Table S1. Strains used in this work.

| Strain               | Description                                                                 | Reference                      |
|----------------------|-----------------------------------------------------------------------------|--------------------------------|
| **Enterococcus faecalis** |                                                                             |                                |
| VE14089              | *E. faecalis* V583 cured of its plasmids. EfCIV583 positive                | (Rigottier-Gois et al., 2011)  |
| E. faecalis JH2-2    | Laboratory strain                                                           | (Jacob and Hobbs, 1974)        |
| VE18590              | *E. faecalis* V583 derivative. Non-lysogenic, EfCIV583-negative.             | (Matos et al. 2013)            |
| VE18589              | VE18590 (EfCIV583)                                                          | (Matos et al. 2013)            |
| JP10318              | VE14089 EfCIV583 tetM                                                      | This work                      |
| JP10416              | JP10318 Δp1                                                                 | This work                      |
| JP10860              | JP10318 Δp2                                                                 | This work                      |
| JP10861              | JP10318 Δp3                                                                 | This work                      |
| JP10862              | JP10318 Δp4                                                                 | This work                      |
| JP10863              | JP10318 Δp5                                                                 | This work                      |
| JP10864              | JP10318 Δp6                                                                 | This work                      |
| JP10984              | VE 18562 (pp1+)                                                             | (Matos et al. 2013)            |
| JP11211              | JP10984 ΔEF0309                                                             | This work                      |
| JP11028              | JP10984 EfCIV583 tetM                                                      | This work                      |
| JP13142              | JP11028 ΔEF0309                                                             | This work                      |
| **Bacillus subtilis** |                                                                             |                                |
| B. subtilis RL-3     | Natural competent                                                           | Richard Losick lab             |
| **Listeria monocytogenes** |                                                                         |                                |
| L. monocytogenes RN10983 |                                                 | Richard Novick lab             |
| **Staphylococcus aureus** |                                                                         |                                |
| S. aureus RN4220     | Restriction-defective strain                                               | (Kreiswirth et al., 1983)      |
| JP8546               | RN4220 pJP1097                                                              | (Mir-Sanchis et al., 2012)     |
| JP8545               | RN4220 pJP1096                                                              | (Mir-Sanchis et al., 2012)     |
| JP10837              | RN4220 pJP1350                                                              | This work                      |
| JP10838              | RN4220 pJP449                                                               | This work                      |
| JP5267               | RN4220 pJP788                                                               | This work                      |
| JP5266               | RN4220 pJP787                                                               | This work                      |
| JP9991               | RN4220 pJP1277                                                              | This work                      |
| JP9992               | RN4220 pJP1278                                                              | This work                      |
| JP5118               | RN4220 pJP782                                                               | This work                      |
| RN10733              | RN4220 pRN9211                                                              | (Ubeda et al., 2007)           |
| RN10734              | RN4220 pRN9217                                                              | (Ubeda et al., 2007)           |
| JP10399              | RN4220 pJP1316                                                              | This work                      |
| JP10739              | JP10399 pJP1317                                                              | This work                      |
| JP10740              | JP10399 pJP1318                                                              | This work                      |
| Strain   | Description | Reference  |
|----------|-------------|------------|
| **Staphylococcus aureus** |            |            |
| JP10822  | JP10399 pJP1330 | This work  |
| JP10741  | JP10399 pJP1319 | This work  |
| JP10742  | JP10399 pJP1320 | This work  |
| JP10743  | JP10399 pJP1321 | This work  |
| JP10744  | JP10399 pJP1322 | This work  |
| JP10745  | JP10399 pJP1323 | This work  |
| JP10746  | JP10399 pJP1324 | This work  |
| JP10747  | JP10399 pJP1325 | This work  |
| JP10748  | JP10399 pJP1326 | This work  |
| JP10749  | JP10399 pJP1327 | This work  |
| **Escherichia coli**    |            |            |
| JP5630   | DH5α pJP795/pJP796 | This work  |
| JP5631   | DH5α pJP795/pJP797 | This work  |
| JP5632   | DH5α pJP795/pJP798 | This work  |
| JP5039   | DH5α pJP782     | This work  |
| JP4994   | DH5α pJP781     | This work  |
| JP9821   | DH5α pJP1306    | This work  |
| JP10488  | BL21 (DE3) pJP1328 | This work  |
| **Lactococcus lactis** |            |            |
| IL1403   | Laboratory strain | (Chopin et al., 1984) |
| JP14198  | IL1403 pAGEnt    | This work  |
| JP14199  | IL1403 pJP1868   | This work  |
| JP14203  | IL1403 pJP1869   | This work  |
Table S2. Oligonucleotides used in this work.

| Plasmid | Oligonucleotides | Sequence (5’-3’) |
|---------|-----------------|-----------------|
| **Excision, circularisation and integration** | | |
| **EFCI** | **Excision** | | |
| | EfCI-1m | TAAAAACAGCGCCTTCGTCC |
| | EfCI-2c | AATCAGTAGTAGCTAAGAAG |
| | **Circularization** | | |
| | EfCI-8m | CTCTTTCAATCAGGAGTGCC |
| | EfCI-12c | TATGCTGACTGATAGAGCC |
| | **In/out** | | |
| | EfCI-8m | CTCTTTCAATCAGGAGTGCC |
| | EfCI-2c | AATCAGTAGTAGCTAAGAAG |
| | pJP795 | EfCI-int-5mH | CCCAAGCTTTTGGCTAAACCAAGAAAG |
| | EfCI-int-4cB | CGCGATCCATTATGAGGTGAATATGGCC |
| | pJP796 | EfCI-int-1mS | ACGGTGACCAGTTAAGAAACATCTCTCC |
| | EfCI-int-3cB | CGCGATCCAGTGATAAAGATCTGAGTCC |
| | pJP797 | EfCI-int-1mS | ACGGTGACCAGTTAAGAAACATCTCTCC |
| | EfCI-int-4cB | CGCGATCCATTATGAGGTGAATATGGCC |
| | pJP798 | EfCI-int-2mS | ACGGTGAGCTGAAACACTTGAATATGGCC |
| | EfCI-int-3cB | CGCGATCCAGTGATAAAGATCTGAGTCC |
| | pJP1350 | SaPIbov-149cB | CGCGATCCAGTGATAAAGATCTGAGTCC |
| | SaPIbov-1243mK | CGCGATCCAGTGATAAAGATCTGAGTCC |
| | pJP788 | EfPI-16mE | CCGGAATTCCGTTTTTATCAGGAGTCC |
| | EfPI-15cB | CGCGATCCAGTGATAAAGATCTGAGTCC |
| | pJP787 | EfPI-16mE | CCGGAATTCCGTTTTTATCAGGAGTCC |
| | EfPI-17cB | CGCGATCCAGTGATAAAGATCTGAGTCC |
| | pJP1277 | EfPI-56mE | CCGGAATTCCGAAAGCACCCCTACTATCTCC |
| | EfPI-15cB | CGCGATCCAGTGATAAAGATCTGAGTCC |
| | pJP1278 | EfPI-56mE | CCGGAATTCCGAAAGCACCCCTACTATCTCC |
| | EfPI-17cB | CGCGATCCAGTGATAAAGATCTGAGTCC |
| | pJP782 | EfPI-7mB | CGCGATCCAGTGATAAAGATCTGAGTCC |
| | EfPI-9cS | CGCGATCCAGTGATAAAGATCTGAGTCC |
| | pJP781 | EfPI-6mB | CGCGATCCAGTGATAAAGATCTGAGTCC |
| | EfPI-9cS | CGCGATCCAGTGATAAAGATCTGAGTCC |
| | pJP1306 | EfPI-7mB | CGCGATCCAGTGATAAAGATCTGAGTCC |
| | EfPI-49c | GCATTTGGGAGATTGTTTTAGC |
| | EfPI-50m | GCTGAAATATCCTCAATGCTCAATGCAGTATTAGTACTCC |
| | EfPI-9cS | ACGCGATCCAGTGATAAAGATCTGAGTCC |
| | pJP1312 | EfPI-27mXS | GCTCTAGGACACGCGTGAACGAGCCTCTCTCTTCTCTCTCT |
| | EfPI-28cB | CGCGATCCTCTTAAGAGGTGCTTAAGAG |
| | EfPI-29mP | AAAACTGCAAGAGCAGGATTATCATGAGC |
| | EfPI-30cE | CGCGATCCACTACTGAGAATCTGAGAAG |
| | pJP1313 | EFV583phi1-3mBglII | GAAGATCTTTTGAACCGGCAAGAAAG |
| | EFV583phi1-4cS | ACGCGATCCACTACTGAGAATCTGAGAAG |
| Plasmid   | Oligonucleotides | Sequence (5’-3’)                                                                 |
|----------|-----------------|--------------------------------------------------------------------------------|
| pJP1351  | EFV583phi2-3mB  | CGCGGATCCTTAGCCGACGAAGTATGCG                                                  |
|          | EFV583phi2-6m   | ACAGAATATCCCTAAATCCCCAAACGATGGCAAACGC ACAG                                     |
|          | EFV583phi2-5c   | GAATTAGGATTATTCTGTC                                                            |
|          | EFV583phi2-4cS  | ACGCCTGGACATACCGCATGGGCAGG                                                    |
| pJP1352  | EFV583phi3-3mB  | CGCGGATCCAGTGGAGCTGAGGGAAAGG                                                  |
|          | EFV583phi3-4cS  | ACGCCTGCGACATAGCCTTTGAGTAAAGGGC                                              |
| pJP1353  | EFV583phi4-3mB  | CGCGGATCCAGTGGAGCTGAGGGAAAGG                                                  |
|          | EFV583phi4-4cS  | ACGCCTGCGACATAGCCTTTGAGTAAAGGGC                                              |
| pJP1354  | EFV583phi5-3mB  | CGCGGATCCATCAATCGCTGCAATAGGG                                                   |
|          | EFV583phi5-4cS  | ACGCCTGCAGACGGTTTGTAGTAAGGGGC                                                |
| pJP1355  | EFV583phi6-3mB  | CGCGGATCCAGTGGAGCTGAGGGAAAGG                                                  |
|          | EFV583phi6-4cS  | ACGCCTGCGACATAGCCTTTGAGTAAAGGGC                                              |
| pJP1552  | EFV583phi1-5mS  | AGCGTCGACTTTGAACCTTTGTGGGAATACG                                                |
|          | EF0309-5c       | AACCGGTGTTTGCGCATACCC                                                          |
|          | EF0309-6m       | GGTATGCCAAAACCGGTTAAGAAAAGAAGGGC                                             |
|          | EFV583phi1-6cB  | CGCGGATCCCTGCCGCTATACGTCTTAATTG                                              |
| pJP1316  | EPI-15cB        | CGCGGATCCACATATAGGGCGTGTGTAACC                                                |
|          | TT-1cSp         | ACATGATCGTGCCTTTTGTTTTATGATAGGG                                               |
| pJP1317  | EFV583phi1-5mS  | ACGCCTGCGACTTTGAACTTTGTGGGAATACG                                              |
|          | EFV583phi1-6cB  | CGCGGATCCCTGCCGCTATACGTCTTAATTG                                              |
| pJP1318  | EFV583phi1-7mS  | ACGCCTGCGACATATCGCTTTGAGTAAAGGGC                                              |
|          | EFV583phi1-8cB  | CGCGGATCCCTGCCGCTATACGTCTTAATTG                                              |
| pJP1330  | EFV583phi1-9mS  | ACGCCTGCGACAAAGGCGATTTTTCAATGTAAACAGATG                                      |
|          | EFV583phi1-10cB | CGCGGATCCCTGAAATTTTTAAAAGAATACCATG                                           |
| pJP1319  | EFV583phi1-11mS | ACGCCTGCGACATCGCTTTGAGTAAAGGCG                                               |
|          | EFV583phi1-12cB | CGCGGATCCCTTGAATTTGTGTTTTTTCTCGT                                               |
| pJP1320  | EFV583phi1-13mS | ACGCCTGCGACTATAAGGAGATGGTGTTG                                                  |
|          | EFV583phi1-14cS | CGCGGATCCCTTGAATTTGTGTTTG                                                       |
| pJP1321  | EFV583phi1-15mS | ACGCCTGCGACAGCAGTTTCTATACCTCATTG                                               |
|          | EFV583phi1-16cB | CGCGGATCCCTTGAATTTTTATAATGCGACTAAC                                              |
| pJP1322  | EFV583phi1-17mS | ACGCCTGCGACAGTTTCTAAGTTATGTTGATATTTATATG                                      |
|          | EFV583phi1-18cB | CGCGGATCCCTTCACTAACTAAGGCTCΤ                                                  |
| pJP1323  | EFV583phi1-5mS  | ACGCCTGCGACTTTGAACTTTGTGGGAATACG                                              |
|          | EFV583phi1-35cB | CGCGGATCCCTTGCACAGGTTTCCAGATACA                                                 |
| pJP1324  | EFV583phi1-36mS | ACGCCTGCGACGTCCATAATGTTGTTGGTGΤ                                                  |
|          | EFV583phi1-37cB | CGCGGATCCCGATAATCCACGGTTTCTTGT                                               |
| pJP1325  | EFV583phi1-38mS | ACGCCTGCGACGTCTTTGAGTGTGTTTGGTTCG                                              |
|          | EFV583phi1-39cB | CGCGGATCCCTCCTACAGAATATCCTGT                                                  |
| pJP1326  | EFV583phi1-40mS | ACGCCTGCGACGTCTTTGAGTGTGTTTGGTTCG                                              |
|          | EFV583phi1-41cB | CGCGGATCCAAATTCACAGGCTAGCC                                                  |
| pJP1327  | EFV583phi1-42mS | ACGCCTGCGACGTCTTTGAGTGTGTTTGGTTCG                                              |
|          | EFV583phi1-6cB  | CGCGGATCCCTGCCGCTATACGTCTTAATTG                                              |
| Plasmid   | Oligonucleotides | Sequence (5’-3’)                                                                 |
|-----------|------------------|---------------------------------------------------------------------------------|
| pJP1328   | EfPI-45mB        | CGCGGATCCGATGAGAAAGGAGTTTCCCTCTGATG                                           |
|           | EfPI-46cE        | CCGGAATTTCATTCTTCTTAGCTTTTGATTTACG                                            |
|           | EF0309-1mS       | ACGCGTCGACTTCACACAGAAACAGAACCATTGCCAAAA                                        |
|           | EF0309-2cP       | CCGTAAAGGTT                                                               |
| pJP1868   | blL286-cos_mP    | TCAAGTTCTGCAGATTTTTTAATAACCCCTCCCCCCTATCTT                                      |
|           | blL286-cos_cS    | TCTCTTACTAGTTTTTCTCTTTTTCTTTAGTTTTTGAC                                       |
| pJP1869   | blL310-cos_mP    | TCAAGTTCTGCAGTTTTTTAAACCCCGCCTATCTT                                           |
|           | blL310-cos_cS    | CCTACTAGTTTTTAGTTTGTGACCCCTATATAAAAAT                                         |

