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RESEARCH ARTICLE

# Comprehensive profiling of EBV gene expression in nasopharyngeal carcinoma through paired-end transcriptome sequencing

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**Supplemental Table 1** The sum of 12 NPC tissue samples clinical data

| Specimen No. | Hospital number | Gender | Age | Pathological diagnosis | Clinical stage UICC2002 | VCA-IgA | EA-IgA |
|---|---|---|---|---|---|---|---|
| NPC41 | 213039 | Male | 50 | Undifferentiated type of non-keratinizing carcinoma | T2N2M0 | 1：1280 | 1:160 |
| NPC46 | 212042 | Female | 31 | Undifferentiated type of non-keratinizing carcinoma | T1N1M0 | 1:640 | 1:160 |
| NPC49 | 212884 | Male | 44 | Undifferentiated type of non-keratinizing carcinoma | T2N2M0 | 1:320 | 1:20 |
| NPC51 | 213400 | Female | 34 | Undifferentiated type of non-keratinizing carcinoma | T2N2M0 | 1:640 | 1:40 |
| NPC52 | 213637 | Female | 50 | Undifferentiated type of non-keratinizing carcinoma | T4N3M0 | 1:160 | 1:20 |
| NPC53 | 213394 | Female | 49 | Undifferentiated type of non-keratinizing carcinoma | T2N2M0 | 1:320 | 1:20 |
| NPC54 | 213628 | Female | 51 | Undifferentiated type of non-keratinizing carcinoma | T3N3M0 | 1:160 | Negative |
| NPC57 | 214767 | Male | 38 | Undifferentiated type of non-keratinizing carcinoma | T3N2M0 | 1:320 | 1:20 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| NPC60 | 212552 | Male | 40 | Undifferentiated type of non-keratinizing carcinoma, Bone metastases | T4N1M1 | 1:80 | 1:10，Negative after treatment |
| NPC62 | 213713 | Female | 66 | Undifferentiated type of non-keratinizing carcinoma | T3N1M0 | 1:640 | 1:80 |
| NPC64 | 214443 | Male | 37 | Undifferentiated type of non-keratinizing carcinoma | T4N3M0 | 1:160 | Negative |
| NPC66 | 213945 | Female | 47 | Undifferentiated type of non-keratinizing carcinoma | T3N2M0 | 1:1280 | 1:80 |

**Supplemental Table 2** Primers of the EBV genes

| | |
|---|---|
| *BKRF1(EBNA1)* | Forward: 5'-GTAGGGGATGCCGATTATTTTG-3' |
| | Reverse: 5'-CTCCTTGACCACGATGCTTTC-3' |
| *BYRF1(EBNA2)* | Forward: 5'-CATCTGCTATGCGAATGCTT-3' |
| | Reverse: 5'-ATGTGGCTGGACCAACCTG-3' |
| *EBNA3A* | Forward: 5'-GTTTTTAGCGACGGGCGAGTG-3' |
| | Reverse: 5'-GACAGGGACGGGTTCTACT-3' |
| *EBNA3B* | Forward: 5'-CATCCTGTCGCCATTCCTTAT-3' |
| | Reverse: 5'-CCATTCCACTCTTGTCTTCCTCC-3' |
| *EBNA3C* | Forward: 5'-CATTAACTCCCGTGCCTAACAG-3' |
| | Reverse: 5'-TCCCGAGCGTATCTTTCTTGC-3' |
| *EBER1* | Forward: 5'-GAGGTTTTGCTAGGGAGGAGAC-3' |
| | Reverse: 5'-GAAGACGGCAGAAAGCAGAGT-3' |
| *EBER2* | Forward: 5'- AACGCTCAGTGCGGTGCTA-3' |
| | Reverse: 5'- GCCGAATACCCTTCTCCCA-3' |
| *LMP1* | Forward: 5'-GTATTGGCACAAGATGGAAAGC-3' |
| | Reverse: 5'-CAACTACCAGGCAGATGAGGC-3' |
| *LMP2A* | Forward: 5'-ACGATGGCGGAAACAACTC-3' |
| | Reverse: 5'-GGGTCCTCATAAGGCGGTG-3' |
| *BMRF1* | Forward: 5'-TCTCAAGGGAGGAGTGCTGC-3' |
| | Reverse: 5'-TCTGGGCTCTGGTGATTCTG-3' |
| *BBLF4* | Forward: 5'-GTCCATAAAGTCCCCGAAGG-3' |
| | Reverse: 5'- CCGAGCAGGATGAAGAACG-3' |
| *BSLF1* | Forward: 5'- CTGTGGCAAGGACGATAGACG-3' |
| | Reverse: 5'- CGAAGGCAGACACCCAATTTC-3' |
| *BBLF2-BBLF3* | Forward: 5'-CACCTGTTGATGGCTTCGG-3' |
| | Reverse: 5'-GTCGCAGGATGTCCCTAAAG-3' |
| *BALF2* | Forward: 5'-CCGAAGTGGTCCAGTTTATGAA-3' |
| | Reverse: 5'-TGGTCAGCAGTGAGCGGTA-3' |
| *BRLF1* | Forward: 5'-CGAGGACGGGATAGGTGAAC-3' |
| | Reverse: 5'-CGGCAAGCAGGTAGTGGAAC-3' |
| *BZLF1* | Forward: 5'-CCCAGTCTCCGACATAACCC-3' |
| | Reverse: 5'-CAGGCTGTGGAACACCAATG-3' |
| *BcLF1* | Forward: 5'-GTTGCCACCTTTGTTATGCG-3' |
| | Reverse: 5'- TGAAACGAGGGAAGGAAGACA-3' |
| *BBRF1* | Forward: 5'-ACCGTGCGTGACCTGCTGA-3' |
| | Reverse: 5'-GCTCTTGGGTTATGGGCTTCTTA-3' |
| *BORF1* | Forward: 5'-CCTCTATGTCGCTCTGACCTATG-3' |
| | Reverse: 5'-ACCGTCAGTAGCACTAAATGTCC-3' |
| *BLLF1* | Forward: 5'-ACACTCATTATCACACGAACGG-3' |
| | Reverse: 5'-AGTAGAGCTGGGTAGACCTGTC-3' |
| *BXLF2* | Forward: 5'-GATGGGTTTCTTGGGCGTCTC-3' |
| | Reverse: 5'- GCCACAGCACCCTGCGAAC-3' |
| *BZLF2* | Forward: 5'-TGATGTCCAGTTCCCTTCTCC-3' |

