysis and explain why. If there | c. Each dot in |
| | | were no exclusions, state so. | Figure 6 |
| | | c. For each analysis, report the exact value of n in each experimental | represent each |
| Dandaniastian | 4 | group. | Individual. |
| Kanuomisation | 4 | to control and treatment groups. If done, provide the method used to | and confounders |
| | | generate the randomisation sequence | were controlled |
| | | b. Describe the strategy used to minimise potential confounders such | by the single- |
| | | as the order of treatments and measurements, or animal/cage location. | blind design. |
| | | If confounders were not controlled, state this explicitly. | 5 |
| Blinding | 5 | Describe who was aware of the group allocation at the different stages | Line 254; single- |
| | | of the experiment (during the allocation, the conduct of the | blind: the |
| | | experiment, the outcome assessment, and the data analysis). | experimenter was |
| | | | aware of the |
| Outcomo | 6 | a Clearly define all outcome mangures assessed (a.g. call death | group allocation. |
| Outcome | 0 | a. Crearly define an outcome measures assessed (e.g. cen death, molecular markers, or behavioural changes) | Line 475-555 |
| measures | | h For hypothesis-testing studies specify the primary outcome | |
| | | measure i e the outcome measure that was used to determine the | |
| | | sample size. | |
| Statistical | 7 | a. Provide details of the statistical methods used for each analysis, | Line 319-332 |
| methods | | including software used. | |
| | | b. Describe any methods used to assess whether the data met the | |
| | | assumptions of the statistical approach, and what was done if the | |
| E | 0 | assumptions were not met. | Line 240 252 |
| Experimental | ð | a. Provide species-appropriate details of the animals used, including species strain and substrain sex age or developmental stage and if | Line 240-252 |
| ammais | | relevant weight | |
| | | b. Provide further relevant information on the provenance of animals, | |
| | | health/immune status, genetic modification status, genotype, and any | |
| | | previous procedures. | |
| Experimental | 9 | For each experimental group, including controls, describe the | Line 240-272 |
| procedures | | procedures in enough detail to allow others to replicate them, | & Fig. 6a |
| | | including: | |
| | | a. What was done, how it was done and what was used. | |
| | | b. when and now often. $V_{1} = V_{2}$ | |
| | | c. where (including detail of any acclimatisation periods). | |
| Dogultz | 10 | a. wny (provide rationale for procedures). | Line 402 525 |
| Kesuits | 10 | rol each experiment conducted, including independent replications, | Line 495-555 |
| | | a Summary/descriptive statistics for each experimental group, with a | |
| | | measure of variability where applicable (e.g. mean and SD. or median | |
| | | and range). | |
| | | b. If applicable, the effect size with a confidence interval. | |

| Abstract | 11 | Provide an accurate summary of the research objectives, animal species, strain and sex, key methods, principal findings, and study conclusions. | Line 38-61 |
|-------------------|----|---|-------------------|
| Background | 12 | a. Include sufficient scientific background to understand the rationale | a. Line 122-133 |
| 2 aviigi valia | | and context for the study, and explain the experimental approach. | |
| | | b. Explain how the animal species and model used address the | b. Line 240-259 |
| | | scientific objectives and where appropriate the relevance to human | & Fig.6a |
| | | biology. | er i giou |
| Objectives | 13 | Clearly describe the research question research objectives and where | Line 131-133 |
| Objectives | 10 | appropriate specific hypotheses being tested | Line 493-496 |
| Edl | 14 | Descrite the name of the others and an anti- | Line 242 247 |
| Ethical | 14 | Provide the name of the ethical review committee of equivalent that | Line 545-547 |
| statement | | has approved the use of annhais in this study, and any relevant incence | |
| | | or protocol numbers (11 applicable). Il etnical approval was not sought | |
| II | 15 | of granted, provide a justification. | L : 240 242 |
| Housing and | 15 | Provide details of housing and husbandry conditions, including any | Line 240-245 |
| husbandry | | environmental enrichment. | |
| Animal care and | 16 | a. Describe any interventions or steps taken in the experimental | a. Line 259-264 |
| monitoring | | protocols to reduce pain, suffering and distress. | |
| 0 | | b. Report any expected or unexpected adverse events. | b. N/A |
| | | c. Describe the humane endpoints established for the study, the signs | |
| | | that were monitored and the frequency of monitoring. If the study did | c. Line 259-262 |
| | | not have humane endpoints, state this. | |
| Interpretation/ | 17 | a. Interpret the results, taking into account the study objectives and | a. Line 633-640 & |
| scientific | | hypotheses, current theory and other relevant studies in the literature. | Abstract |
| implications | | b. Comment on the study limitations including potential sources of | |
| F | | bias, limitations of the animal model, and imprecision associated with | b. Line 624-628 |
| | | the results. | & 631-633 |
| Generalisability/ | 18 | Comment on whether, and how, the findings of this study are likely to | Line 84-87 |
| translation | | generalise to other species or experimental conditions, including any | |
| | | relevance to human biology (where appropriate). | |
| Protocol | 19 | Provide a statement indicating whether a protocol (including the | Protocols were |
| registration | | research question, key design features, and analysis plan) was prepared | reported in the |
| | | before the study, and if and where this protocol was registered. | cited paper. |
| Data access | 20 | Provide a statement describing if and where study data are available. | Line 662 |
| Declaration of | 21 | a. Declare any potential conflicts of interest, including financial and | a. Line 665 |
| interests | | non-financial. If none exist, this should be stated. | |
| | | b. List all funding sources (including grant identifier) and the role of | b. Line 668-673 |
| | | the funder(s) in the design, analysis and reporting of the study. | |