| Southern blot | Oligonucleotides | Sequence (5’-3’)                                                                 |
|---------------|------------------|---------------------------------------------------------------------------------|
| EfCIV583 probe| EfPI-29mP        | AAAACTGCAGGAAGCGGAAGATTTCCATGCC                                              |
|               | EfPI-30cE        | CCGGAATTTCATTGAGAATCAGGAGGCC                                                 |
| Phage p1 probe| EFV583phi1V-1m   | GTGCCCTAAATCATAAGGACGG                                                       |
|               | EFV583phi1V-2c   | AAAGATTCCGTGCGATTATCC                                                        |
Table S3. Plasmids used in this work.

| Plasmid        | Description                                                                 | Reference                              |
|---------------|-----------------------------------------------------------------------------|----------------------------------------|
| pCN41         | Ap’. Used in transcriptional fusions to the staphylococcal β-lactamase blαZ | (Charpentier et al., 2004)             |
| pCN33         | Ap’. Cloning vector                                                          | (Charpentier et al., 2004)             |
| pCN51         | Ap’. Expression vector                                                       | (Charpentier et al., 2004)             |
| pMAK700       | Cm’. Plasmid thermosensitive in *E. coli*                                    | (Hamilton et al., 1989)                |
| pMAD          | Vector for efficient allelic replacement                                     | (Arnaud et al., 2004)                  |
| pCU1          | Cm’. Cloning vector                                                          | (Augustin et al., 1992)                |
| pPROEX HTa    | Expression vector                                                           | Invitrogen                             |
| pAGEnt        | Cm’. Expression vector                                                       | (Linares et al., 2014)                 |
| pJP795        | pMAK700 *attC* EfCIV583                                                     | This work                              |
| pJP796        | pCN51 *int-attP* EfCIV583                                                   | This work                              |
| pJP797        | pCN51 *int-attL* EfCIV583                                                   | This work                              |
| pJP798        | pCN51 Δ*int-attP* EfCIV583                                                  | This work                              |
| pJP1097       | pCN41 *sti-xis-blαZ* SaPIbov1                                               | (Mir-Sanchis et al., 2012)             |
| pJP1096       | pCN41 Δ*sti-xis-blαZ* SaPIbov1                                              | (Mir-Sanchis et al., 2012)             |
| pJP1350       | pCN41 *sti-hel-blαZ* SaPIbov1                                               | This work                              |
| pJP449        | pCN41 Δ*sti-hel-blαZ* SaPIbov1                                              | (Ubeda et al., 2008)                   |
| pJP788        | pCN41 *sti-xis-blαZ* EfCIV583                                               | This work                              |
| pJP787        | pCN41 Δ*sti-xis-blαZ* EfCIV583                                               | This work                              |
| pJP1277       | pCN41 *sti-hel-blαZ* EfCIV583                                               | This work                              |
| pJP1278       | pCN41 Δ*sti-hel-blαZ* EfCIV583                                               | This work                              |
| pJP782        | Suicide plasmid. Em<sup>R</sup> Δ*sti-pri-hel-ori* EfCIV583                  | This work                              |
| pJP781        | Suicide plasmid. Em<sup>R</sup> Δ*sti-pri-hel-Δori* EfCIV583                 | This work                              |
| pJP1306       | Suicide plasmid. Em<sup>R</sup> Δ*sti-pri-Δhel-ori* EfCIV583                 | This work                              |
| pRN9211       | Suicide plasmid. Em<sup>R</sup> *pri-hel-ori* SaPIbov1                      | (Ubeda et al., 2007)                   |
| pRN9217       | Suicide plasmid. Em<sup>R</sup> *pri-hel-ori* SaPI1                         | (Ubeda et al., 2007)                   |
| pJP1312       | pMAD derivative. Insertion of tetM cassette in EfCIV583                      | This work                              |
| pJP1313       | pMAD derivative. Deletion of phage p1 from VE14089                           | This work                              |
| pJP1351       | pMAD derivative. Deletion of phage p2 from VE14089                           | This work                              |
| pJP1352       | pMAD derivative. Deletion of phage p3 from VE14089                           | This work                              |
| pJP1353       | pMAD derivative. Deletion of phage p4 from VE14089                           | This work                              |
| pJP1354       | pMAD derivative. Deletion of phage p5 from VE14089                           | This work                              |
| pJP1355       | pMAD derivative. Deletion of phage p6 from VE14089                           | This work                              |
| pJP1552       | pMAD derivative. Deletion of EF0309 from V583 p1.                            | This work                              |
| pJP1316       | Transcriptional analysis of stl EfCIV583, pCU1 β-lactamase blαZ              | This work                              |
| pJP1317       | Expression of EF0308 to EF0312, pCN51 derivative                            | This work                              |
| pJP1318       | Expression of EF0313 to EF0317, pCN51 derivative                            | This work                              |
| pJP1330       | Expression of EF0318 to EF0323, pCN51 derivative                            | This work                              |
| pJP1319       | Expression of EF0324 to EF0327, pCN51 derivative                            | This work                              |
| pJP1320       | Expression of EF0328 to EF0329, pCN51 derivative                            | This work                              |
| pJP1321       | Expression of EF0330, pCN51 derivative                                       | This work                              |
| Plasmid   | Description                                      | Reference   |
|-----------|--------------------------------------------------|-------------|
| pJP1322   | Expression of EF0331 to EF0333, pCN51 derivative | This work   |
| pJP1323   | Expression of EF0308, pCN51 derivative           | This work   |
| pJP1324   | Expression of EF0309, pCN51 derivative           | This work   |
| pJP1325   | Expression of EF0310, pCN51 derivative           | This work   |
| pJP1326   | Expression of EF0311, pCN51 derivative           | This work   |
| pJP1327   | Expression of EF0312, pCN51 derivative           | This work   |
| pJP1328   | Expression in E. coli of His-StI EfCIV583 + EF0309, pPROEX HTa derivative | This work |
| pJP1868   | pAGEnt containing phage blL286 cos site         | This work   |
| pJP1869   | pAGEnt containing LCIbL310 putative cos site     | This work   |

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Table S4. Description and relationships between the *E. faecalis* PICI elements\(^a\).

| **EFCIV583** | GenBank acces | **EFCI918** | **EFCISF105** | **EFCI16457** | **EFCILA3B-2** |
|--------------|---------------|-------------|---------------|---------------|----------------|
| EFCIV583_1   | EF2955        | int         | 95            | 93            | 100            | 85             |
| EFCIV583_2   | EF2954        | rpr         | 85            | 100           | 97             |               |
| EFCIV583_3   | not annotated |             | 90            | 76            | 100            | 83             |
| EFCIV583_4   | EF2953        |             | 90            | 100           | 99             |               |
| EFCIV583_5   | EF2952        |             | 72            | 85            | 99             | 84             |
| EFCIV583_6   | EF2951        |             | 80            | 80            | 94             | 95             |
| EFCIV583_7   | EF2950        |             | 80            | 98            | 82             | 82             |
| EFCIV583_8   | EF2949        | pri-rep     | 83            | 80            | 78             | 77             |
| EFCIV583_9   | EF2948        |             | 65            | 65            | 65             |               |
| EFCIV583_10  | EF2946        |             | 100           | 100           | 100            |               |
| EFCIV583_11  | EF2945        |             | 94            | 94            | 94             |               |
| EFCIV583_12  | EF2944        |             | 93            | 93            | 93             |               |
| EFCIV583_13  | EF2943        |             | 94            | 94            | 92             |               |
| EFCIV583_14  | EF2942        |             | 88            | 100           | 88             | 100            |
| EFCIV583_15  | EF2941        |             | 97            | 100           | 97             |               |
| EFCIV583_16  | EF2940        |             | 96            | 100           | 96             |               |
| EFCIV583_17  | EF2939        |              | 60            | 100           | 60             |               |
| EFCIV583_18  | EF2938        |              | 100           | 100           | 100            |               |
| EFCIV583_19  | EF2937        |              | 97            | 90            | 97             |               |
| EFCIV583_20  | EF2936        |              | 98            | 98            | 98             |               |
| EFCIV583_21  | EF2947        |              | 98            | 98            | 98             |               |

