**Supplementary Table 3.** List of the pili-encoding genes used for the phylogenetic analyses.

| Organism | Gene function | Accession number |
|----------|---------------|-----------------|
| *Bifidobacterium animalis* subsp. *lactis* DSM 10140 | Cell surface protein fimA, fimbrial subunit | AC524397.1 |
| *Bifidobacterium animalis* subsp. *lactis* AD011 | Possible cell surface protein | ALC28972.1 |
| *Bifidobacterium adolescentis* ATCC 15703 | Cell surface protein fimA, fimbrial subunit | YP_910380.1 |
| *Bifidobacterium dentium* Bld1 | Cell surface protein | YP_003361571.1 |
| *Bifidobacterium dentium* Bld1 | Surface protein with Cna protein B-type domain | YP_003360030.1 |
| *Bifidobacterium bifidum* PRL2010 | Fimbrial subunit-like cell surface protein | YP_003359706.1 |
| *Bifidobacterium Dentium* Bld1 | Fimbrial subunit fimA | YP_003970445.1 |
| *Bifidobacterium Dentium* Bld1 | Cell surface protein | YP_003361281.1 |
| *Bifidobacterium Dentium* Bld1 | LPXTG cell wall surface protein, fimbrial subunit fimA | YP_003361282.1 |
| *Bifidobacterium longum* subsp. *longum* DJO10A | Fimbrial subunit fimA | ZP_000121141.2 |
| *Bifidobacterium bifidum* PRL2010 | Cell surface protein | YP_003971869.1 |
| *Bifidobacterium longum* subsp. *longum* NCC2705 | Fimbrial subunit fimA | NP_695860.1 |
| *Streptococcus sanginis* SK36 | fimA fimbrial subunit-like protein, putative | ABN45021.1 |
| *Bifidobacterium Dentium* Bld1 | Sortase-anchored surface protein | YP_003359781.1 |
| *Bifidobacterium Dentium* Bld1 | Fimbrial subunit fimB | YP_003361396.1 |
| *Actinomyces odontolyticus* | Type-2 fimbrial major subunit precursor | ABD84025.1 |
| *Actinomyces naeslundii* | Fimbrial structural subunit | AAC13545.1 |
| *Arthrobacter arilaitensis* Re117 | Putative fimbrial structural subunit | CBT74507.1 |
| *B. dentium* Bld1 | Collagen adhesin precursor | YP_003361570.1 |
| *Ruminococcus flavefaciens* FD-1 | Fimbrial subunit fimA | ZP_061429461.1 |
| *B. bifidum* PRL2010 | Fimbrial subunit fimA | YP_003970445.1 |
| *Bacteroides stercoris* ATCC 43183 | Major fimbrial subunit protein (fimA) | ZP_02436541.1 |
| *Bacteroides intestinalis* DSM 17393 | Major fimbrial subunit protein fimB | EDV04845.1 |
| *Porphyromonas endodontalis* ATCC 35406 | fimbrillin | EEN83125.1 |
| *Odoribacter denticanis* | Fimbrial subunit fimA | AAT76446.1 |
| *Streptococcus parasanguinis* | Fimbrial subunit fimA, A chain precursor | YP_003933538.1 |
| *Francisella philomiragia* subsp. *philomiragia* ATCC 25017 | Fimbrial subunit fimA | ABZ279793.1 |
| *Pasteurella multocida* subsp. *multocida* str. *Pm70* | Fimbrial subunit fimA | AAK03010.1 |
| *Bordetella petrii* | Putative fimbrial adhesin | CAP44477 |
| *Serratia marcescens* | Fimbrial subunit fimA | AAW62392.1 |
| *Edwardsiella tarda* | Major fimbrial subunit protein | ABK57119.1 |
| *Edwardsiella ictaluri* | Putative major fimbrial subunit protein | AAT41671.1 |
| *Pantoea vagans* C9-1 | Type-1 fimbrial protein, A chain precursor | YP_003933538.1 |
| *Salmonella enterica* subsp. *enterica* serovar *Typh* str. *J185* | Fimbrial protein | ZP_03380023.1 |
| *Salmonella enterica* subsp. *enterica* serovar *Typhimurium* | Putative fimbrial subunit A | AAF21713.1 |
| *Enterobacter cloacae* subsp. *cloacae* ATCC 13047 | P pilus assembly protein, pilin fimA | ADJ69057.1 |
| *Yersinia rodhii* ATCC 43380 | P pilus assembly protein, pilin fimA | EEOQ4201.0 |
| *Pseudomonas syringae* pv. *tomato* Max13 | Type I pilus biogenesis protein fimA | ZP_07232620.1 |
| *Xylella fastidiosa* subsp. *fastidiosa* GB514 | Fimbrial protein | ADN63049.1 |
| *Klebsiella pneumoniae* 342 | Type-1 fimbrial protein | ACO11061.1 |
| *Burkholderia multivorans* ATCC 17616 | Major type 1 subunit fimB | BAG43555.1 |
| *Burkholderia cenocepacia* AU 1054 | Fimbrial protein | ABF76053.1 |
| *Burkholderia mallei* ATCC 10399 | Fimbrial subunit fimA | EDP89455.1 |
| *Yersinia aldovae* ATCC 35236 | Fimbrial protein | EEP93769.1 |