| Patient ID | Gender | Age | CD4 count (cells/mm3) | Viral load (copies/mL) |
|------------|--------|-----|--------------------------|---------------------------|
| 1 | F | 32 | 761 | <20 |
| 2 | М | 35 | 569 | <20 |
| 3 | М | 65 | 375 | <20 |
| 4 | М | 70 | 310 | <20 |
| 5 | М | 52 | 760 | <20 |
| 6 | М | 68 | 451 | <20 |

Supplementary Table 4: The clinical information of ART-treated PLWH.



Supplementary Figure 1. The descriptive picture on three biosynthesis pathways of NAD.

NMN is the direct precursor of NAD in the salvage pathway. Nicotinamide is an indirect precursor and could be synthesized into NAD via enzymes including nicotinamide phosphoribosyltransferase (NAMPT) and nicotinamide mononucleotide adenylyltransferases (NMNATs) in the salvage pathway. Niacin can be catalysed into NAAD by nicotinate phosphoribosyltransferase (NAPRT) in the Preiss-Handler pathway before entering the salvage pathway. Tryptophan could be processed by de novo biosynthesis pathway before entering the Preiss-Handler pathway.



Supplementary Figure 2. NMN treatment or HIV infection does not alter the mRNA level of NMN-related metabolic enzymes. Related to Figure 1 and Figure 2.

MOLT-4 CCR5⁺ cells were infected with live HIV-1_{JRFL} virus (2 ng p24 per 0·1 million cells). Maraviroc (MAR, 1 μ M) pretreatment for 30 min before infection served as control. At 3 hours post-infection, cells were washed with PBS three times before adding fresh prepared RPMI media supplemented without or with 1 μ M MAR or 10 mM NMN, in the presence of 10 U/mL IL-2. At 24 hours after treatment, cells were collected for real-time PCR assays on detecting mRNA level of HIV-1 (a) and NMN-related genes including *NAPRT* (b), *NAMPT* (c), *NMNAT1* (d), *NMNAT2* (e), *NMNAT3* (f). Normalized NMN-related gene mRNA levels to mock control were calculated for genes except HIV-1, whereas normalized HIV-1 mRNA level to the infected control were calculated for HIV-1. Data represent Mean \pm 95% CI; data passed normality test, and statistics were calculated based on a One-way ANOVA test with a post-hoc Turkey's test. Each dot represents one independent experiment.



Supplementary Figure 3. Increase frequency and expression of CXCR4 on CD4⁺ T cells under 10 mM NMN treatment. Related to Figure 2.