| | |
|---|---|
| | Reverse: 5’-GGTGTTTCCAAGCCTGTGC-3’ |
| *BBRF3* | Forward: 5’- ACTGCGTGGCTTTCATCTACTAC -3’ |
| | Reverse: 5’- TGGATGAAGACCTGTATGGACC -3’ |
| *BILF2* | Forward: 5’-AGCCACCCCAGACAGGAGAT-3’ |
| | Reverse: 5’- CACCACAAGCACCAGTCACAG-3’ |
| *BLRF1* | Forward: 5’-CTGTGCCACTGCTCTTCCTC-3’ |
| | Reverse: 5’-GGTCAAAGAAGGCGAGAATGT-3’ |
| *BDLF3* | Forward: 5’-CATCGGCATCGGGTCCTA-3’ |
| | Reverse: 5’-GGATGCGTTGGAAGTTGTTG-3’ |
| *BKRF2* | Forward: 5’- GCCACCTGTCTTGTCACCATT-3’ |
| | Reverse: 5’- TTGCTCACCAGGTAAATGTCG-3’ |
| *BMRF2* | Forward: 5’- CCCCTTCATTTGGTGCTTTG-3’ |
| | Reverse: 5’- CGTCGGGAATCCAAGCCTGTA-3’ |
| *BPLF1* | Forward: 5’-CCGATGACTGGAACACCCTG |
| | Reverse: 5’-CCCAATAGCATAGCGGCAAG |
| *BGLF2* | Forward: 5’-CAGACAAGGACAGGTGCCAG-3’ |
| | Reverse: 5’- CTGATGTGCTGCCCCAATA-3’ |
| *BOLF1* | Forward: 5’- CTCTTCACCCTGAGATACAGCACG-3’ |
| | Reverse: 5’- CTGGAGGTCCGTGGAGTAGTGG-3’ |
| *BBLF1* | Forward: 5’-CGACGGGGGAATAATCAACC-3’ |
| | Reverse: 5’-CATCATTTTCAGAGTCCTCATCATA-3’ |
| *BSRF1* | Forward: 5’-CTGTTCAAGCCAATAGCATCACG-3’ |
| | Reverse: 5’-GTCGCCAGCCTGTTTGTCC-3’ |
| *BGLF4* | Forward: 5’- AGCATCTTGTTGCGGTCGT-3’ |
| | Reverse: 5’- GCCTCTTCCATTCGGACATTAG-3’ |
| *BNRF1* | Forward: 5’-GACGGGCTCGGAGAAATGG-3’ |
| | Reverse: 5’-TCGCTGCCTCACTGTAATGAAGAC-3’ |
| *BLRF2* | Forward: 5’-ACGGTGTAACTACCCGCAATG-3’ |
| | Reverse: 5’-TCTCGTGGTCGTGTTCCCTC-3’ |
| *BRRF2* | Forward: 5’-AGCAGTGTAGTCCTGTCAATCTCCT-3’ |
| | Reverse: 5’- CGAAAACAGCATCGGAGTCATC-3’ |
| *BDLF2* | Forward: 5’- ATCTCCGCAGTCCGTTCTTC-3’ |
| | Reverse: 5’- CTCTACCTTCCACGACTTCACC-3’ |
| *BKRF4* | Forward: 5’- TCTCGCCATCTACCCAACAGT-3’ |
| | Reverse: 5’- TTTGGTGGATTGCGGAACT-3’ |
| *BORF2* | Forward: 5’-GTGGTTTCACTGGCACGATTG-3’ |
| | Reverse: 5’-ACCTTGGTGGACGCATTGG-3’ |
| *BXLF1* | Forward: 5’- TGTTTCCTCCCTCGCTTCTT-3’ |
| | Reverse: 5’- TTTTCCCTCTAATGCTGCTCC-3’ |
| *BRRF1* | Forward: 5’-GACATCGCCGAGGTTCTTG-3’ |
| | Reverse: 5’-TATGGAGATGCCGTCGTAG-3’ |
| *BTRF1* | Forward: 5’-GGAACTGGACACGGAAACGC-3’ |
| | Reverse: 5’-CAGCCATTGCCAGTCTCACCC-3’ |
| *BVLF1* | Forward: 5’-GCACGGTCCAGAAGCAGATA-3’ |