| **EFCILA3B** | GenBank acces | **EFCIV583** | **EFCI918** | **EFCISF105** | **EFCI16457** | **EFCILA3B-2** |
|--------------|---------------|-------------|-------------|---------------|---------------|----------------|
| EFCILA3B_2   | D347_01789    | fic         | 85          | 84            | 87            | 85             |
| EFCILA3B_3   | D347_01790    | int         | 99          | 83            | 70            | 83             |
| EFCILA3B_4   | D347_01791    | rpr         | 97          | 97            | 97             |               |
| EFCILA3B_5   | D347_01792    |             | 83          | 83            | 70             | 83             |
| EFCILA3B_6   | D347_01793    |             | 99          | 99            |               |               |
| EFCILA3B_7   | D347_01794    |             | 99          | 99            |               |               |
| EFCILA3B_8   | D347_01795    |             | 84          | 84            | 84             | 85             |
| EFCILA3B_9   | D347_01796    |             | 95          | 95            | 94             |               |
| EFCILA3B_10  | D347_01797    | pri-rep     | 83          | 83            | 81             | 100            |
| EFCILA3B_11  | D347_01798    |             | 98          | 98            | 97             | 96             |
| EFCILA3B_12  | D347_01799    |             | 80          | 94            | 97             | 95             |
| EFCILA3B_13  | D347_01800    |             | 64          | 64            | 64             | 64             |
| EFCILA3B_14  | D347_01801    |             | 100         | 100           | 100            | 100            |
| EFCILA3B_15  | D347_01802    |             | 91          | 93            | 91             |               |
| EFCILA3B_16  | D347_01803    |             | 96          | 92            | 95             | 92             |
| EFCILA3B_17  | D347_01804    |             | 92          | 94            | 91             |               |
| EFCILA3B_18  | D347_01805    |             | 100         | 86            | 100            | 86             |
| EFCILA3B_19  | D347_01806    |              | 97          | 97            | 97             |               |
| EFCILA3B_20  | D347_01807    |              | 88          | 93            | 88             | 93             |
| GenBank acces | EfcISF105\(^b\) | EfcIV583 | EfcI918 | EfcILA3B-2 | EfcIB16457 |
|--------------|----------------|----------|---------|------------|-----------|
| UM9_00916    | EfcISF105_1    | 93       | 92      | 87         | 93        |
| UM9_00917    | EfcISF105_2    | 93       | 92      | 87         | 93        |
| UM9_00918    | EfcISF105_3    | 93       | 92      | 87         | 93        |
| UM9_00919    | EfcISF105_4    | 93       | 92      | 87         | 93        |
| UM9_00920    | EfcISF105_5    | 93       | 92      | 87         | 93        |
| UM9_00921    | EfcISF105_6    | 93       | 92      | 87         | 93        |
| UM9_00922    | EfcISF105_7    | 93       | 92      | 87         | 93        |
| UM9_00923    | EfcISF105_8    | 93       | 92      | 87         | 93        |
| UM9_00924    | EfcISF105_9    | 93       | 92      | 87         | 93        |
| UM9_00925    | EfcISF105_10   | 93       | 92      | 87         | 93        |
| UM9_00926    | EfcISF105_11   | 93       | 92      | 87         | 93        |
| UM9_00927    | EfcISF105_12   | 93       | 92      | 87         | 93        |
| UM9_00928    | EfcISF105_13   | 93       | 92      | 87         | 93        |
| UM9_00929    | EfcISF105_14   | 93       | 92      | 87         | 93        |
| UM9_00930    | EfcISF105_15   | 93       | 92      | 87         | 93        |
| UM9_00931    | EfcISF105_16   | 93       | 92      | 87         | 93        |
| UM9_00932    | EfcISF105_17   | 93       | 92      | 87         | 93        |
| UM9_00933    | EfcISF105_18   | 93       | 92      | 87         | 93        |
| UM9_00934    | EfcISF105_19   | 93       | 92      | 87         | 93        |
| UM9_00935    | EfcISF105_20   | 93       | 92      | 87         | 93        |
| UM9_00936    | EfcISF105_21   | 93       | 92      | 87         | 93        |
| UM9_00937    | EfcISF105_22   | 93       | 92      | 87         | 93        |

| GenBank acces | EfcIB16457\(^b\) | EfcIV583 | EfcI918 | EfcILA3B-2 | EfcISF105 |
|--------------|-----------------|----------|---------|------------|-----------|
| Q95_00339    | EfcIB16457_1    | 93       | 92      | 87         | 93        |
| Q95_00340    | EfcIB16457_2    | 93       | 92      | 87         | 93        |
| Q95_00341    | EfcIB16457_3    | 93       | 92      | 87         | 93        |
| Q95_00342    | EfcIB16457_4    | 93       | 92      | 87         | 93        |
| Q95_00343    | EfcIB16457_5    | 93       | 92      | 87         | 93        |
| Q95_00344    | EfcIB16457_6    | 93       | 92      | 87         | 93        |
| Q95_00345    | EfcIB16457_7    | 93       | 92      | 87         | 93        |
| Q95_00346    | EfcIB16457_8    | 93       | 92      | 87         | 93        |
| Q95_00347    | EfcIB16457_9    | 93       | 92      | 87         | 93        |
| Q95_00348    | EfcIB16457_10   | 93       | 92      | 87         | 93        |
| Q95_00349    | EfcIB16457_11   | 93       | 92      | 87         | 93        |
| Q95_00350    | EfcIB16457_12   | 93       | 92      | 87         | 93        |
| Q95_00351    | EfcIB16457_13   | 93       | 92      | 87         | 93        |
| Q95_00352    | EfcIB16457_14   | 93       | 92      | 87         | 93        |
| Q95_00353    | EfcIB16457_15   | 93       | 92      | 87         | 93        |
| Q95_00354    | EfcIB16457_16   | 93       | 92      | 87         | 93        |
| Q95_00355    | EfcIB16457_17   | 93       | 92      | 87         | 93        |
| Q95_00356    | EfcIB16457_18   | 93       | 92      | 87         | 93        |
| Q95_00357    | EfcIB16457_19   | 93       | 92      | 87         | 93        |
| Q95_00358    | EfcIB16457_20   | 93       | 92      | 87         | 93        |
| Q95_00359    | EfcIB16457_21   | 93       | 92      | 87         | 93        |
| EFCI918 | GenBank acces | EFCIV583 | EFCIB16457 | EFCILA3B-2 | EFCISF105 |
|---------|--------------|----------|------------|------------|-----------|
| EFCI918_1 | HMPREF2097_00609 | int | 95 | 95 | 84 | 92 |
| EFCI918_2 | HMPREF2097_00610 | rpr | 67 | 67 | 64 | 82 |
| EFCI918_3 | HMPREF2097_00611 | | 69 | 69 | 94 | 70 |
| EFCI918_4 | HMPREF2097_00612 | | 69 | 69 | 94 | 70 |
| EFCI918_5 | HMPREF2097_00613 | | 69 | 69 | 94 | 70 |
| EFCI918_7 | HMPREF2097_00615 | csp | 94 | 94 | 93 | 94 |
| EFCI918_8 | HMPREF2097_00616 | | 94 | 94 | 93 | 94 |
| EFCI918_9 | HMPREF2097_00617 | | 94 | 94 | 93 | 94 |
| EFCI918_10 | HMPREF2097_00618 | pri-rep | 96 | 96 | 98 | 97 |
| EFCI918_11 | HMPREF2097_00619 | | 98 | 98 | 98 | 98 |
| EFCI918_12 | HMPREF2097_00620 | | 98 | 98 | 98 | 98 |
| EFCI918_13 | HMPREF2097_00621 | | 98 | 98 | 98 | 98 |
| EFCI918_14 | HMPREF2097_00622 | | 98 | 98 | 98 | 98 |
| EFCI918_15 | HMPREF2097_00623 | | 98 | 98 | 98 | 98 |
| EFCI918_16 | HMPREF2097_00624 | | 98 | 98 | 98 | 98 |
| EFCI918_17 | HMPREF2097_00625 | | 98 | 98 | 98 | 98 |
| EFCI918_18 | HMPREF2097_00626 | | 98 | 98 | 98 | 98 |
| EFCI918_19 | HMPREF2097_00627 | uvrB | 98 | 98 | 98 | 98 |
| EFCI918_20 | HMPREF2097_00628 | | 98 | 98 | 98 | 98 |
| EFCI918_21 | HMPREF2097_00629 | | 98 | 98 | 98 | 98 |
| EFCI918_22 | HMPREF2097_00630 | | 98 | 98 | 98 | 98 |
| EFCI918_23 | HMPREF2097_00631 | | 98 | 98 | 98 | 98 |
| EFCI918_24 | HMPREF2097_00632 | | 98 | 98 | 98 | 98 |

*PICI similarities were determined with BLASTX. Shading: light grey, >90 % similarity to corresponding gene in the PICI element described in the left column; dark grey, 50–90 %; black, <50 %; white, no corresponding gene. Abbreviations: int, integrase; rpr, PICI represor; pri-rep, primase-helicase homologues; csp, cold-shock protein.

We have annotated genes in the PICIs according to the following nomenclature: **PICI_ORF number**.
## Table S5. EfCIV583 orthologies.

| EfCIV583 gene | Function | Orthologs | Species | Length | Similarity (aa) | Overlap | Element | Start | End | Size (kb) | Comments |
|---------------|----------|-----------|---------|--------|----------------|---------|---------|-------|-----|-----------|----------|
| EF2936        | efa:EF2936 | Enterococcus faecalis | 112 |       |       |          | EfCIV583 |       |     |           | No matches in database (DB) |
| EF2937        | efa:EF2937 | Enterococcus faecalis | 69 | 1.000 | 69 | EfCIV583 |       |     |     |           | |
| EF2937        | eq:DR75_2900 | Enterococcus faecalis | 69 | 0.492 | 59 | No insert |       |     |     |           | |
| EF2937        | eft:EF62_pB0056 | Enterococcus faecalis | 69 | 0.475 | 59 | PICI | 39611 | 46683 | 17.0 |           | |
| EF2938        | efa:EF2938 | Enterococcus faecalis | 92 |       |       |          | EfCIV583 |       |     |           | No match in enterococci; no match in DB with less than 2x MW & over 35% similarity |
| EF2939        | efa:EF2939 | Enterococcus faecalis | 67 |       |       |          | EfCIV583 |       |     |           | Cold-shock protein, has many matches in different species, none in any inserted element |
| EF2940        | efa:EF2940 | Enterococcus faecalis | 190 |       |       |          | EfCIV583 |       |     |           | No significant match in DB |
| EF2941        | efa:EF2941 | Enterococcus faecalis | 65 | 1.000 | 65 | EfCIV583 |       |     |     |           | |
| EF2941        | spu:576079 | Strongylocentrotus purpuratus | 297 | 0.358 | 67 | No insert |       |     |     |           | |
| EF2941        | wse:WALSEDRAFT_57668 | Wallemia sebi | 491 | 0.391 | 64 | No insert |       |     |     |           | |
| EF2941        | bdi:100822641 | Brachypodium distachyon | 1101 | 0.381 | 63 | No insert |       |     |     |           | |
| EF2941        | ath:AT1G10490 | Arabidopsis thaliana | 1028 | 0.413 | 63 | No insert |       |     |     |           | |
| wci:WS105_0618 | Weissella ceti | 74 | 0.429 | 49 | Prophage |
| wct:WS74_0819 | Weissella ceti | 74 | 0.429 | 49 | Prophage |
| EF2942 | efa:EF2942 | Enterococcus faecalis | 185 | EfCIV583 | No match in enterococci; no significant match in DB |
| EF2943 | efa:EF2943 | Enterococcus faecalis | 177 | EfCIV583 | No match in enterococci; no significant match in DB |
| EF2944 | efa:EF2944 | Enterococcus faecalis | 160 | EfCIV583 | No match in enterococci; no significant match in DB |
| EF2945 | efa:EF2945 | Enterococcus faecalis | 46 | EfCIV583 | No match in DB |
| EF2946 | efa:EF2946 | Enterococcus faecalis | 47 | EfCIV583 | No match in DB |
| EF2947 | efa:EF2947 | Enterococcus faecalis | 136 | 1.000 | 136 | EfCIV583 |
| efc:EFAU004_02137 | Enterococcus faecium | 135 | 0.406 | 128 | PICI | 2159624 2173033 13.4 | Has full capsid module |
| efu:HMPREF0351_12135 | Enterococcus faecium | 135 | 0.406 | 128 | PICI | Has full capsid module |
| pper:PRUPE_ppa005581m | Prunus persica | 453 | 0.302 | 96 | No insert |
| cts:Ctha_2453 | Chloroherpeton thalassium | 755 | 0.333 | 66 | No insert |
| EF2948 | pri-rep | efa:EF2948 | Enterococcus faecalis | 794 | 1.000 | 794 | EfCIV583 |
| lmoc:LMOSLCC5850_1262 | Listeria monocytogenes | 780 | 0.585 | 482 | Prophage |
| lmod:LMON_1266 | Listeria monocytogenes | 780 | 0.585 | 482 | Prophage |
| lmow:AX10_00090 | Listeria monocytogenes | 780 | 0.585 | 482 | Prophage |
| lwe:lwe1216 | Listeria welshimeri | 780 | 0.585 | 482 | Prophage |
| saa:SAUSA300_0809 | Staphylococcus aureus | 790 | 0.449 | 637 | SaPI | 881996 895129 13.1 |
| saui:AZ30_04285 | Staphylococcus aureus | 790 | 0.449 | 637 | SaPI |
| sax:USA300HOU_0861 | Staphylococcus aureus | 790 | 0.449 | 637 | SaPI |
| bthu:YBT1518_01285 pu | Bacillus thuringiensis | 797 | 0.532 | 477 | Prophage |
| EF2949 | efa:EF2949 | Enterococcus faecalis | 82 | EfCIV583 | No significant match in DB |
| EF2950 | efa:EF2950 | Enterococcus faecalis | 97 | 1.000 | 97 | EfCIV583 |
|--------|------------|-----------------------|----|--------|-----|---------|
| efc:EF2AU004_02141 | Enterococcus faecium | 52 | 0.396 | 48 | PICI | 2159624 2174178 |
| efu:HMPREF0351_12139 | Enterococcus faecium | 52 | 0.396 | 48 | PICI |
| efd:EF3D3_1868 | Enterococcus faecalis | 84 | 0.333 | 72 | defective | 3.2 |
| cpa:eCPAST_c11890 | Clostridium pasteurianum | 398 | 0.457 | 46 | No insert |
| gmx:10077868 | Glycine max (soybean) | 922 | 0.322 | 90 | No insert |
| EF2951 | efa:EF2951 | Enterococcus faecalis | 221 | 1.000 | 221 | EfCIV583 |
| ppen:T256_00520 | Pedicoccus pentosaceus | 234 | 0.471 | 227 | PICI | 99518 111337 |
| lbh:Lbuc_0024 | Lactobacillus buchneri | 232 | 0.416 | 219 | PICI | 24658 40308 |
| capS:Clop_0076 | Clostridium pasteurianum | 225 | 0.420 | 207 | PICI | 76442 85868 |
| std:SPPN_01200 | Streptococcus pseudopneumoniae | 209 | 0.421 | 202 | PICI | 190041 202462 |
| lbk:LVISK_0740 | Lactobacillus brevis | 225 | 0.392 | 222 | PICI | 765893 774063 |
| smb:smi_2013 | Streptococcus mitis | 208 | 0.408 | 201 | PICI | 2057587 2068441 |
| snc:HMPREF0837_10280 | Streptococcus pneumoniae | 201 | 0.399 | 203 | PICI | 249288 267373 |
| snd:MYY_0022 | Streptococcus pneumoniae | 201 | 0.399 | 203 | PICI |
| snt:SPT_0025 | Streptococcus pneumoniae | 201 | 0.399 | 203 | PICI |
| ssut:TL13_0174 | Streptococcus suis | 206 | 0.391 | 202 | PICI | 131344 143429 |
| EF2952 | efa:EF2952 | Enterococcus faecalis | 82 | 1.000 | 82 | EfCIV583 |
| EF2953 | efa:EF2953 | Enterococcus faecalis | 105 | 1.000 | 105 | EfCIV583 |
| xne:XNC1_0454 | Xenorhabdus nematophilus | 313 | 0.300 | 100 | No insert |
| xnm:XNC2_0444 | Xenorhabdus nematophila | 313 | 0.300 | 100 | No insert |
| rca:Rcas_1163 | Roseiflexus castenholzii | 325 | 0.323 | 93 | No insert |
| gca:Galf_2037 | Gallionella capsiferriformans | 79 | 0.316 | 76 | PICI | 2192302 2211152 |
| elo:ECO42_2423 | Escherichia coli | 63 | 0.333 | 54 | Prophage | 2552120 2559893 |