Purified human $CD4^+$ T Cells were treated with indicated compounds [NMN (0·1, 1, 10 mM) or PBS control] for five days and harvested for FACS analysis. (**a-b**) Representative histogram plots and FACS plots were displayed. The MFI (**c**) and frequency (**d**) of CXCR4 on CD4⁺ T cells were compared among groups (n=5). Data represent Mean \pm 95% CI; data passed normality test, and statistics were calculated based on a One-way ANOVA test with a post-hoc Turkey's test. Each dot represents one independent experiment.



Supplementary Figure 4. NMN treatment did not change mRNA levels of HIV-1 full gene and its structural, regulatory and accessory genes. Related to Figure 2.

Purified primary $CD4^+T$ cells were treated with or without 10 mM of NMN for 24 hours before being infected with live HIV-1_{JRFL} virus (2 ng p24 per 0·1 million cells) in the absence or presence of 10 mM of NMN for another 24 hours, followed by being harvested for bulk RNA-seq analysis. Clean reads were aligned to the HIV-1 genome (GenBank: U63632.1) using Hisat2 v2.2.1. The percentages of viral reads aligned to HIV-1 whole genome (**a**), *HIV-1 Gag* (**b**), *HIV-1 Pol* (**c**), *HIV-1 Vif* (**d**), *HIV-1 Vpr* (**e**), *HIV-1 Tat* (**f**), *HIV-1 Rev* (**g**) and *HIV-1 Env* (**h**) were calculated and compared. Data represent Mean with Min to Max in the floating bars.



Supplementary Figure 5. Representative flow cytometry plots of JRFL-nLuc-infected NMN-treated CD4⁺ T cells. Related to Figure 2.

Purified human $CD4^+$ T Cells were pre-treated without or with 1 μ M Maraviroc (MAR) for 30 min. Cells were mocked infected or infected with HIV_{JRFL}-nLuc. At 24 hours post-infection, cells were washed and treated without or with 0·1, 1, 10 mM of NMN in the presence of IL-2 (10 ng/mL)/IL-15 (200 ng/mL) for 7 days. Vehicle-treated infected cells served as control (Ctrl), whereas mock cells serve as mock control. (a) Representative FACS plots on gating CD69⁺, CD25⁺, and HLA-DR⁺ cells from CD4⁺ T cells. (b) Representative histogram plots of CD69, CD25 and HLA-DR in flow cytometry analysis.



Supplementary Figure 6. Decreased percentage of CD25⁺ and HLA-DR⁺ CD4⁺ T cells from HIV-uninfected donors under NMN treatment upon reactivation. Related to Figure 3.

Frozen PBMCs from 4 independent HIV-uninfected donors were used for resting CD4⁺ T cell isolation. Purified resting CD4⁺ T cells were treated with PMA (50 ng/mL) plus Ionomycin (1 µg/mL) (in short as PMA/Iono), PMA/Iono plus 10 mM NMN or mock, in the presence of 10 nM EFV and 10 U/ml IL-2 in one experiment. On day 4 after treatment, cells were collected for FACS analysis. (a) Representative FACS plots were displayed. (b) The percentage of CD69⁺, CD25⁺ and HLA-DR⁺ cells on CD4⁺ T cells was compared. Data represent Mean \pm 95% CI; data passed normality test, and statistics were calculated based on paired Student's t-test. Each dot represents one independent individual.

а



Supplementary Figure 7. NMN did not alter the percentage of p24⁺ cells in HLA-DR⁺ or HLA-DR⁻ CD4⁺ T cells. Related to Figure 4.

Primary CD4⁺ T cells were isolated from PBMCs (n=7) and pre-treated with 10 mM of NMN for 24 hours before infection with live HIV-1_{JRFL} virus (2 ng p24 per 0·1 million cells) or mock. After infection, cells were treated with 10 mM NMN for seven days. On Day 7 post-infection, cells were harvested for intracellular p24 staining and FACS analysis on CD25, HLA-DR, and ki67 expression. (a) The gating strategy on p24⁺ cells in HLA-DR^{+/-} CD4⁺ T cells among groups was displayed with representative plots. (b) The percentage of p24⁺ cells in HLA-DR^{+/-} CD4⁺ T cells was compared. Data represent Mean \pm SD; data did not pass normality test, and statistics were calculated using a Friedman test with an appropriate posthoc test. Each dot represents one independent individual.