| | |
|---|---|
| | Reverse: 5’-ACGGAAATCTGCTCTTCAACCT-3’ |
| *BLLF2* | Forward: 5’-CGGTGATTCAACTACGCCAAGAC-3’ |
| | Reverse: 5’-GGTGGCTTGGGCTGTGGTAAC-3’ |
| *BILF1* | Forward: 5’-CACTTGGGTATGGCGTTGG-3’ |
| | Reverse: 5’-TCTGTTGAGATTGGCGTCGGG-3’ |
| *BHLF1* | Forward: 5’-CTGGTTCTGGGGCTCCTCTG-3’ |
| | Reverse: 5’- CACCCAGGTCGGACTAGCG-3’ |
| *BHRF1* | Forward: 5’-AGGACACTGTAGTTCTGCGTTATC-3’ |
| | Reverse: 5’-GCTTGGGTCTCCACGGTG-3’ |
| *BALF1* | Forward: 5’-CCCTGAGGAAGGATAGGAAGC-3’ |
| | Reverse: 5’-CCAGTAGTCGTAGTGGTCGTTGTA-3’ |
| *BCRF1* | Forward: 5’-CCAAGAGCGAAGACGAGGAGT-3’ |
| | Reverse: 5’- TGAACACGAGCAGGCGAAAC-3’ |
| *BFLF2* | Forward: 5’-GGTGACCAGGTAAGCGTAGAGA-3’ |
| | Reverse: 5’-GGTTCATGTGCCTCAGGAGTT-3’ |
| *BFRF1* | Forward: 5’-GTCTCGGTCTGGTCAAGTCG-3’ |
| | Reverse: 5’-CGTAACTCGCCTCGTCTTCG-3’ |
| *BFRF1A* | Forward: 5’-GCATCTTTCTTGAGGCGTTTA-3’ |
| | Reverse: 5’-CAATCCGAGCAATGACCTGT-3’ |
| *BFRF2* | Forward: 5’-GTGCCCACTGTCTTCTGCC-3’ |
| | Reverse: 5’-AGAGAACATTGCGGCTTACG-3’ |
| *BGLF3.5* | Forward: 5’-CGCTCTAGCTGCTTGTAGTTGAT-3’ |
| | Reverse: 5’-CGTGACAGATTTGGGAGGG-3’ |
| *BVRF2* | Forward: 5’-ACAAACCGCCGAGGCAAAC-3’ |
| | Reverse: 5’- GAGCGTCCATCGCCAAGAA-3’ |
| *BXRF1* | Forward: 5’-AAGCGTTACTCGCAAGGCA-3’ |
| | Reverse: 5’-AGGTGGGGAGGGTCTTTTG-3’ |
| *BGLF5* | Forward: 5’- TCAACAGATAGTCACCCTCCGA-3’ |
| | Reverse: 5’- TGACCCCATCTACCCATCCTA-3’ |
| *BKRF3* | Forward: 5’- CTTGCTGCCGTTATTGCCTG-3’ |
| | Reverse: 5’- GGGACTGGAAAGCCGTATGC-3’ |
| *BLLF3* | Forward: 5’-CGGTGAGTGTCACTGAGACGG-3’ |
| | Reverse: 5’-CCAGATGGAGGAGGACAAGG-3’ |
| *BARF1* | Forward: 5’-GCCTCTAACGCTGTCTGTCCA-3’ |
| | Reverse: 5’-GCTCCCATCCTTTTCCTTCATA-3’ |
| *BALF3* | Forward: 5’ GGACCCACGTCTCCTGTAACC-3’ |
| | Reverse: 5’GCCTTCTCCTCAGCCTCCAAC-3’ |
| *SM* | Forward: 5’-CCTACCTCGGCATCGTTTG-3’ |
| | Reverse: 5’-CCTTCTCGTCCTCGTCCCT-3’ |