**Comments:**
- Has full capsid module
- Defective phage
- Defective phage
- Defective phage
- Defective phage
- Integrase backwards, no transcriptional divergence
- Prophage
- Integrase backwards, no transcriptional divergence
- Defective phage
| EfcIV583 gene | Function | Orthologs          | Species                  | Length | Similarity | Overlap | Element   | Start | End   | Size (kb) | Comments                                      |
|--------------|----------|--------------------|--------------------------|--------|------------|--------|-----------|-------|-------|----------|-----------------------------------------------|
| EF2954       | rpr      | efa:EF2954         | Enterococcus faecalis    | 316    | 1.000      | 316    | EfcIV583  |       |       |          | No close match in enterococci                |
|              |          | scp:HMPREF0833_11008 | Streptococcus parasanguinis |      |            |        |           |       |       |          |                                               |
|              |          | rto:RTO_22090      | Ruminococcus torques     | 138    | 0.400      | 110    |           |       |       |          | No insert                                     |
|              |          | ssui:T15_0899      | Streptococcus suis       | 182    | 0.412      | 102    | PICI      |       |       |          |                                               |
|              |          | csc:Csa_2097       | Caldicellulosiruptor saccharolyticus |  | | | | | | | |                                            |
|              |          | lam:LA2_03865      | Lactobacillus amylovorus | 147    | 0.540      | 63     | No insert |       |       |          |                                               |
|              |          | lay:LAB52_03720    | Lactobacillus amylovorus | 241    | 0.507      | 71     | No insert |       |       |          |                                               |
| EF2955       | int      | efa:EF2955         | Enterococcus faecalis    | 381    | 1.000      | 381    | EfcIV583  |       |       |          |                                               |
|              |          | efau:EFAU085_00503  | Enterococcus faecium     | 393    | 0.467      | 379    | Genomic island |       |       |          |                                               |
|              |          | efc:EFAU004_00565  | Enterococcus faecium     | 393    | 0.467      | 379    | Genomic island |       |       |          |                                               |
|              |          | eft:EF62_2611      | Enterococcus faecalis    | 380    | 0.467      | 379    | Genomic island |       |       |          |                                               |
|              |          | efu:HMPREF0351_10594 | Enterococcus faecium     | 393    | 0.467      | 379    | Genomic island |       |       |          |                                               |
|              |          | ehr:EHR_01850      | Enterococcus hirae       | 380    | 0.467      | 379    | Genomic island |       |       |          |                                               |
|              |          | efq:DR75_1138      | Enterococcus faecalis    | 380    | 0.464      | 379    | Genomic island |       |       |          |                                               |
|              |          | ecas:ECBG_01612    | Enterococcus casseliflavus |      |            |        |           |       |       |          |                                               |
|              |          | crn:CAR_c08850     | Carnobacterium sp        | 382    | 0.448      | 384    | Genomic island |       |       |          |                                               |

*No insert: The ortholog seems to be chromosomally encoded, not been part of a defined mobile element.
**Table S6. Orthology analysis of the 22 ORFs of LICICVS6-1**

### Abbreviations

| Code   | Name                                      | Abbreviation                           | Notes                        |
|--------|-------------------------------------------|----------------------------------------|------------------------------|
| llr    | Lactococcus lactis                       | cbr - Cenorhabditis elegans            | lga - Lactobacillus gasseri ATCC 33323 |
| lla    | LL403                                    | cat - Croceibacter atlanticus          |                              |
| ltc    | SK11                                     | cdf - Peptoclostridium difficile 630   |                              |
| lld    | KL07                                     | ckl - Clostridium kluyveri DSM 525     |                              |
| lli    | UC509.9                                  | cso - Clostridium cf. saccharolyticum K10 |                              |
| lmn    | MG1363                                   | efq - E. faecalis ATCC 29212           |                              |
| lln    | N29000                                   | ehr - E. hirae                         |                              |
| lll    | A76                                      | emf - Enterococcus faecium NRRL B-2354 |                              |
| lls    | IO-1                                     | ere - Enterococcus faecium NRRL B-2354 |                              |
| lkk    | KF147                                    | evi - Echincola vietnamensis           |                              |
| llt    | CV65                                     | eri - Enterococcus faecium NRRL B-2354 |                              |
| llw    | PK2                                      | elc - Lactobacillus casei              |                              |
| llx    | NCDO2118                                 | lpg - Lactobacillus paracasei N1115    |                              |
|       |                                           | lca - Lactobacillus casei ATCC 334     |                              |