Supplementary Figure 8. NMN significantly reduced p24⁺ cells in CD25⁺ki67⁺ CD4⁺ T cells on day 7 after the infection. Related to Figure 4.

Primary CD4⁺ T cells were isolated from PBMCs (n=6) and pre-treated without or with 1 μ M Maraviroc (MAR) for 30 min before being infected with live HIV-1_{JRFL} virus (2 ng p24 per 0·1 million cells) or mock. After infection, cells were treated with 10 mM NMN for seven days. On Day 7 post-infection, cells were harvested for intracellular p24 staining. (a) The experimental flowchart was displayed. (b) The frequencies and expression levels of CD25 and ki67 in CD4⁺ T cells were assessed by flow cytometry. (c) The gating strategies on CD25⁺ki67⁺CD4⁺ T cells and p24⁺ cells in CD25⁺ki67⁺CD4⁺ T cells. The percentage of CD25⁺ki67⁺CD4⁺ T cells on day 4 (d) and day 7 (e) was compared among groups. The normalized supernatant p24 levels to infection control on day 4 (h) and day 7 (i) was compared among groups.

Data represent Mean \pm SD. For (b), data passed normality test, and statistics were calculated using a Two-way ANOVA test followed by a Bonferroni's multiple comparisons test. For (d), data passed normality test, and statistics were calculated using a paired Student's t-test. For (e-i), data did not pass normality test, and statistics were calculated using a Friedman test without correction. Each dot represents one independent individual.



Supplementary Figure 9. Effect of NMN treatment on CD4⁺ T cell subpopulations by CyTOF analysis. Related to Figure 4.

Purified CD4⁺ T cells were isolated from fresh PBMCs of 3 independent healthy donors. Cells were treated with 10 mM NMN or vehicle for 4 days before being collected for CyTOF analysis on CD25⁺ cells among various CD4⁺ T cell subsets in one experiment. The t-SNE plot of CyTOF data was generated by opt-SNE using the KNN algorithm and the Fit-SNE gradient algorithm. Clustering was processed using the FlowSOM algorithm in order to obtain 10 populations (meta clusters). (a) The FlowSOM-generated heatmap displays the MFI of multiple markers per population. (b) Representative plots show the gating strategy on CD25⁺ cells among populations. (c) The percentage of CD25⁺ cells in all populations was compared between groups. (d) The percentage of these two populations in CD4⁺ T cells was compared between the NMN group and the control group. Data represent Mean \pm SD; data passed normality test, and statistics were calculated using a paired Student's t-test. Each dot represents one independent individual.



Supplementary Figure 10. The *in vitro* validation results on top modulated genes found by RNA-seq analysis. Related to Figure 5.

MOLT-4 CCR5⁺ cells were treated without or with 10 mM NMN for 24 hours before RNA extraction for qPCR assays on (a) the mRNA expression level of *FOSL2, BTBD11, NR4A2, IGSF9B, HCG27, HMOX1 and IL2RA.* MOLT-4 CCR5⁺ cells were transiently transfected with 10 nM of siHCG27 or control siRNA. At 48 hours after transfection, cells were treated without or with 10 mM NMN for additional 24 hours before RNA extraction for qPCR assay on the mRNA expression level of *HCG27* (b) and *IL2RA* (c, CD25). Data represent Mean \pm SD; data passed normality test, and statistics were calculated using an unpaired Student's t-test. Each dot represents one replicated experiment.



Supplementary Figure 11. The heatmap of some specific pathways affected by NMN treatment. Related to Figure 5.

Purified primary $CD4^+$ T cells were treated with (n=3) or without (n=4) 10 mM of NMN for 48 hours before harvesting for bulk RNA-seq analysis. CD25-related Gene Ontology (GO) of Gene Set Enrichment Analysis (GSEA) was performed. The heatmap of the specific pathways including responses to virus, cell activation, leukocyte proliferation and apoptotic process was displayed.



Supplementary Figure 12. The percentage of CD25⁺, HLA-DR⁺ and ki67⁺ in p24⁺ CD4⁺ T cells under NMN treatment after HIV infection in the presence of EFV. Related to Figure 5.