**Supplemental Table 3** RPKM of EBV genes in C666-1

| EBV genes（68） | RPKM |
|---|---|
| *A73* | 97624.37192 |
| *BARF0* | 3101.033118 |
| *BKRF1* | 21994.20667 |
| *BYRF1* | 529.2988061 |
| *EBNA3A* | 819.9930711 |
| *EBNA3B* | 825.2326434 |
| *EBNA3C* | 1430.652564 |
| *LMP1* | 2558.505512 |
| *LMP2A* | 1210.230737 |
| *RPMS1* | 23180.57335 |
| *BALF2* | 3279.245984 |
| *BALF5* | 72413.21685 |
| *BBLF2-BBLF3* | 356.7649411 |
| *BBLF4* | 478.3292915 |
| *BMRF1* | 8397.33645 |
| *BRLF1* | 1207.663063 |
| *BSLF1* | 1525.187112 |
| *BZLF1* | 3674.968947 |
| *BBRF1* | 210.3402422 |
| *BcLF1* | 124.6009732 |
| *BORF1* | 1887.107342 |
| *BALF4* | 103008.0457 |
| *BBRF3* | 530.1679339 |
| *BDLF3* | 366.3798828 |
| *BILF2* | 691.5604214 |
| *BKRF2* | 1247.815543 |
| *BLLF1* | 1469.756303 |
| *BLRF1* | 835.9152666 |
| *BMRF2* | 10942.78463 |
| *BXLF2* | 2800.966431 |
| *BZLF2* | 960.9293801 |
| *BBLF1* | 566.442582 |
| *BDLF2* | 204.511336 |
| *BGLF2* | 255.4874554 |
| *BGLF4* | 1201.385197 |
| *BKRF4* | 9083.868195 |
| *BLRF2* | 1056.432791 |
| *BNRF1* | 3035.342054 |
| *BOLF1* | 1284.545597 |
| *BORF2* | 3227.421338 |
| *BPLF1* | 2323.313701 |
| *BRRF2* | 1360.304491 |

| | |
|---|---|
| *BSRF1* | 2162.310496 |
| *BXLF1* | 1557.7171 |
| *BALF1* | 2921.921011 |
| *BALF3* | 42068.75844 |
| *BARF1* | 3684.428326 |
| *BcRF1* | 114.6461684 |
| *BFLF2* | 809.7110263 |
| *BFRF1* | 510.9749107 |
| *BFRF1A* | 633.0828857 |
| *BFRF2* | 509.0328608 |
| *BGLF3.5* | 1118.17237 |
| *BGLF5* | 1645.209028 |
| *BHLF1* | 5666.139716 |
| *BHRF1* | 3811.686541 |
| *BILF1* | 30671.14658 |
| *BKRF3* | 2186.11434 |
| *BLLF3* | 1388.697943 |
| *BRRF1* | 4706.391099 |
| *BTRF1* | 303.8797852 |
| *BVLF1* | 315.3819504 |
| *BVRF2* | 355.1950184 |
| *BXRF1* | 1037.340632 |
| *LF1* | 11815.75122 |
| *LF2* | 76788.53718 |
| *LF3* | 325.7810309 |
| *SM*（*BSLF2+BMLF1*) | 1883.421585 |

**Supplemental Table 4** RPKM of EBV genes in NPC41

| EBV genes（29） | RPKM |
|---|---|
| *A73* | 168647.9 |
| *BARF0* | 18684.95 |
| *BKRF1* | 15980.03 |
| *EBNA3C* | 725.0175 |
| *LMP2* | 3614.169 |
| *RPMS1* | 34612.62 |
| *BALF1* | 8144.145 |
| *BALF2* | 1115.943 |
| *BALF3* | 46249.46 |
| *BALF4* | 94398.04 |
| *BALF5* | 102570.5 |
| *BaRF1* | 1188.024 |
| *BARF1* | 5675.222 |
| *BBRF1* | 586.2723 |
| *BILF1* | 12650.75 |
| *BKRF2* | 3912.73 |
| *BKRF3* | 4218.413 |
| *BKRF4* | 9907.464 |
| *BMRF2* | 3016.518 |
| *BNLF2a* | 17703.5 |
| *BNLF2b* | 5293.694 |
| *BNRF1* | 6413.437 |
| *BORF2* | 435.2735 |
| *BPLF1* | 171.4149 |
| *BRRF2* | 669.0915 |
| *BZLF1* | 5121.541 |
| *LF1* | 5361.273 |
| *LF2* | 81621.38 |
| *LF3* | 972.8951 |