### Orthologies

| Gene       | length | sim | OL | insert | start  | end   | size (kb) | comment              |
|------------|--------|-----|----|--------|--------|-------|-----------|----------------------|
| 1lt:CVAS_0027a* | ltc    | 107 | 1.000 | 107 | PICI | 36265 | 50942 | 14.7               |
| 1la:LS5519  | 107    | 1.000 | 107 | PICI | 35516 | 50948 | 15.4               |
| 1lm:LLmg_2538 | 107    | 0.897 | 107 | PICI | 2478636 | 2491949 | 13.3          |
| 1ln:LLNZ_13110 | 107    | 0.897 | 107 | PICI | 2479452 | 2492765 | 13.3          |
| 1ld:P620_13395 | 106    | 0.796 | 98  | PICI | 2530163 | 2544289 | 14.2          |
| 1ls:Lllo_1806 | 111   | 0.698 | 96  | PICI | 1963199 | 1976945 | 13.7          |
| myr:MYRA21_3441 | 179    | 0.344 | 64  | NI** |       |       |            |
| 1lt:CVAS_0027b* | HP    | 136 | 1.000 | 136 | PICI | 36265 | 50942 | 14.7               |
| 1la:LS5867  | 136    | 1.000 | 136 | PICI | 35516 | 50948 | 15.4               |
| 1lm:LLmg_2537 | 136    | 0.949 | 136 | PICI | 2478636 | 2491949 | 13.3          |
| 1ln:LLNZ_13105 | 136    | 0.949 | 136 | PICI | 2479452 | 2492765 | 13.3          |
| 1lc:LACR_2255 | 136    | 0.904 | 136 | PICI | 2111920 | 2125925 | 14.0          |
| r1lh_11410 | 136    | 0.904 | 136 | PICI | 2111920 | 2125925 | 14.0          |
| lgr:LCFT_1117 | 140    | 0.530 | 132 | Propage | 1109676 | 1146622 | 36.9          |
| lgv:LCGL_1137 | 140    | 0.530 | 132 | Propage |       |       |            |
| 1ld:P620_10790 | 140    | 0.534 | 133 | Propage | 2078353 | 2118530 | 40.2          |
| 1lt:CVAS_0027 | terS  | 147 | 1.000 | 147 | PICI | 36265 | 50942 | 14.7               |
| 1la:LS6274  | 147    | 1.000 | 147 | PICI | 35516 | 50948 | 15.4               |
| 1lc:LACR_2256 | 147    | 0.959 | 147 | PICI | 2111920 | 2125925 | 14.0          |
| 1lr:l1h_11415 | 147    | 0.959 | 147 | PICI | 2111920 | 2125925 | 14.0          |
| 1lm:LLmg_2250 | 146    | 0.938 | 146 | PICI | 2211673 | 2228382 | 16.7 Has phage resistance |
| 1ln:llnz_11610 | 146    | 0.938 | 146 | PICI | 2211673 | 2228382 | 16.7 Has phage resistance |
| lga:LGAS_0603 | 173    | 0.550 | 120 | Propage | 600763 | 680457 | 79.7 Probably 2 prophages in tandem |
| lpl1:LP_2423 | 169    | 0.530 | 115 | Propage | 2163938 | 2203818 | 39.9          |
| 1lt:CVAS_0028 | HP    | 193 | 1.000 | 193 | PICI | 36265 | 50942 | 14.7               |
| 1la:LS6850  | 193    | 0.995 | 193 | PICI | 35516 | 50948 | 15.4               |
| 1lm:LLmg_0029 | 193    | 0.902 | 193 | PICI | 32974 | 51647 | 18.7               |
| 1ln:lnz_00140 | 193    | 0.902 | 193 | PICI | 32974 | 51647 | 18.7               |
| 1lc:LACR_2257 | 180    | 0.631 | 179 | PICI | 216658 | 2128806 | 18.1          |
| 1lr:l1h_11420 | 180    | 0.631 | 179 | PICI | 2111920 | 2125925 | 14.0          |
| Gene | Length | Sim OL | Insert | Start | End | Size | Comment |
|------|--------|--------|--------|-------|-----|------|---------|
| l1k:1lKF_2464 | 179 | 0.609 | 179 | PICI | 2505047 | 2520783 | 15.7 | |
| l1d:P620_02915 | 133 | 0.568 | 139 | PICI | 527748 | 537492 | 9.7 | Defective; has prohead protease |
| lgr:LGT_1791 | 287 | 0.328 | 125 | PICI | 175594 | 178604 | 12.7 | Has phage protease |
| lgv:LGL_1812 | 287 | 0.328 | 125 | PICI | 175594 | 178604 | 12.7 | Has phage protease |
| Mtr:mgr | 1527 | 0.272 | 173 | | | NI | |
| l1t:cVCAAS_0029 | rep | 542 | 1.000 | 542 | PICI | 36265 | 50942 | 14.7 |
| l1a:l37667 | 542 | 1.000 | 542 | PICI | 35516 | 50948 | 15.4 |
| l1m:1mg_0030 | 542 | 0.985 | 542 | PICI | 32974 | 51647 | 18.7 |
| l1n:lnz_00145 | 542 | 0.985 | 542 | PICI | 32974 | 51647 | 18.7 |
| l1d:P620_13370 | 542 | 0.954 | 542 | PICI | 2530163 | 2544289 | 14.2 |
| l1k:1lKF_2463 | 542 | 0.941 | 542 | PICI | 2505047 | 2520783 | 15.7 |
| l1r:l1h_l2835 | 544 | 0.930 | 542 | PICI | 2352357 | 2368410 | 16.0 |
| l1c:LACR_2258 | 542 | 0.917 | 542 | PICI | 2111920 | 2125925 | 14.0 |
| l1w:Kw_l1804 | 487 | 0.495 | 489 | Prophage | 1878501 | 1919139 | 40.6 |
| smbr:smi_0425 | 534 | 0.458 | 509 | Prophage | 398225 | 440170 | 41.9 |
| stx:MGAS1882_1149 | 491 | 0.452 | 499 | Prophage | 1099359 | 1143106 | 46.7 |
| l1t:cVCAAS_0030 | pri | 264 | 1.000 | 264 | PICI | 36265 | 50942 | 14.7 |
| l1c:LACR_2259 | 264 | 0.962 | 264 | PICI | 2111920 | 2125925 | 14.0 |
| l1m:1mg_2253 | 264 | 0.958 | 264 | PICI | 2211673 | 2228382 | 16.7 | Has phage resistance |
| l1n:lnz_11625 | 264 | 0.958 | 264 | PICI | 2211673 | 2228382 | 16.7 | Has phage resistance |
| l1r:l1h_l1430 | 264 | 0.951 | 264 | PICI | 2111920 | 2125925 | 14.0 |
| l1k:1lKF_2462 | 264 | 0.920 | 264 | PICI | 2505047 | 2520783 | 15.7 |
| l1d:P620_11530 | 264 | 0.917 | 264 | PICI | 2217535 | 2230575 | 13.0 |
| lcl:LCABL_30870 | 273 | 0.323 | 266 | Hybrid | 3030347 | 3044256 | 13.9 | PICI–prophage hybrid, with entire capsid module |
| l1t:cVCAAS_0031 | HP | 109 | 1.000 | 109 | PICI | 36265 | 50942 | 14.7 |
| l1a:L40104 | 109 | 1.000 | 109 | PICI | 35516 | 50948 | 14.4 |
| l1m:1mg_2532 | 109 | 0.954 | 109 | PICI | 2478636 | 2491949 | 13.3 |
| l1n:lnz_13075 | 109 | 0.954 | 109 | PICI | 2479452 | 2492765 | 13.3 |
| l1r:l1h_l1435 | 111 | 0.963 | 108 | PICI | 2111920 | 2125925 | 14.0 |
| l1d:P620_11535 | 109 | 0.944 | 108 | PICI | 2217535 | 2230575 | 13.0 |
| l1k:1lKF_2461 | 109 | 0.917 | 109 | PICI | 2505047 | 2520783 | 15.7 |
| l1c:LACR_2260 | 111 | 0.907 | 108 | PICI | 2116658 | 2218806 | 12.1 |
| lgr:LGT_1789 | 109 | 0.562 | 105 | PICI | 175594 | 178604 | 12.7 | Has phage protease |
| lgv:LGLL_1810 | 109 | 0.562 | 105 | PICI | 75594 | 178604 | 12.7 | Has phage protease |
| stx:STP_l1275 | 115 | 0.321 | 81 | Prophage | 1375102 | 1412591 | 37.5 |
| l1t:cVCAAS_0032 | HP | 64 | 1.000 | 64 | PICI | 36265 | 50942 | 14.7 |
| l1a:L200001 | 64 | 1.000 | 64 | PICI | 35516 | 50948 | 14.4 |
| l1k:1lKF_2460 | 64 | 0.969 | 64 | PICI | 2505047 | 2520583 | 15.0 |
| l1d:P620_02875 | 64 | 0.953 | 64 | Hybrid | 521256 | 537492 | 16.2 | Has 2 integrases |
| l1r:l1h_l12820 | 104 | 0.344 | 61 | PICI | 2352357 | 2368410 | 16.0 |
| l1c:cVCAAS_0033 | HP | 79 | 1.000 | 79 | PICI | 36265 | 50942 | 14.7 |
| l1a:L40862 | 79 | 0.987 | 79 | PICI | 35516 | 50948 | 14.4 |
| l1d:P620_11550 | 79 | 0.949 | 79 | PICI | 2217535 | 2230575 | 13.0 |
| l1k:1lKF_2458 | 79 | 0.924 | 79 | PICI | 2505047 | 2520583 | 15.0 |
| l1c:LACR_2262 | 79 | 0.924 | 79 | PICI | 2116658 | 2218806 | 12.2 |
| l1m:1mg_0034 | 79 | 0.911 | 79 | PICI | 32974 | 51647 | 18.6 |
| l1n:lnz_00165 | 79 | 0.911 | 79 | PICI | 32974 | 51647 | 18.6 |
| l1r:l1h_l1440 | 79 | 0.848 | 79 | PICI | 2111920 | 2125925 | 14.0 |
| lgr:LGT_1792 | 59 | 0.426 | 61 | PICI | 1755947 | 1768604 | 12.7 |
| lgv:LGLL_1813 | 59 | 0.426 | 61 | PICI | 1769776 | 1782433 | 12.7 |
| Gene    | length | sim OL insert     | start   | end     | size | comment                          |
|---------|--------|-------------------|---------|---------|------|----------------------------------|
| ehi:Lchvi_3649 | 1172   | 0.387 75 NI |         |         |      |                                  |
| 1lt:tCVCAS_0034 HP | 173    | 1.000 173 PICI  | 36265   | 50942   | 14.7| Has phage resistance             |
| 1la:lL41670 | 173    | 1.000 173 PICI  | 35516   | 50948  | 14.4|                                  |
| 1lm:l1mg_2260 | 173    | 0.789 171 PICI  | 2211673 | 2228382 | 16.7|                                  |
| 1ln:1lnZ_11660 | 173    | 0.789 171 PICI  | 2211673 | 2228382 | 16.7|                                  |
| 1ld:P620_01795 | 173    | 0.789 171 PICI  | 321043  | 33060  | 12.0| 3’ end uncertain                |
| 1lk:1lkF_2456 | 174    | 0.759 174 PICI  | 2050047 | 2050853 | 15.0|                                  |
| 1lc:1LACR_2265 | 201    | 0.724 170 PICI  | 2116658 | 2128806 | 12.2|                                  |
| 1lr:1lh_11460 | 201    | 0.679 168 PICI  | 2111920 | 2125925 | 14.0|                                  |
| mar:MAE_57910 | 265    | 0.313 134 NI   |         |         |      | Caenorhabditis                   |
| cbr:CBG10226  | 806    | 0.312 112 No map|         |         |      |                                  |
| 1lt:tCVCAS_0035 HP | 64     | 1.000 64 PICI   | 36265   | 50942   | 14.7|                                  |
| 1la:L42195 | 64     | 1.000 64 PICI   | 35516   | 50948  | 14.4|                                  |
| 1ld:P620_02515 | 64     | 0.969 64 PICI   | 453940  | 463397 | 9.3 | Defective                        |
| 1lr:1lh_11465 | 64     | 0.953 64 PICI   | 2111920 | 2125925 | 14.0|                                  |
| 1la:1llo_1816 | 73     | 0.922 64 PICI   | 1963199 | 1976945 | 13.7|                                  |
| 1lk:1lkF_2455 | 64     | 0.938 64 PICI   | 2505047 | 2520583 | 15.0|                                  |
| 1lc:1LACR_2266 | 64     | 0.938 64 PICI   | 2116658 | 2128806 | 12.2|                                  |
| 1lm:l1mg_0037 | 64     | 0.922 64 PICI   | 32974   | 51647 | 18.6|                                  |
| 1ln:1lnZ_00180 | 64     | 0.922 64 PICI   | 32974   | 51647 | 18.6|                                  |
| 1lt:CVCAS_0036 reg | 246 | 1.000 246 PICI | 36265 | 50942 | 14.7|                                  |
| 1la:L42465 | 246    | 1.000 245 PICI  | 35516   | 50948  | 14.4|                                  |
| 1lm:l1mg_2527 | 230    | 0.327 196 PICI  | 2478636 | 2491949 | 13.3|                                  |
| 1ln:1lnZ_13050 | 230    | 0.327 196 PICI  | 2479452 | 2492765 | 13.3|                                  |
| 1ld:P620_01785 | 230    | 0.321 196 PICI  | 321043  | 330910 | 9.9 |                                  |
| 1lk:1lkF_2454 | 230    | 0.306 196 PICI  | 2505047 | 2520583 | 15.0|                                  |
| 1lg:1LCGT_1785 | 232    | 0.298 188 PICI  | 1755947 | 1768604 | 12.7|                                  |
| 1lgv:1LGLL_1806 | 232    | 0.298 188 PICI  | 1767976 | 1782433 | 12.7|                                  |
| efm:M7W_2070 | 241    | 0.367 120 Prophage | 1889045 | 1924864 | 39.5|                                  |
| ehr:EBHR_09450 | 241    | 0.358 120 Prophage | 1847859 | 1882330 | 34.5|                                  |
| 1lt:CVCAS_0037 HP | 246    | 1.000 246 PICI  | 36265   | 50942   | 14.7|                                  |
| 1la:L42465 | 246    | 1.000 245 PICI  | 35516   | 50948  | 14.4|                                  |
| 1lm:l1mg_2527 | 230    | 0.327 196 PICI  | 2478636 | 2491949 | 13.3|                                  |
| 1ln:1lnZ_13050 | 230    | 0.327 196 PICI  | 2479452 | 2492765 | 13.3|                                  |
| 1ld:P620_01785 | 230    | 0.321 196 PICI  | 321043  | 330910 | 9.9 |                                  |
| 1lk:1lkF_2454 | 230    | 0.306 196 PICI  | 2505047 | 2520583 | 15.0|                                  |
| 1lg:1LCGT_1785 | 232    | 0.298 188 PICI  | 1755947 | 1768604 | 12.7|                                  |
| 1lgv:1LGLL_1806 | 232    | 0.298 188 PICI  | 1767976 | 1782433 | 12.7|                                  |
| efm:M7W_2070 | 241    | 0.367 120 Prophage | 1889045 | 1924864 | 39.5|                                  |
| ehr:EBHR_09450 | 241    | 0.358 120 Prophage | 1847859 | 1882330 | 34.5|                                  |
| 1lt:CVCAS_0038 HP | 128    | 1.000 128 PICI  | 36265   | 50942   | 14.7|                                  |
| 1la:L43680 | 128    | 1.000 128 PICI  | 35516   | 50948  | 14.4|                                  |
| 1lr:1lh_12770 | 128    | 0.761 128 PICI  | 2352357 | 2368410 | 16.0|                                  |
| 1lc:1LACR_2269 | 127    | 0.701 127 PICI  | 2116658 | 2128806 | 12.0|                                  |
| 1lm:l1mg_0041 | 140    | 0.550 129 PICI  | 32974   | 51647 | 18.6|                                  |
| 1ln:1lnZ_00200 | 146    | 0.550 129 PICI  | 32974   | 51647 | 18.6|                                  |
| 1lw:kw2_0886 | 118    | 0.505 111 PICI  | 903732  | 908883  | 5.1 | Defective PICI? Has lysin gene   |
| 1ld:P620_12480 | 141    | 0.454 130 Prophage | 2348850 | 2374861 | 26.0|                                  |
| 1lg:1LCGT_1146 | 114    | 0.470 115 Prophage | 1110376 | 1146622 | 36.2|                                  |
| 1li:1li_0637 | 115    | 0.461 115 NI    |         |         |      |                                  |
| Gene    | length | sim  | OL    | insert | start | end   | size | comment                      |
|---------|--------|------|-------|--------|-------|-------|------|-----------------------------|
| efg:BR75_1672 | 110    | 0.456| 114   | Prophage | 1660409 | 1695776 | 35.4 |                             |
| l1t:CVCAS_0039 | reg     | 184  | 1.000| 184    | PICI   | 36265  | 50942 | 14.7                         |
| l1la:L44085    | 184    | 1.000| 184    | PICI   | 35516  | 49727  | 14.2                         |
| l1lm:1lmg_0042 | 184    | 0.924| 184    | PICI   | 32974  | 51647  | 18.6                         |
| l1ln:1lnZ_00205 | 184    | 0.924| 184    | PICI   | 32974  | 51647  | 18.6                         |
| l1lr:1lh_12765 | 184    | 0.913| 184    | PICI   | 2352357| 2368410| 16.0                        |
| l1lc:LACR_2270 | 183    | 0.799| 184    | PICI   | 2116658| 2128806| 12.2                        |
| l1ld:p620_12940 | 98     | 0.887| 97     | PICI   | 2464618| 2479987| 15.4                        |
| l1gr:LCGT_0311 |        | 196  | 0.395| 195    | NI     |        | NI                           |
| l1gy:LCGL_0311 |        | 196  | 0.395| 195    | NI     |        | NI                           |
| l1lk:1lkF_1033 | 187    | 0.343| 181    | Prophage| 1066254| 1100809| 34.6                       |
| l1t:CVCAS_0040 | reg     | 64   | 1.000| 64     | PICI   | 36265  | 50942 | 14.7                         |
| l1la:L45035    | 64     | 1.000| 64     | PICI   | 35516  | 49727  | 14.2                         |
| l1lm:1lmg_0044 | 64     | 0.984| 64     | PICI   | 32974  | 51647  | 18.6                         |
| l1ln:1lnZ_00215 | 64    | 0.984| 64     | PICI   | 32974  | 51647  | 18.6                         |
| l1lr:1lh_12760 | 64     | 0.984| 64     | PICI   | 2352357| 2368410| 16.0                        |
| l1lc:LACR_2271 | 64     | 0.969| 64     | PICI   | 2116658| 2128806| 12.2                        |
| l1ld:p620_12935 | 64    | 0.969| 64     | PICI   | 2464618| 2479987| 15.4                        |
| l1lk:1lkF_2448 | 64     | 0.938| 64     | PICI   | 2505047| 2520583| 15.0                        |
| loa:LOAG_08304 |        | 788  | 0.372| 43     |        |        | eye worm gene               |
| l1t:CVCAS_0041 | reg     | 53   | 1.000| 53     | PICI   | 36265  | 50942 | 14.7                         |
| l1la:L45351    | 80     | 0.981| 53     | PICI   | 35516  | 49727  | 14.2                         |
| l1lm:1lmg_0047 | 80     | 0.962| 53     | PICI   | 32974  | 51647  | 18.6                         |
| l1ln:1lnZ_00240 | 80     | 0.962| 53     | PICI   | 32974  | 51647  | 18.6                         |
| cat:CA2559_02645 | 294    | 0.368| 38     | NI     |        | NI   | Tiny defective prophage remnant? |
| l1t:CVCAS_0042 | HP      | 74   | 1.000| 74     | PICI   | 36265  | 50942 | 14.7                         |
| l1la:L45702    | 74     | 1.000| 74     | PICI   | 35516  | 49727  | 14.2                         |
| l1lm:1lmg_0048 | 74     | 1.000| 74     | PICI   | 32974  | 51647  | 18.6                         |
| l1ln:1lnZ_00245 | 70     | 1.000| 70     | PICI   | 32974  | 51647  | 18.6                         |
| cso:CLS_07510  | 55     | 0.491| 53     | NI     |        | NI   |                        |
| ckl:CK1L_1132  |        | 56   | 0.446| 56     | NI     |        | NI   |                        |
| en:BIEREC_3588 |        | 55   | 0.462| 52     | NI     |        | NI   |                        |
| mer:H729_05640 |        | 69   | 0.441| 59     | NI     |        | NI   |                        |
| cdf:CD630_05860 |        | 59   | 0.453| 53     | NI     |        | NI   |                        |
| lmc:Lm4b_00359 |        | 62   | 0.463| 54     | NI     |        | NI   |                        |
| l1t:CVCAS_0043 | HP      | 108  | 1.000| 108    | PICI   | 36265  | 50942 | 14.7                         |
| l1ld:p620_13295 | 108    | 1.000| 108    | PICI   | 2530163| 2544289| 14.1                        |
| l1lm:1lmg_0051 | 108    | 1.000| 108    | PICI   | 32974  | 51647  | 18.6                         |
| l1ln:1lnZ_00260 | 108    | 1.000| 108    | PICI   | 32974  | 51647  | 18.6                         |
| l1lk:1lkF_2449 | 108    | 0.963| 108    | PICI   | 2505047| 2520583| 15.0                        |
| l1lc:LACR_C39  | 120    | 0.627| 102    |       |        |       | Transposon on plasmid         |
| l1lr:1lh_p620  | 120    | 0.627| 102    |       |        |       | Transposon on plasmid         |
| l1rh:1rh_13780 | 117    | 0.618| 102    |       |        |       | Transposon on plasmid         |
| l1pg:AP91_13470 |        | 105  | 0.519| 106    | NI     |        | NI   |                        |
| lca:LSEI_2757  | 105    | 0.519| 106    | NI     |        |       | NI   |                        |
| l1t:CVCAS_0044 | HP      | 54   | 1.000| 54     | PICI   | 36265  | 50942 | 14.7                         |
| l1la:L200004   | 54     | 1.000| 54     | PICI   | 35516  | 50948  | 14.4                         |
| l1ld:p620_12920 | 54    | 1.000| 54     | PICI   | 2463882| 2479987| 16.1                        |
| l1lm:1lmg_0053 | 54     | 1.000| 54     | PICI   | 32974  | 51647  | 18.6                         |
| l1ln:1lnZ_00265 | 54     | 1.000| 54     | PICI   | 32974  | 51647  | 18.6                         |
| Gene      | length | sim  | OL  | insert | start   | end     | size | comment            |
|-----------|--------|------|-----|--------|---------|---------|------|--------------------|
| llk:llkF_2446 | 54     | 0.926| 54  | PICI   | 2505047 | 2520583 | 15.0 |                    |
| llw:Kw2_2347  | 53     | 0.731| 52  | NI     |         |         |      |                    |
| llic:LACR_2598 | 53     | 0.712| 52  | NI     |         |         |      |                    |
| llr:llh_13190 | 53     | 0.712| 52  | NI     |         |         |      |                    |
| lls:lll_0576   | 66     | 0.558| 52  | NI     |         |         |      |                    |
| lgr:LCGT_1418  | 64     | 0.560| 50  | NI     |         |         |      |                    |
| lgv:LCGL_1439  | 64     | 0.560| 50  | NI     |         |         |      |                    |
| llc:LACR_0301  | 101    | 1.000| 101 | PICI   | 36265   | 50942   | 14.7 |                    |
| lla:L47979     | 101    | 1.000| 101 | PICI   | 35516   | 50948   | 14.4 |                    |
| lll:llmg_0054  | 101    | 1.000| 101 | PICI   | 32974   | 51647   | 18.6 |                    |
| lln:llnZ_00270 | 101    | 1.000| 101 | PICI   | 32974   | 51647   | 18.6 |                    |
| llk:llkF_2445  | 101    | 0.990| 101 | PICI   | 2505047 | 2520583 | 15.0 |                    |
| lgr:LCGT_1323  | 99     | 0.494| 87  | NI     |         |         |      |                    |
| lgv:LCGL_1344  | 99     | 0.494| 87  | NI     |         |         |      |                    |
| lcn:C270_07595 | 99     | 0.354| 99  | NI     |         |         |      |                    |
| llc:CVCAS_0045 | 394    | 1.000| 394 | PICI   | 36265   | 50942   | 14.7 |                    |
| lla:L48477     | 394    | 0.997| 394 | PICI   | 35516   | 50948   | 14.4 |                    |
| lll:llmg_0055  | 394    | 0.997| 394 | PICI   | 32974   | 51647   | 18.6 |                    |
| lln:llnZ_00275 | 394    | 0.997| 394 | PICI   | 32974   | 51647   | 18.6 |                    |
| llc:LLCGL_01770| 398    | 0.513| 396 | PICI   | 321043  | 333060  | 12.0 | 3’end uncertain    |
| lll:LLR_0301   | 398    | 0.513| 396 | PICI   | 278489  | 289370  | 10.9 | 3’end uncertain    |
| llk:llkF_2008  | 399    | 0.477| 396 | PICI   | 2063071 | 2074196 | 11.1 |                    |
| lla:lll_1819   | 410    | 0.470| 396 | PICI   | 1963199 | 1976945 | 13.7 |                    |
| llr:llh_10885  | 393    | 0.471| 397 | Prophage | 1973375 | 2011192 | 37.8 |                    |
| lgr:LCGT_1777  | 396    | 0.415| 393 | PICI   | 1755947 | 1768604 | 12.5 |                    |
| lgv:LCGL_1798  | 396    | 0.415| 393 | PICI   | 1769776 | 1782433 | 12.6 |                    |
| l1l:ll_1862    | 343    | 0.444| 347 | Prophage | 1846819 | 1857113 | 10.9 | Defective. Has dut |
| snu:SPNA45_01857 | 388   | 0.414| 391 | PICI   | 1886061 | 1902018 | 15.9 |                    |
| smb:smi_2017   | 388    | 0.376| 391 | PICI   | 2057587 | 2070717 | 13.1 |                    |