Primary $CD4^+$ T cells were isolated from PBMCs of 3 independent healthy donors and infected with live HIV-1_{JRFL} virus (2 ng p24 per 0·1 million cells) or mock in one experiment. At 24 hours post-infection, cells were treated without or with 10 mM NMN in the presence of 10 nM EFV and 10 U/mL IL-2. On Day 7 post-infection, cells were harvested for intracellular p24 staining and FACS analysis on CD25, HLA-DR, and ki67 expression. The representative plots (a) and the percentage (b) of CD25⁺, HLA-DR⁺ and ki67⁺ in p24⁺CD4⁺ T cells were displayed. Data represent Mean. Each dot represents one independent individual.



Supplementary Figure 13. Gating strategy on human immune cells from peripheral blood cells in NMN-treated HIV-infected huPBL mice. Related to Figure 6.

Gating strategy on $CD4^+$ or $CD8^+$ T cells from $CD45^+$ cells and $CCR5^+CD4^+$ cells from peripheral blood cells of NMN-treated HIV-infected huPBL mice was displayed. The orange frame represents $CD4^+$ T cells.



Supplementary Figure 14. Gating strategy on human immune cells from splenocytes in NMN-treated HIV-infected huPBL mice. Related to Figure 6.

Gating strategies on CD4⁺ or CD8⁺ T cells from CD45⁺ cells, p24⁺CD4⁺ T cells, CCR5⁺CD4⁺ T cells, ki67⁺CD4⁺ T cells, CD25⁺CD4⁺ T cells HLA-DR⁺CD38⁺CD4⁺ T cells and Annexin V⁺CD4⁺ T cells from splenocytes of NMN-treated HIV-infected huPBL mice were displayed. The orange frame represents CD4⁺ T cells.



Supplementary Figure 15. NMN treatment plus cART did not selectively reduce apoptotic cells in either CD25⁺ or CD25⁻ CD4⁺ T cells in the HIV-infected huPBL mouse model as compared to cART alone group. Related to Figure 6.

In HIV-infected huPBL mouse model, the percentage of Annexin V⁺ cells in CD25⁺ (a) or CD25⁻ (b) CD4⁺ T cells from splenocytes (Day 28 post-infection) was compared among groups. Data represent Mean \pm SD; data passed normality test, and statistics were calculated based on unpaired Student's t-test. # represents the significant difference between experimental groups and the control group, and the corresponding *p* value was reported in the corresponding group colour (cART-plus-NMN group in purple). Each dot represents one individual mouse. Circles show mice from Batch 1, whereas rectangles show mice from Batch 2.



Supplementary Figure 16. NMN treatment plus cART reduces proliferating CD4⁺ T cells in HIV-infected huPBL mouse model. Related to Figure 6.

In HIV-infected huPBL mouse model, the percentage of ki67⁺ CD4⁺ T cells (a), MFI of p24 in ki67⁺ CD4⁺ T cells (b), and MFI of ki67 in p24⁺ CD4⁺ T cells (c) from splenocytes (Day 28 post-infection) were compared among groups. Data represent Mean \pm SD; data passed normality test, and statistics were calculated based on unpaired Student's t-test. # represents the significant difference between experimental groups and the control group, and the corresponding *p* value was reported in the corresponding group colour (cART group in red, while cART-plus-NMN group in purple). * represents the significant difference between cART group and cART-plus-NMN group, and the corresponding *p* value was reported in black colour. Two batches of mice were conducted in this experiment. Each dot represents one individual mouse. Circles show mice from Batch 1, whereas rectangles show mice from Batch 2. Note: The red dot in the cART-plus-NMN group was the individual which exclusively acquired a high MFI level of p24 in ki67⁺ CD4⁺ T cells or ki67 in p24⁺ CD4⁺ T cells in this FACS staining panel.



200 µm

Supplementary Figure 17. Representative images of spleen sections from HIV-infected huPBL mice receiving cART and/or NMN. Related to Figure 6.

In HIV-infected huPBL mouse model, spleen tissues were collected on Day 28 post-infection when sacrificed. After immunohistochemistry (IHC) staining on tissue sections from spleen, IHC slides were scanned via PerkinElmer Vectra Polaris[™] Automated Quantitative Pathology Imaging System and analysed by Inform Software. Representative images were displayed.