**Supplemental Table 5** RPKM of EBV genes in NPC46

| EBV genes（17） | RPKM |
|---|---|
| *A73* | 241969.2 |
| *BARF0* | 14514.1 |
| *BKRF1* | 3963.441 |
| *LMP1* | 6575.011 |
| *RPMS1* | 62107.59 |
| *BALF1* | 1771.34 |
| *BALF2* | 520.1055 |
| *BALF3* | 42367.53 |
| *BALF4* | 108588.5 |
| *BALF5* | 102682.8 |
| *BARF1* | 5290.082 |
| *BILF1* | 10005.52 |
| *BNLF2a* | 25669.9 |
| *BNLF2b* | 30703.22 |
| *BNRF1* | 5045.43 |
| *LF1* | 5413.892 |
| *LF2* | 79203.59 |

**Supplemental Table 6** RPKM of EBV genes in NPC49

| EBV genes（38） | RPKM |
|---|---|
| *EBNA3C* | 582.7832 |
| *EBNA3A* | 612.3849 |
| *RPMS1* | 5564.459 |
| *BARF0* | 8582.47 |
| *LMP1* | 19439.66 |
| *BKRF1* | 30647.86 |
| *BYRF1* | 42098.32 |
| *A73* | 68350.83 |
| *BPLF1* | 643.0041 |
| *BBLF2-BBLF3* | 799.3145 |
| *BFRF2* | 977.54 |
| *LF1* | 1231.284 |
| *BALF1* | 1309.284 |
| *BGLF4* | 1345.823 |
| *BALF2* | 1537.742 |
| *BcRF1* | 1541.155 |
| *BRLF1* | 1909.913 |
| *BMRF2* | 2424.736 |
| *BXLF2* | 2455.603 |
| *BKRF4* | 2654.604 |
| *BRRF2* | 2689.144 |
| *BTRF1* | 2723.312 |
| *BBLF4* | 2857.796 |
| *BORF1* | 3170.979 |
| *BHLF1* | 3501.989 |
| *BILF1* | 3697.787 |
| *BFLF2* | 5442.355 |
| *BRRF1* | 5582.351 |
| *LF3* | 10948.45 |
| *BNRF1* | 12504.21 |
| *BZLF2* | 12917.49 |
| *BALF3* | 21243.55 |
| *BALF5* | 42149.68 |
| *BALF4* | 48225.31 |
| *LF2* | 51141.26 |
| *BNLF2a* | 132817.2 |
| *BNLF2b* | 161696.6 |
| *BHRF1* | 360182.8 |

**Supplemental Table 7** RPKM of EBV genes in NPC51

| EBV genes（27） | RPKM |
|---|---|
| *LMP1* | 1520.771 |
| *LMP2* | 1772.705 |
| *BKRF1* | 5041.994 |
| *BARF0* | 15274.56 |
| *RPMS1* | 37491.02 |
| *A73* | 149451.6 |
| *BRRF2* | 136.7422 |
| *BPLF1* | 140.1281 |
| *LF3* | 159.0644 |
| *BHLF1* | 222.5939 |
| *BRLF1* | 242.7963 |
| *BMRF1* | 363.2952 |
| *BRRF1* | 473.1015 |
| *BORF2* | 711.6544 |
| *BMRF2* | 1027.476 |
| *BALF2* | 2410.974 |
| *BALF1* | 3994.603 |
| *BNRF1* | 5131.304 |
| *BARF1* | 5302.146 |
| *LF1* | 6261.045 |
| *BNLF2a* | 10854.19 |
| *BILF1* | 12692.12 |
| *BALF3* | 52800.82 |
| *BALF5* | 97679.39 |
| *LF2* | 104191.8 |
| *BALF4* | 105978 |