*ORFs that are not annotated in LlCICV56-1 but are annotated in LlCIIl403-1, which has the identical sequence in that region.
### Table S7. Putative phage-inducible chromosomal islands of Gram-positive cocci.

| PICI         | Strain             | Accession number | Size (kb) | att site core                      | Accessory genes<sup>b</sup>                      |
|--------------|--------------------|------------------|-----------|-----------------------------------|-------------------------------------------------|
| EICIV583     | *E. faecalis* V583 | AE016830         | 12.9      | TATTAATGAAACAACGTG                | UvrB protein; Cold-shock protein                  |
| EICILASB-2   | *E. faecalis* LA3B-2| ATJC01000082     | 12.9      | TAAACTGTAAGTTTATG                 | Cold-shock protein                                |
| EICIL918     | *E. faecalis* 918  | AVN01000040      | 12.6      | TATTAATGAAACAACGTG                | UvrB protein; Cold-shock protein                  |
| EICILASB57   | *E. faecalis* B16457| AII01000003      | 12.7      | TATTAATGAAACAACGTG                | UvrB protein; Cold-shock protein                  |
| EICISF105    | *E. faecalis* SF105| AJEE01000013     | 12.3      | TATTAATGAAACAACGTG                | UvrB protein; Cold-shock protein                  |
| LICibiIL310  | *L. lactis* IL1403 | AE005176         | 14.9      | CAAAAAACACTGATTTGGAATGCCGTATG     | Enterocin immunity (EntA); LtrA                   |
| LICibiIL312  | *L. lactis* IL1403 | AE005176         | 15.1      | GAAAAGCGCAGTTAAATAATTATAGCTAT     | Peptidase_M48; Cold shock protein                 |
| LICINZ9000-1 | *L. lactis* – cremoris NZ9000 | CP002094 | 19.4 | CAAAAAACACTGATTTGGAATGCCGT        | bcnA; IS712A; Non-specific endonuclease          |
| LICINZ9000-2 | *L. lactis* – cremoris NZ9000 | CP002094 | 18.3 | TAGAACTATGGTTAAAA                  | Abortive phage resistance                        |
| LICI-NZ9000-3| *L. lactis* – cremoris NZ9000 | CP002094 | 10.3 | ATTCACCTTGGAATGAATATA              | LtrA                                             |
| LICIISK11    | *L. lactis* – cremoris SK11 | CP000425   | 12.9 | TAGAACTATGGTTAAAA                  | DNA/RNA non-specific endonuclease                 |
| LICICV56-1   | *L. lactis* - lactis CV56 | CP002365 | 14.7 | CAAAAAACACTGATTTGGAATGCCGTATG     | Enterocin immunity (EntA); LtrA                   |
| LICI-CV56-2  | *L. lactis* - lactis CV56 | CP002365 | 10.1 | JLTAAAAATAGACCTAGACCTAGATGAGATCA | Cold shock protein                                |
| LICI-KLDS-2  | *L. lactis* - lactis KLDS 4.0325 | CP006766  | 12.1 | TCAGACCTAAGACTGATGAATAAAG         | Prohead protease                                  |
| LICI-KLDS-3  | *L. lactis* – lactis KLDS 4.0325 | CP006766  | 15.2 | GCTATAATAGAAACTATAT               | Prohead protease                                  |
| LICI-A76-1   | *L. lactis* – cremoris A76 | CP003132   | 14.8 | TTTTAACATAGTTTCTATTTATCA         |                                                  |
| LICI-A76-2   | *L. lactis* – cremoris A76 | CP003132   | 15.2 | TAAAACCTATA                      |                                                  |
| LICI-KF147   | *L. lactis* – lactis KF147 | CP001634  | 14.9 | TAAAACCTATA                      | BcnA-imm; Pyrimidine dimer DNA glycosylases      |
| MG1363-1     | *L. lactis* – lactis MG1363 | AM040671  | 19.4 | CAAAAAACACTGATTTGGAATGCCGT       | bcnA; IS712A; Non-specific endonuclease          |
| PICI          | Strain                  | Accession number (Genomic location) | Size (kb) | att site core          | Accessory genes |
|--------------|-------------------------|-------------------------------------|-----------|------------------------|-----------------|
| SpnCI-       | *S. pneumoniae* Taiwan  | NC_012469 3563-23357                | 19.8      | CCTTTTTTGTGTGA         |                 |
| Taiwan-0.03  |                         |                                     |           |                        |                 |
| SpnCI-ST556- | *S. pneumoniae* ST556   | CP003357 3563-21646                 | 18.1      | CCTTTTTTGTGTGA         |                 |
| 0.03         |                         |                                     |           |                        |                 |
| SpnCI-       | *S. pneumoniae* Taiwan  | NC_012469 197987-210888             | 12.9      | TACAAAATCGGCTTTTTT     |                 |
| Taiwan-0.2   |                         |                                     |           |                        |                 |
| SpnCI-Tigr4- | *S. pneumoniae* Tigr4   | NC_003028 1063231-1073321           | 10.1      | CCTAACAAAAC            | TA system       |
| 1.06         |                         |                                     |           |                        |                 |
| SpnCI-       | *S. pneumoniae* INV104  | FO312030 1070841-1079518            | 8.7       | CTTAAAAAATAA           |                 |
| INV104-1.06  |                         |                                     |           |                        |                 |
| SpnCI-A45-1.9| *S. pneumoniae* A45     | NC_018594.1 1887268-1902018         | 14.7      | GCCCATACAAACCCCAT      | DNA-damage-inducible protein D |
| 1.9          |                         |                                     |           |                        |                 |
| SsuCI-TL13   | *S. suis* TL-13         | CP003993 1339840-1351861            | 12.0      | CTTGAAAAAATAA          |                 |
| SolCI-       | *S. oligofermentans* AS1.3089 | CP004409.1 602331- 612649 | 10.3     | CTTGAAAAAATAA          | TA system       |
| AS1.3089-0.6 |                         |                                     |           |                        |                 |
| SpnCI-       | *S. pneumoniae* TCH8431/19A | CP001993 (440193-453094) | 12.9     | ATTATACTACAATACTCGGC   |                 |
| TCH8431-0.45 |                         |                                     |           |                        |                 |
| SpnCI-       | *S. pneumoniae* TCH8431/19A | CP001993 (248868-267453) | 18.6    | TAACACAAAAAGGG         | DNA-damage-inducible protein D |
| TCH8431-0.25 |                         |                                     |           |                        | Inserted plasmid|