| *Escherichia coli* | fimA precursor | CAA85727.1 |
| *Shigella boydii* Sb227 | Major type 1 subunit fimB | ABB68780.1 |
| *Klebsiella pneumoniae* subsp. *pneumoniae* MGH 78578 | Major type 1 subunit fimB (pilin) | YP_001336915.1 |
| *Klebsiella pneumoniae* | Fimbrial subunit fimA | ACV60168.1 |
| *Erwinia tasmaniensis* Et1/99 | Type-1 fimbrial protein, FimA | CAO97915.1 |
| *Salmonella enterica* subsp. *enterica* serovar *Typhi* str. *Ty2* | Type-1 fimbrial protein subunit A | NP_806054.1 |
| *Salmonella enterica* subsp. *indica* | Major pilin protein fimA | AAD23947.1 |
| *Haemophilus ducreyi* 35000HP | Fimbrial major pilin protein | NP_872871.1 |
| *Pectobacterium carotovorum* subsp. *carotovorum* WPP14 | Fimbriac major subunit protein | ZP_0382453.1 |
| *Yersinia berdovici* ATCC 43970 | P pilus assembly protein, pilin FimA | EEQ06994.1 |
| *Serratia odorifera* 4Rx13 | Type-1 fimbrial protein, A chain | EFA71402.1 |
| *Providencia stuartii* ATCC 25827 | Pilus assembly protein, pilin fimA | EDZ55322.1 |
| *Yersinia intermedia* ATCC 29009 | P pilus assembly protein, pilin fimA | EEOQ4201.0 |
| *Salmonella enterica* subsp. *enterica* serovar *Typhi* str. J185 | Fimbrial subunit fimA | ZP_003379271.1 |
| *Cronobacter sakazakii* ATCC BAA-894 | Pilus assembly protein, pilin fimA | ABU76251.1 |
| *Pseudomonas fluorescens* Pf-5 | Type I pilus biogenesis protein fimA | AAY90745.1 |
| *Pseudomonas aeruginosa* PA7 | Type I pilus biogenesis protein fimA | ABR38321.1 |
| *Pantoea ananatis* LMG 20103 | Fimbrial subunit fimA | ADD76691.1 |
| *Xenorhabdus nematophilus* ATCC 19061 | Putative Fimbrial subunit (pilin) | CBZ89795.1 |
| *Bakholderia glumae* BGR1 | P pilus assembly protein, pilin fimA | ACR30627.1 |
| Organism/Microbial Strain | Protein/Assembly Subunit | Accession Number |
|---------------------------|--------------------------|------------------|
| Burkholderia dolosa AUO158 | P pilus assembly protein pilin FimA | EAY67592.1 |
| Yersinia frederiksenii ATCC 33641 | P pilus assembly protein, pilin FimA | EEQ12942.1 |
| Cupriavidus metallidurans CH34 | Fimbral protein | ABF08548.1 |
| Cupriavidus taiwanensis | Major type 1 subunit fimbrin (pilin) | CAQ72393.1 |
| Bordetella bronchiseptica | Putative major fimbrial structural subunit | AAB94076.1 |
| Yersinia bercovieri ATCC 43970 | P pilus assembly protein, pilin FimA | ZP_04627370.1 |
| Pseudomonas putida GB-1 | Fimbral protein | ABY97371.1 |
| Burkholderia ubonensis Bu | Type I pilus biogenesis protein FimA | ZP_02379636.1 |
| Pseudomonas aeruginosa PA1 | Putative fimbrial protein | ZP_06881617.1 |
| Yersinia pestis FV-1 | Fimbral protein | ZP_02332403.1 |
| Haemophilus influenzae PittGG | Putative F17-like fimbrial subunit | YP_001293149.1 |
| Yersinia mollaretii ATCC 43969 | P pilus assembly protein, pilin FimA | ZP_04639781.1 |
| Deinococcus radiodurans R1 | Adhesin B | NP_296243.1 |
| Photobacterium profundum 3TCK | Pilus assembly protein, pilin FimA | EAS44350.1 |
| Parabacteroides distasonis ATCC 8503 | Putative fimbrilin precursor | ABR45199.1 |
| Bacteroides eggerthii DSM 20697 | Fimbral subunit FimA | EEC55246.1 |
| Bacillus subtilis | Ycdl | BAA22247.1 |
| Bordetella parapertussis | Putative major fimbrial structural subunit | AAB94079.1 |
| Dichelobacter nodosus | Fimbral subunit AC6 | AAA23337.1 |
| Ktedonobacter racemifer DSM 44963 | Putative peptidoglycan binding domain | EFH87082.1 |
| Thermicrobium roseum DSM 5159 | Major pilin protein fimA | ACM06850.1 |
| Thermoanaerobacter whegieli R8.B1 | Putative peptidoglycan binding domain | EFN47949.1 |
| Coprothermobacter proteolyticus DSM 5265 | Major pilin protein fimA | ACI17737.1 |
| Thermus thermophiles HB27 | Major pilin protein fimA | AAS81862.1 |
| Providencia rettgeri DSM 1131 | Major pilin protein fimA | ZP_06125206.1 |
| Bacteroides cellulosilyticus DSM 14838 | Fimbral subunit FimA | EEF86816.1 |
| Drosophila fima | Amylase | AAC47377.1 |