**Supplemental Table 8** RPKM of EBV genes in NPC52

| EBV genes（71） | RPKM |
|---|---|
| *EBNA3B* | 153.5746 |
| *BYRF1* | 295.5051 |
| *EBNA3A* | 305.1989 |
| *LMP2* | 1737.428 |
| *LMP1* | 1863.133 |
| *BKRF1* | 3593.932 |
| *BARF0* | 9471.19 |
| *RPMS1* | 32585.12 |
| *A73* | 143638.8 |
| *BPLF1* | 68.66976 |
| *BHLF1* | 109.0821 |
| *BSLF1* | 164.8074 |
| *LF3* | 233.8484 |
| *BXLF1* | 237.1817 |
| *BVLF1* | 264.1145 |
| *BRRF2* | 268.0418 |
| *BTRF1* | 339.3094 |
| *BBLF4* | 356.0654 |
| *BFLF1* | 411.2353 |
| *BGLF3* | 433.0526 |
| *BLRF2* | 442.3512 |
| *BaRF1* | 475.9291 |
| *BKRF2* | 522.4873 |
| *BFRF1A* | 530.171 |
| *BcRF1* | 576.0579 |
| *BLLF1* | 635.2709 |
| *BDLF4* | 638.0819 |
| *BGLF4* | 670.7279 |
| *BLRF1* | 700.0316 |
| *BHRF1* | 751.0755 |
| *SM* | 751.0755 |
| *BcLF1* | 834.7699 |
| *BGLF1* | 851.6132 |
| *BFRF2* | 852.5722 |
| *BXRF1* | 868.7139 |
| *BVRF2* | 951.8581 |
| *BDLF1* | 955.01 |
| *BGRF1-BDRF1* | 1043.462 |
| *BRRF1* | 1159.216 |
| *BFRF3* | 1222.089 |
| *BRLF1* | 1427.787 |
| *BXLF2* | 1529.772 |

| | |
|---|---|
| *BLLF3* | 1550.608 |
| *BVRF1* | 1767.856 |
| *BBRF3* | 1775.942 |
| *BDLF2* | 1883.933 |
| *BORF2* | 2092.476 |
| *BBLF2-BBLF3* | 2290.573 |
| *BFRF1* | 2567.475 |
| *BKRF3* | 3098.187 |
| *BGLF5* | 3367.88 |
| *BMRF1* | 3382.622 |
| *BILF2* | 3474.856 |
| *BARF1* | 3897.473 |
| *BGLF2* | 4707.037 |
| *BDLF3* | 5215.98 |
| *BALF1* | 5220.145 |
| *BALF2* | 5236.906 |
| *BFLF2* | 5876.754 |
| *BZLF1* | 7327.566 |
| *BMRF2* | 7452.012 |
| *BKRF4* | 8268.722 |
| *BNRF1* | 8418.424 |
| *LF1* | 8897.848 |
| *BILF1* | 10827.01 |
| *BALF3* | 35869.09 |
| *BNLF2b* | 63620.52 |
| *BALF4* | 82523.77 |
| *LF2* | 83505.63 |
| *BNLF2a* | 87469.52 |
| *BALF5* | 94387.13 |

**Supplemental Table 9** RPKM of EBV genes in NPC53

| EBV genes（22） | RPKM |
|---|---|
| *LMP2* | 721.8593 |
| *BKRF1* | 3219.695 |
| *BARF0* | 6664.199 |
| *RPMS1* | 20739.57 |
| *A73* | 85625.59 |
| *LMP1* | 226652.6 |
| *BPLF1* | 171.1838 |
| *BMRF2* | 251.0377 |
| *LF3* | 388.6334 |
| *BRRF1* | 577.9517 |
| *BALF2* | 636.8219 |
| *BARF1* | 2428.959 |
| *BALF1* | 3659.925 |
| *LF1* | 5354.046 |
| *BILF1* | 6603.975 |
| *BNRF1* | 9334.642 |
| *BALF3* | 21387.14 |
| *LF2* | 34903.58 |
| *BALF4* | 51848.93 |
| *BALF5* | 52985.25 |
| *BNLF2a* | 397791.8 |
| *BNLF2b* | 513677.2 |

**Supplemental Table 10** RPKM of EBV genes in NPC54

| EBV genes（16） | RPKM |
|---|---|
| *BARF0* | 15821.51 |
| *BKRF1* | 17976.75 |
| *RPMS1* | 43518.37 |
| *A73* | 155021.4 |
| *BPLF1* | 143.6797 |
| *LF3* | 244.6438 |
| *BALF2* | 400.8778 |
| *BKRF3* | 1767.934 |
| *BARF1* | 2038.699 |
| *BNRF1* | 2401.924 |
| *LF1* | 7222.198 |
| *BILF1* | 18797.71 |
| *BALF3* | 59295.16 |
| *BALF5* | 91765.52 |
| *BALF4* | 98641.65 |
| *LF2* | 118410.5 |