*Nt: Not identified.

**The identities of the accessory genes are based on annotations; none has been tested experimentally.
Table S8. Role of the cloned cos site in pAGEnt transfera.

| Donor strain | Cloned site cos | Plasmid titreb |
|--------------|----------------|----------------|
| JP14198      | Empty vector   | < 10           |
| JP14199      | Phage bIL286   | $4.5 \times 10^2$ |
| JP14203      | LICI-bIL310    | $1.2 \times 10^2$ |

aThe means of results from three independent experiments are shown. Variation was within ±5% in all cases.
bNo. of transductants/ml induced culture, using IL1403 as recipient strain.
### Table S9. Orthology analysis of SpnCl6706B

| Abbreviations | Description |
|---------------|-------------|
| spn: SPN TIGR4 | SPN = Streptococcus pneumoniae |
| std: SPNN | SPNN = S. pseudopneumoniae |
| snb: SPN 670–6B | |
| snc: SPN TCH8431/19A | |
| snd: SPN ST556 | |
| sni: SPN INV1D4 | |
| snu: SPN Taiwan19f–14 | |
| spi: SPN A45 | |
| smb: SMB MGAS10750 | SMB = S. mitis B |
| scp: SPS ATCC 15912 | SPS = S. parasanguinis |
| stc: STH CNRZ1066 | STH = S. thermophilus |
| ste: STH LMD-9 | |
| stn: STH ND03 | |
| stw: STH MN-ZLW-002 | |
| spv: SPN Hungary19A | |
| stk: SPU | SPU = S. parauberis |
| sther: STH ASCC 1725 | |
| sga: SGL UCN34 | SGL = S. galactiae |
| sgg: SGL ATCC BAA-2069 | |
| sgt: SGL ATCC 43143 | |
| sjj: SPN JJA | |
| sagm: SAG 09mas018883 | |
| sub: SUB | SUB = S. uberis |
| sui: SSU T15 | SSU = S. suis |
| ssut: SSU TL-13 | |
| sst: SSU ST3 | |
| ssuy: SSU YB51 | |
| slu: SLT KE3 | SLT = S. lutetiensis |
| sak: SAG A909 | SAG = S. agalactiae |
| sagt: SAG COH1 | |
| nce: NCE | NCE = Nocema seranae |
| stx: SPY MGAS1882 | SPF = S. pyogenes |
| spnn: SPN A026 | |
| lmn: LMO 08-5778 | LMO = Listeria monocytogenes |
| fsc: FSU | FSU = Fibrinobacter succinogenes |
| pph: PPH | PPH = Pelodictyon phaeoclathratiforme |
| drc: =Dehalobacter restrictus | |
| dec: =Dehalobacter sp. CF | |
| ded: =Dehalobacter sp. DCA | |
| rbr: =Ruminococcus bromii | |
## Orthologs

| Gene           | length | sim  | OL | insert | site | size | site          |
|----------------|--------|------|----|--------|------|------|---------------|
| snb:SP670_0026 (388 a.a.) |       | int  |    |        |      |      |               |
| snc:HMPREF0837_10291     | 388    | 0.874| 388| PICI   | 0.25 | 14.9 | dnaA         |
| snd:MYY_0032            | 398    | 0.874| 388| PICI   | 0.01 | 16.1 | dnaA         |
| snt:SP5_0037           | 388    | 0.874| 388| PICI   | 0.01 | 14.9 | dnaA         |
| smb:ami_2017           | 388    | 0.546| 388| PICI   | 2.05 | 12.2 | sugar hydrolase|
| scp:S. parasangui:HMPREF0833_11010 | 388 | 0.549| 388| PICI   | 1.02 | 10.6 | cna          |
| ste:STER_0829          | 388    | 0.531| 388| PICI   | 0.74 | 9.4  | pabB         |
| stc:sttr0783           | 388    | 0.531| 388| PICI   | 0.73 | 8.1  | pabB         |
| sthe:TJ03_05120        | 388    | 0.531| 388| PICI   | 0.93 | 7.7  | dinB         |
| stn:STND_0774          | 388    | 0.531| 388| PICI   | 0.75 | 10.2 | uvrA         |
| snt:SPT_0036           | 386    | 0.525| 387| PICI   | 1.48 | 11   | SAM          |
| sna:GALLO_2149         | 388    | 0.525| 387| PICI   | 2.2  | 11.9 | gshA         |
| sgg:SGBAA2069_c21460   | 388    | 0.525| 387| PICI   | 2.2  | 11.8 | gshA         |
| snt:GGB_2132           | 388    | 0.525| 387| PICI   | 2.2  | 11.9 | gshA         |
| sgt:S. GGB_21480       | 388    | 0.503| 388| PICI   | 2.1  | 14.6 | rpsD         |
| sub:SUB1840            | 388    | 0.505| 388| PICI   | 1.8  | 12.6 | rpsD         |
| slu:KE3_0026           | 381    | 0.518| 388| PICI   | 0.03 | 11.0 | tyrS         |
| sak:SAK_2094           | 388    | 0.508| 388| PICI   | 2.06 | 15.6 | rpsD         |

| Gene           | length | sim  | OL | insert | site | size | site          |
|----------------|--------|------|----|--------|------|------|---------------|
| snb:SP670_0025 (284 a.a.) |       | dinD|    |        |      |      |               |
| snc:SPNA45_01858    | 274    | 0.993| 271| PICI   | 1.9  | 14.7 | yesMN        |
| drr:DEHRE_03560     | 278    | 0.598| 276| NI*    |      |      |               |
| dec:DCF50_p2453     | 278    | 0.583| 276| NI     |      |      |               |
| ded:DHBDCA_p2442    | 278    | 0.583| 276| NI     |      |      |               |
| rbr:RBR_05470       | 280    | 0.561| 278| NI     |      |      |               |
| snc:HMPREF0837_10290| 186    | 0.987| 155| PICI   | 0.25 | 14.9 | dnaA         |
| snd:MYY_0031        | 186    | 0.987| 155| PICI   | 0.01 | 14.9 | dnaA         |
| snt:SP5_0036        | 186    | 0.987| 155| PICI   | 0.01 | 14.9 | dnaA         |
| fsc:FSU_1649         | 279    | 0.570| 270| NI     |      |      |               |
| fsu:Fisuc_1187       | 279    | 0.570| 270| NI     |      |      |               |
| pph:Ppha_0973        | 362    | 0.525| 276| NI     |      |      |               |
| xne:XNC1_0195        | 271    | 0.549| 266| defective and rearranged PICI-like fragment xne:XNE = Xenorhabdus nematophila |

| Gene           | length | sim  | OL | insert | site | size | site          |
|----------------|--------|------|----|--------|------|------|---------------|
| snb:SP670_0024 (238 a.a.) |       | rpr |    |        |      |      |               |
| snc:HMPREF0837_10283 | 246    | 0.983| 237| PICI   | 0.25 | 18.1 | dnaN         |
| snd:MYY_0025        | 246    | 0.983| 237| PICI   | 0.01 | 16.1 | dnaA         |
| snt:SP5_0029        | 238    | 0.983| 237| PICI   | 0.01 | 14.9 | dnaA         |
| snc:SPNA45_01863    | 255    | 0.745| 239| PICI   | 1.9  | 15.4 | yesMN        |
| sji:SPJ_1901        | 250    | 0.626| 246| prophase |      |      |               |
| Gene           | length | sim   | OL   | insert | site | size | site |
|---------------|--------|-------|------|--------|------|------|------|
| snb:SP670_0023 (50 a.a.) |        |       |      |        |      |      |      |
| snb:SP670_0022 (194 a.a.) |        |       |      |        |      |      |      |
| ssq:SSU09_2185 | 248    | 0.568 | 192  | PICI   | 2.1  | recF |      |
| sst:SSUST3_2012 | 248    | 0.568 | 192  | PICI   | 2.0  | recF |      |
| sst:SSUST3_2012 | 248    | 0.568 | 192  | PICI   | 2.0  | recF |      |
| spy:SPy_2127   | 255    | 0.457 | 184  | PICI   | 1.8  | mutL |      |
| sst:SPYALAB49_001792 | 193   | 0.457 | 184  | PICI   | 1.7  | mutL |      |
| sdc:SDG16_2198 | 255    | 0.446 | 184  | PICI   | 2.0  | mutL |      |
| sdc:SDG12_1934_10830 | 187   | 0.415 | 183  | PICI   | 2.1  | rpsD |      |
| sds:SDG2_2138  | 187    | 0.415 | 183  | PICI   | 2.1  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssu:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| ssn:TL15_1236  | 261    | 0.425 | 153  | proph  | 1.2  | rpsD |      |
| Gene                  | length | sim | OL | insert site | size | site | site |
|-----------------------|--------|-----|----|-------------|------|------|------|
| snb:SP670_0019 (142 a.a.) | 142    | 0.993 | 142 | PICI 0.25   | 18.1 | dnaN |
| snc:HMPREF0837_10277  |        |      |     |            |      |      |      |
| snd:MYX_0019          | 142    | 0.993 | 142 | PICI 0.01   | 16.1 | dnaA |
| snt:SPT_0022          | 142    | 0.993 | 142 | PICI 0.01   | 14.9 | dnaA |
| spb:M28_Spy1799       | 189    | 0.384 | 138 | PICI 1.80   | 14.0 | mutS/L |
| snb:SP670_0018 (48 a.a.) HP (4 hits only) | 48     | 1.000 | 48  | PICI 0.25   | 18.1 | dnaN |
| snc:HMPREF0837_10276  |        |      |     |            |      |      |      |
| snd:MYX_0018 hypothet | 48     | 1.000 | 48  | PICI 0.01   | 16.1 | dnaA |
| snt:SPT_0021 hypothet | 48     | 1.000 | 48  | PICI 0.01   | 14.9 | dnaA |
| rdn:HMPREF0733_10312  | 1301   | 0.396 | 48  | PICI 0.25   | 18.1 | dnaN |
| snb:SP670_0017        | 49     | 0.980 | 49  | PICI 0.25   | 18.1 | dnaN |
| snc:HMPREF0837_10275  |        |      |     |            |      |      |      |
| snd:MYX_0016          | 46     | 1.000 | 29  | PICI 0.01   | 14.9 | dnaA |
| snt:SPT_0020          | 46     | 1.000 | 29  | PICI 0.01   | 14.9 | dnaA |
| ssk:SSUD12_0495       | 155    | 0.862 | 29  | PICI 0.5    | 11.6 | lysS |
| snb:SP670_0015 (166 a.a.) | 170   | 0.910 | 166 | PICI 0.25   | 18.1 | dnaN |
| snc:HMPREF0837_10273  |        |      |     |            |      |      |      |
| snd:MYX_0016          | 170    | 0.910 | 166 | PICI 0.03   | 13.2 | dnaA |
| snt:SPT_0021          | 169    | 0.910 | 166 | PICI 0.01   | 14.9 | dnaA |
| std:SPPN_01215        | 169    | 0.800 | 165 | PICI 0.2    | 12.4 | mmA |
| eol:Emtol_1450        | 514    | 0.342 | 73  | PICI      |      |      |      |
| snb:SP670_0014 (46 a.a.) | 46     | 0.913 | 46  | PICI 0.25   | 18.1 | dnaN |
| snc:HMPREF0837_10272  |        |      |     |            |      |      |      |
| snt:SPT_0018          | 46     | 0.913 | 46  | PICI 0.01   | 14.9 | dnaA |
| smb:ami_2011          | 66     | 0.826 | 46  | PICI 2.1    | 10.9 | sugar hydrolase |
| snd:MYX_0015          | 39     | 0.923 | 39  | PICI 0.01   | 16.1 | dnaA |
| spnn:T308_00880       | 66     | 0.674 | 46  | PICI 1.6    | 12.4 | uvrA |
| spv:SPH_0295          | 66     | 0.674 | 46  | PICI 0.26   | 12.4 | uvrA |
| spn:SP_1136           | 148    | 0.630 | 46  | PICI 1.1    | 11.5 | enolase |
| scp:HMPREF0833_11005  | 66     | 0.630 | 46  | PICI 1.02   | 10.6 | cna |
| sni:INV104_09830      | 59     | 0.590 | 39  | PICI 1.1    | 8.2  | enolase |
| ssui:T15_1589         | 63     | 0.571 | 42  | PICI 1.60   | 10.0 | fabG |
| snb:SP670_0013 (71 a.a.) | 71     | 0.986 | 71  | PICI 0.25   | 18.1 | dnaN |
| snc:HMPREF0837_10270  |        |      |     |            |      |      |      |
| snt:SPT_0016          | 71     | 0.986 | 71  | PICI 0.01   | 14.9 | dnaA |
| std:SPPN_01220        | 71     | 0.901 | 71  | PICI 0.2    | 13.2 | dnaA |
| scp:HMPREF0833_11004  | 71     | 0.859 | 71  | PICI 1.02   | 12.4 | mmA |
| smb:ami_2010          | 71     | 0.845 | 71  | PICI 2.1    | 10.9 | sugar hydrolase |
| spnn:T308_00885       | 71     | 0.789 | 71  | PICI 1.6    | 12.4 | mmA |
| spv:SPH_0296          | 71     | 0.789 | 71  | PICI 0.26   | 12.4 | uvrA |
| dav:DESACE_04385      | 580    | 0.319 | 69  | PICI      |      |      |      |
| scg:SCI_1442          | 64     | 0.349 | 63  | PICI 10.5   |      |      |      |
Gene               length  sim  OL  insert  site  size  site
scon:SCRE_1399     64      0.349  63  PICI   10.5  gpmA
scos:SCR2_1399     64      0.349  63  PICI   0.5   gpmA
bvu:BVU_2093       583     0.432  37  NI

