**Table S3: primers used in this study. a**

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| Gene deletions or insertions |
| stfR::cat | CGCCGTCACATGCCGGGACCATTACCGTGTATGAAGATTCCAACTTTTGGCGAAAATGAG |
| GTTGATGCCGTTCCTGCGCTGGAAGACGCTGACTGAGCCGACGGGAACTTCATTTAAATGGCG |
| tfaQ::cat | GTTATTTATTTCTGAACTCGGTCCGTTACCGGAAAATGTTACCTGTCCTCCTTAGTTCCTATTCC |
| TATCCTTCACCCAGGCTGTGCCGTTCCACTTCTGAAACTCCCCTTCTGCCACTCATCGCAGTAC |
| redβ::FRT | GATCCCGGTACGCTGCAGGATAATGTCCGGTGTCATGCTGTCCTCCTTAGTTCCTATTCC |
| CATTGCTCACCACCAGGTTGATATTGATTCAGAGGTATAAAACGAGTGTAGGCTGGAGCTGCTTC |
| exo::FRT | CTTGGATTCCTGAAACAGAAAGCCGCAGAGCAGAAGGTGGCAGCATGAACACAGGAACACTTAACGGC |
| CCTACCCGGATATTATCGTGAGGATGCGTCATCGCCATTGCTCCCCTGTAGGCTGGAGCTGCTTCG |
| orf::FRT | GGGAGAGGGAAGTCATGAAAAAACTAACCTTTGAAATTCGGCAGCATTACACGTCTTGAG |
| CATGCAGCCCTGTCTCCCCATCTCGCTTTCCACTCCAGAGCCCATGGTCCATATGAATATCCTCC |
| rap::FRT | GATGATGGCTAAACCAGCGCGAAGACGATGTAAAAACGATGGCAGCATTACACGTCTTGAG |
| GTCATGCGGCCTCACTTCTGCTATTTCGCAGGTCTTTGAGCCATGGTCCATATGAATATCCTCC |
| Φ80-*ble* | CAACAAAGAGATAAATCCAAGCCCGTTTTGTACGGGCTGTatgaccatgattacgccaag |
| ATGCAGGTAACGCAGCCAGAATTGTTGATTGGCTGATCGTTAAGTTGGGTAACGCCAGG |
| yecD::cat | CTTCCACGCTACGCACACGGGCGATGCGCGGGTAGATATGGTTGACAACTTTTGGCGAAAATGAG |
| AAGACGCCTGTAGTGCCGCCAGCGCCGAGCAGCACAATAACAGTAGGAACTTCATTTAAATGGCG |
| nohD::cat | ATTGAGTACGAACGCCATCGACTTACGCGTGCGCAGGCCGATGCACAGGACAACTTTTGGCGAAAATGAG |
| CACCTGCGATCCGCGACAGCACGAAAGTACAGAATGCGGTTTCCACCACTGGAACTTCATTTAAATGGCG |
| ybcN::cat | CTCCAGCTTGGGTAAAAGATGCTCTCAAACACACATATCTCGGTTATGAAGGAACTTCATTTAAATGGCG |
| TCGGAGGTATGGCGTAACGACTGGATAGTGGTGATATCACCGGTTACGACACAACTTTTGGCGAAAATGAG |
| Detection of excision of defective prophages |
| Rac | CTCCAGCATGGTATAGCTGTCTTTAC | described in [82]  |
| CAGATTTCTTATGCTGGGCGTTCCG |
| Qin | CGACAATACGCGCCACATAA |
| AACGGCGAGTAAGTAGTACGC |
| Dlp12 | CAAAAGCCATTGACTCAGCAAGG |
| ACGGATAAGACGGGCATAAATGA |
| Activity of oriJ (rac), semi-qPCR |
| *gyrB* | GTCGAAGTGGCGTTGCAGTG | described in ([Fogg et al, 2010](#_ENREF_1)) b |
| AGCCTGCCAGGTGAGTACCG |
| λ *Q* | GAGTGCGGAAGATGCAAAGG |
| TTAACAGTGCGTGACCAGG |
| *oriJ* | GTTGAGTCAGGCGAAATCC |
| CCACGGTAACCACAATCAC |  |
| Identification of recombination junctions in λ hybrids  |
| Qin | GCTCATGCCCATTCTTTC |
| ACGTTTCTGCGGCATAT |
| Rac | ACTGGCGTACTGACGGATTC (rac 1) |
| ACGTTTCTGCGGCATAT (rac 2) |
|  | ACGTTTCTGCGGCATATC (rac 3) |
| Dlp12 | TTAGCATCCGCCCATTCAAC |
| TGGTCAGTTCGAGCATAAGG |
| Construction of *recET* and *exo/erf* λ |
| recE | CGAGCTCCCGCTCGAGCTTTTGCGATTGGTGGTTGC |
| GGAGGATGAAACTGGCGAAGTCGCA |
| recT | CGAGCTCCATTACACCGCCAGGCTGAA |
| CCGCTCGAGGGAGGCTGGGCTAAGGAATATGCAA |
| exo/erf | GTTTGCCGCATGTGGCTTTG |
| GGAGGCCATCAACAACGAAGCCC TG |
| pKD4 | TGATTGCGCCTACCCGGATATTATCGTGAGGATGCGTCATTCCTCCTTAGTTCCTATTCC |
| CATTGCTCACCACCAGGTTGATATTGATTCAGAGGTATAATGCAGATTGCAGCAT TACAC |

1. Unless specified, primers were designed for this study.
2. Fogg PC, Allison HE, Saunders JR, McCarthy AJ (2010). *J Virol* **84:** 6876-6879