**Supplemental Table 11** RPKM of EBV genes in NPC57

| EBV genes（21） | RPKM |
|---|---|
| *A73* | 195776.0131 |
| *BARF0* | 20985.1545 |
| *BKRF1* | 2204.04827 |
| *LMP2* | 811.8181235 |
| *RPMS1* | 60254.07784 |
| *BALF2* | 1611.412236 |
| *BALF3* | 65760.35086 |
| *BALF4* | 102013.7466 |
| *BALF5* | 103657.8281 |
| *BBLF2-BBLF3* | 1675.215852 |
| *BILF1* | 7749.880361 |
| *BKRF3* | 1579.239943 |
| *BNRF1* | 919.527124 |
| *BORF1* | 1107.631303 |
| *BPLF1* | 256.6891591 |
| *BSLF1* | 462.0404863 |
| *BXLF2* | 571.832285 |
| *BZLF1* | 3286.873378 |
| *LF1* | 1720.363513 |
| *LF2* | 79446.78711 |
| *LF3* | 874.1306498 |

**Supplemental Table 12** RPKM of EBV genes in NPC60

| EBV genes（23） | RPKM |
|---|---|
| *LMP2* | 1539.227 |
| *BKRF1* | 2046.823 |
| *LMP1* | 3112.546 |
| *BARF0* | 18096.17 |
| *RPMS1* | 33693.86 |
| *A73* | 152617.3 |
| *BKRF3* | 427.7541 |
| *BRRF2* | 610.6229 |
| *BRRF1* | 704.2125 |
| *BZLF1* | 890.2849 |
| *BKRF4* | 3013.9 |
| *BNLF2b* | 3220.736 |
| *BILF1* | 5597.702 |
| *BALF2* | 5819.577 |
| *LF1* | 6290.715 |
| *BNLF2a* | 7180.658 |
| *BALF1* | 7927.966 |
| *BARF1* | 9372.053 |
| *BNRF1* | 16438.21 |
| *BALF3* | 44495.08 |
| *LF2* | 48895.27 |
| *BALF4* | 96486.96 |
| *BALF5* | 118666.4 |

**Supplemental Table 13** RPKM of EBV genes in NPC62

| EBV genes（19） | RPKM |
|---|---|
| *LMP2* | 756.7485 |
| *BKRF1* | 2054.537 |
| *LMP1* | 23371.21 |
| *BARF0* | 25150.66 |
| *RPMS1* | 67037.73 |
| *A73* | 189914.1 |
| *BALF1* | 852.6261 |
| *LF3* | 1018.543 |
| *BALF2* | 1335.202 |
| *BILF1* | 7826.182 |
| *LF1* | 8820.145 |
| *BARF1* | 11883 |
| *BNRF1* | 12428.69 |
| *BNLF2b* | 51725.99 |
| *BALF3* | 52235.76 |
| *BNLF2a* | 83403.61 |
| *BALF4* | 85650.17 |
| *BALF5* | 86611.21 |
| *LF2* | 88956.67 |

**Supplemental Table 14** RPKM of EBV genes in NPC64

| EBV genes（16） | RPKM |
|---|---|
| *LMP2* | 1100.895 |
| *BKRF1* | 1423.275 |
| *RPMS1* | 24600.76 |
| *BARF0* | 28651.25 |
| *A73* | 149652.3 |
| *LF3* | 790.2639 |
| *BALF2* | 971.2057 |
| *BALF1* | 2480.749 |
| *BNRF1* | 4987.83 |
| *LF1* | 8165.36 |
| *BARF1* | 8231.916 |
| *BILF1* | 28609.2 |
| *BALF3* | 58063.14 |
| *LF2* | 70124.44 |
| *BALF5* | 104504.8 |
| *BALF4* | 106070.8 |

**Supplemental Table 15** RPKM of EBV genes in NPC66

| EBV genes (46) | RPKM |
|---|---|
| *A73* | 177563.3 |
| *BARF0* | 25261.18 |
| *BKRF1* | 4037.409 |
| *EBNA3C* | 522.0577 |
| *LMP1* | 2679.087 |
| *LMP2* | 1040.971 |
| *RPMS1* | 37384.85 |
| *BALF1* | 7037.149 |
| *BALF2* | 7346.725 |
| *BALF3* | 45934.47 |
| *BALF4* | 71899.76 |
| *BALF5* | 93373.83 |
| *BARF1* | 7005.45 |
| *BBLF2-BBLF3* | 716.0267 |
| *BBLF4* | 640.0041 |
| *BcLF1* | 375.1109 |
| *BDLF2* | 1231.362 |
| *BDLF4* | 1146.91 |
| *BFLF2* | 1625.089 |
| *BFRF2* | 1313.522 |
| *BGLF1* | 510.2395 |
| *BGLF2* | 4614.866 |
| *BGLF3.5* | 3366.255 |
| *BGLF4* | 1205.589 |
| *BGLF5* | 3301.932 |
| *BILF1* | 19046.77 |
| *BILF2* | 1040.971 |
| *BKRF3* | 1012.506 |
| *BKRF4* | 8322.989 |
| *BLLF3* | 1858.076 |
| *BMRF1* | 3840.025 |
| *BMRF2* | 8688.324 |
| *BNLF2a* | 127476.2 |
| *BNLF2b* | 78776.97 |
| *BNRF1* | 2161.651 |
| *BOLF1* | 209.0336 |
| *BORF2* | 1253.696 |
| *BRRF1* | 7501.013 |
| *BRRF2* | 481.7875 |
| *BSRF1* | 4734.277 |
| *BXLF1* | 2557.911 |
| *BXLF2* | 733.2437 |