snb:SP670_0012 (97 a.a.)
  snc:HMREF0837_10269
  std:SPPN_01225
  snu:SPNA45_01869
  smb:smi_2009
  snt:MYY_0013
  snt:SPF_0015
  nce:NCBIP100853

  97     0.959  97  PICI   0.25  18.1  dnaN
  98     0.928  97  PICI   0.2   12.4  mmmA
  94     0.957  93  PICI   1.9   14.7  yesMN
  97     0.856  97  PICI   2.1   10.9  sugar hydrolase
  68     0.956  68  PICI   0.01  16.1  dnaA
  58     0.948  58  PICI   0.01  14.9  dnaA
  221    0.302  96  NI

snb:SP670_0011 (113 a.a.)
  snc:HMREF0837_10268
  std:SPPN_01230
  snt:SPF_0007
  snt:SPN_00890
  spv:SPH_0297
  scp:HMREF0833_11003
  sdq:SDSE16_2216
  spai:Mi6_Spy151
  stg:MGAS1525_1660

  113    1.000 113  PICI   0.25  18.1  dnaN
  113    1.000 113  PICI   0.01  14.9  dnaN
  113    1.000 113  PICI   1.9   15.4  yesMN
  113    1.000 113  PICI   0.2   12.4  mmmA
  113    0.841 113  PICI   2.1   10.9  sugar hydrolase
  113    0.841 113  PICI   1.6   12.4  uvrA
  113    0.841 113  PICI   0.26  12.4  uvrA
  113    0.735 113  PICI   1.02  10.6  cna
  109    0.667 111  PICI   2.0   19.6  mutL/S
  109    0.667 111  PICI   1.8   13.3  mutL/S
  109    0.667 111  PICI   1.7   12.2  rpsD

snb:SP670_0010 (90 a.a.)
  snc:HMREF0837_10267
  std:SPPN_01235
  snt:SPF_0013
  snc:HMREF0837_10266
  snt:SPF_0007
  spv:SPH_0298
  scp:HMREF0833_11002
  ssut:TL13_0170
  sgat:GBSCO1L1946
  stt:SUSTR3_2006

  90     1.000  90  PICI   0.25  18.1  dnaN
  90     1.000  90  PICI   0.01  14.9  dnaN
  90     0.967  90  PICI   0.2   12.4  mmmA
  93     0.708  89  PICI   0.24  12.4  uvrA
  93     0.708  89  PICI   1.6   12.4  uvrA
  93     0.708  89  PICI   0.26  12.4  uvrA
  91     0.674  89  PICI   2.1   10.9  sugar hydrolase site
  91     0.607  89  PICI   1.02  10.6  cna
  92     0.539  89  PICI   0.14  13.1  ackA
  90     0.556  90  PICI   2.0   14.8  rpsD

snb:SP670_0009 (286 a.a.)  pri
  snc:HMREF0837_10266
  std:SPPN_00905
  snt:SPF_0299
  snc:HMREF0837_10266
  std:SPPN_00905
  snt:SPF_0299
  snc:HMREF0837_10266
  std:SPPN_00905
  snt:SPF_0299
  snc:HMREF0837_10266
  std:SPPN_00905
  snt:SPF_0299

  286    0.965 286  PICI   0.25  18.1  dnaN
  286    0.965 286  PICI   0.01  14.9  dnaN
  286    0.965 286  PICI   0.01  16.1  dnaA
  286    0.965 286  PICI   0.01  14.9  dnaN
  286    0.965 286  PICI   0.01  14.9  dnaN
  286    0.930 286  PICI   2.1   10.9  sugar hydrolase
  288    0.907 289  PICI   1.6   12.4  uvrA
  288    0.907 289  PICI   0.26  12.4  uvrA
  289    0.810 289  PICI   2.1   17.4  rpsD
  288    0.741 290  PICI   1.8   11.9  mutS/L
  285    0.718 287  PICI   1.8   12.9  mutS/L
| Gene       | length | sim   | OL | insert | site | size | site   |
|------------|--------|-------|----|--------|------|------|--------|
| stz:SPYALAB49_001801 | 285    | 0.718 | 287 | PICI   | 1.8  | 14.3 | mutS/L |
| spa:M6_Spy1816      | 285    | 0.718 | 287 | PICI   | 1.8  | 13.3 | mutS/L |
| sak:SAR_2084        | 285    | 0.725 | 287 | PICI   | 2.1  | 15.6 | rpsD   |
| snb:SP670_0008      | 500    | 0.915 | 492 | PICI   | 1.8  | 11.9 | mutS/L |
| spf:SpyM51774       | 489    | 0.916 | 488 | PICI   | 0.26 | 12.4 | uvrA   |
| snc:HMPREF0837_10498| 489    | 0.916 | 488 | PICI   | 0.44 | 15.4 | uvrA   |
| snt:SPT_0233        | 489    | 0.916 | 488 | PICI   | 1.6  | 12.4 | uvrA   |
| spn:T308_00910      | 498    | 0.897 | 495 | PICI   | 2.1  | 17.6 | rpsD   |
| sak:SAR_2083        | 480    | 0.900 | 480 | PICI   | 2.1  | 15.6 | rpsD   |
| sthe:T303_05075     | 501    | 0.758 | 483 | PICI   | 0.93 | 7.7  | dltD   |
| stc:str0775         | 500    | 0.754 | 483 | PICI   | 0.73 | 8.1  | pabB   |
| stn:STND_0765       | 501    | 0.754 | 483 | PICI   | 0.75 | 10.2 | uvrA   |
| ssui:T15_1593       | 507    | 0.484 | 494 | PICI   | 1.6  | 10   | fabG   |
| spi:MGAS10750_Spy1910| 498   | 0.474 | 485 | PICI   | 1.8  | 13.5 | mutS/L |

Sn:SP670_0007 (167aa)

| Gene       | length | sim   | OL | insert | site | size | site   |
|------------|--------|-------|----|--------|------|------|--------|
| snc:HMPREF0837_10500 | 176    | 0.889 | 162 | PICI   | 0.44 | 15.4 | uvrA   |
| snt:SPT_0235      | 176    | 0.889 | 162 | PICI   | 0.2  | 12.4 | uvrA   |
| spn:T308_00920    | 176    | 0.889 | 162 | PICI   | 1.6  | 12.4 | uvrA   |
| spv:SPH_0302      | 176    | 0.889 | 162 | PICI   | 0.25 | 12.4 | uvrA   |
| snu:SPNA45_01874  | 142    | 0.923 | 142 | PICI   | 1.88 | YesMN|        |
| smb:smi_2003      | 153    | 0.865 | 141 | PICI   | 2.05 | Fucosidase|
| ssq:SSUD9_2176    | 204    | 0.529 | 172 | PICI   | 2.16 | recF  |
| sn:SSUST3J_0303   | 182    | 0.529 | 172 | PICI   | 2.00 | recF  |
| sag:MSA_21990     | 231    | 0.537 | 164 | PICI   | 2.05 | rpsD  |
| ssui:YB51_9925    | 150    | 0.500 | 148 | PICI   | 2.02 | recF  |
| sub:SUB1829       | 205    | 0.426 | 162 | PICI   | 2.01 | rpsD  |

Sn:SP670_0006 (167aa)

| Gene       | length | sim   | OL | insert | site | size | site   |
|------------|--------|-------|----|--------|------|------|--------|
| snu:SPNA45_01875 | 167    | 1.000 | 167 | PICI   | 1.88 | YesMN|        |
| smb:smi_2002    | 167    | 0.934 | 167 | PICI   | 2.05 | Fucosidase|
| snc:HMPREF0837_10501| 169    | 0.879 | 165 | PICI   | 0.44 | uvrA   |
| spn:T308_00925  | 169    | 0.879 | 165 | PICI   | 1.6  | uvrA   |
| spv:SPH_0303    | 169    | 0.879 | 165 | PICI   | 0.25 | uvrA   |
| sag:MSA_21980   | 163    | 0.722 | 162 | PICI   | 2.05 | rpsD   |
| ssui:T15_1595   | 166    | 0.548 | 166 | PICI   | 1.60 | fabG   |
| sagm:BSA_21300  | 162    | 0.525 | 162 | PICI   | 2.08 | 14.6  | rpsD  |
| sak:SAR_2081    | 162    | 0.519 | 162 | PICI   | 2.07 | 15.7  | rpsD  |
| spa:M6_Spy1821  | 162    | 0.512 | 162 | NI     |      |       |        |
| Gene               | length | sim | OL  | insert | size | site   | site   | note                        |
|--------------------|--------|-----|-----|--------|------|--------|--------|-----------------------------|
| Snb:SP670_0005 (130aa) | 130    | 0.946 | 130 | PICI   | 0.19 | 12.4   | mmmN   |                             |
| smb:smi_2000       | 140    | 0.311 | 132 | PICI?  | 1.94 | 12.6   | very poor annot |                             |
| sgl:SGG2119        | 140    | 0.303 | 132 | PICI   | 1.94 | 14.1   | pgp    |                             |
| sgl:SGG2136        | 140    | 0.303 | 132 | PICI   | 2.23 | 11.4   | slu:KE3_2016 |                             |
| sgt:SGGB_2119      | 140    | 0.303 | 132 | PICI   | 2.18 | 11.8   | sgt:SGGBA2069_c21340 |                             |
| lsa:LSA0600        | 113    | 0.350 | 80  | PICI   | 0.60 | 8.1    | sga:GALLO_2136 |                             |

snb:SP670_0004 (52 a.a.) no matching protein in DB