| | |
|---|---|
| *BZLF1* | 5268.326 |
| *LF1* | 2205.972 |
| *LF2* | 83185.65 |
| *LF3* | 840.654 |

**Supplemental Table 16** RPKM of EBV genes in SHEN

| EBV genes（83） | RPKM |
|---|---|
| *EBNA-LP* | 9.874177 |
| *EBNA3C* | 796.5567 |
| *BKRF1* | 1044.909 |
| *LMP2* | 1638.578 |
| *EBNA3B* | 1722.05 |
| *BYRF1* | 1774.742 |
| *EBNA3A* | 2553.431 |
| *LMP1* | 3389.216 |
| *BARF0* | 6544.132 |
| *RPMS1* | 22672.34 |
| *A73* | 95630.39 |
| *BCRF1* | 292.7607 |
| *BGLF3* | 330.7404 |
| *LF3* | 454.6178 |
| *BBLF4* | 698.3969 |
| *BZLF2* | 737.5217 |
| *BcRF1* | 1066.569 |
| *BBRF1* | 1223.015 |
| *BSLF1* | 1230.097 |
| *BSRF1* | 1325.845 |
| *BSLF2* | 1627.018 |
| *BaRF1* | 1668.736 |
| *BPLF1* | 1764.092 |
| *BFLF1* | 1817.843 |
| *BGLF3.5* | 1820.439 |
| *BRLF1* | 1924.829 |
| *BXRF1* | 1930.104 |
| *BOLF1* | 1954.036 |
| *BLLF3* | 2117.321 |
| *BVRF1* | 2121.72 |
| *BTRF1* | 2132.056 |
| *BGLF4* | 2235.33 |
| *BBLF2-BBLF3* | 2357.896 |
| *BDLF4* | 2525.255 |
| *BGRF1-BDRF1* | 2586.42 |
| *BGLF1* | 2591.797 |
| *BVLF1* | 2769.001 |
| *BBRF2* | 2870.943 |
| *BXLF1* | 3005.371 |
| *SM* | 3035.013 |
| *BRRF2* | 3182.385 |
| *LF1* | 3387.179 |

| | |
|---|---|
| *BALF1* | 3420.531 |
| *BBLF1* | 3491.171 |
| *BFRF1A* | 3570.604 |
| *BGLF5* | 3635.081 |
| *BKRF2* | 4026.732 |
| *BORF1* | 4073.544 |
| *BVRF2* | 4237.928 |
| *BARF1* | 4262.042 |
| *BILF1* | 4574.362 |
| *BRRF1* | 4619.877 |
| *BLRF1* | 5395.039 |
| *BcLF1* | 5723.45 |
| *BZLF1* | 5799.875 |
| *BDLF1* | 6067.126 |
| *BFRF2* | 6376.15 |
| *BFRF1* | 6655.137 |
| *BNRF1* | 6733.141 |
| *BALF2* | 7152.359 |
| *BXLF2* | 8185.539 |
| *BBRF3* | 8384.781 |
| *BFRF3* | 8909.353 |
| *BGLF2* | 9551.904 |
| *BFLF2* | 10012.42 |
| *BHRF1* | 10377.45 |
| *BDLF2* | 11082.63 |
| *BLRF2* | 12868.72 |
| *BLLF1* | 12901.46 |
| *BILF2* | 13591.15 |
| *BORF2* | 15048.89 |
| *BALF3* | 16064.22 |
| *BKRF3* | 17482.62 |
| *BMRF1* | 17762.77 |
| *BDLF3* | 21920.8 |
| *BMRF2* | 30554.65 |
| *BKRF4* | 34653.06 |
| *BHLF1* | 37058.05 |
| *BALF5* | 37664.81 |
| *BALF4* | 39524.53 |
| *LF2* | 41237.18 |
| *BNLF2a* | 61715.87 |
| *BNLF2b* | 82258.86 |