Supplementary Material

Characterizing dysbiosis of gut microbiome in PD: Evidence for overabundance of opportunistic pathogens  Zachary Wallen et al.

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### Supplementary Table 1. Subject Data

|                      | Dataset 1 |                      | Dataset 2 |                      |
|----------------------|-----------|----------------------|-----------|----------------------|
|                      | PD        | Control              | PD        | Control              |
|                      | N with data | Summary statistics | N with data | Summary statistics | N with data | Summary statistics | N with data | Summary statistics | P     |
| Number of subjects enrolled with complete data | 212 | - | 136 | - | - | 323 | - | 184 | - | - |
| Number of subjects whose 16S sequences passed QC | 201 | - | 132 | - | - | 323 | - | 184 | - | - |
| Number of unique ASVs detected | 201 | 4,863 | 132 | 3,315 | - | 323 | 9,188 | 184 | 6,667 | - |
| Number of genera detected | 201 | 404 | 132 | 333 | - | 323 | 527 | 184 | 441 | - |
| Number of subjects whose 16S sequences passed QC | 199 | - | 132 | - | - | 323 | - | 184 | - | - |
| Age                      | 199 | 68.3±9.2 | 132 | 70.2±8.6 | 0.04 | 323 | 67.7±9.0 | 184 | 66.4±8.3 | 0.05 |
| Sex (N & % male)         | 199 | 133 (67%) | 132 | 52 (39%) | 1E-06 | 323 | 206 (64%) | 184 | 55 (30%) | 2E-13 |
| Seattle, WA              | 199 | 93 | 132 | 58 | - | 323 | 0 | 184 | 0 | - |
| Albany, NY               | 199 | 75 | 132 | 62 | - | 323 | 0 | 184 | 0 | - |
| Atlanta, GA              | 199 | 31 | 132 | 12 | - | 323 | 0 | 184 | 0 | - |
| Birmingham, AL           | 199 | 0 | 132 | 0 | - | 323 | 323 | 184 | 184 | - |
| Stool sample travel time in days | 190 | 3.3±1.9 | 129 | 2.6±1.5 | 2E-03 | 314 | 5.2±3.3 | 183 | 5.0±2.6 | 0.73 |
| Race (N & %White)        | 199 | 196 (98%) | 132 | 132 (100%) | 0.28 | 321 | 317 (99%) | 184 | 183 (>99%) | 0.66 |
| BMI                     | 192 | 26.6±5.5 | 128 | 28.3±5.7 | 0.02 | 312 | 27.4±5.0 | 180 | 27.9±5.9 | 0.62 |
| Lost >10 pounds in past year | 195 | 45 (23%) | 126 | 15 (12%) | 0.01 | 316 | 79 (25%) | 181 | 21 (12%) | 3E-04 |
| Gained >10 pounds in past year | 196 | 26 (13%) | 129 | 10 (8%) | 0.15 | 309 | 45 (15%) | 179 | 20 (11%) | 0.33 |
| Fruits or vegetables daily | 194 | 151 (78%) | 131 | 116 (89%) | 0.02 | - | - | - | - | - |
| Meat, fish, poultry daily | 193 | 110 (57%) | 131 | 82 (63%) | 0.36 | - | - | - | - | - |
| Nuts daily               | 194 | 43 (22%) | 130 | 36 (28%) | 0.29 | - | - | - | - | - |
| Yogurt at least a few times a week | 191 | 68 (36%) | 128 | 57 (45%) | 0.13 | - | - | - | - | - |
| Grains daily             | 192 | 132 (69%) | 129 | 86 (67%) | 0.72 | - | - | - | - | - |
| Alcohol                  | 194 | 116 (60%) | 131 | 93 (71%) | 0.05 | 320 | 133 (42%) | 181 | 101 (56%) | 3E-03 |
|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| 15 | Tobacco | 196 | 14 (7%) | 131 | 5 (4%) | 0.24 | 321 | 13 (4%) | 183 | 13 (7%) | 0.15 |
| 16 | Caffeine | 193 | 137 (71%) | 131 | 100 (76%) | 0.31 | 319 | 273 (86%) | 183 | 161 (88%) | 0.50 |
| 17 | Constipation (no bowel movement) in ≥3 days prior to stool collection | 196 | 29 (15%) | 129 | 2 (2%) | 3E-05 | 302 | 54 (18%) | 176 | 8 (5%) | 2E-05 |
| 18 | Diarrhea on the day of stool collection | 196 | 6 (3%) | 129 | 2 (2%) | 0.49 | 301 | 12 (4%) | 178 | 5 (3%) | 0.61 |
| 19 | GI pain on the day of stool collection | 164 | 14 (9%) | 120 | 8 (7%) | 0.66 | 303 | 27 (9%) | 179 | 3 (2%) | 1E-03 |
| 20 | Excess gas on the day of stool collection | 196 | 27 (14%) | 130 | 2 (2%) | 9E-05 | 303 | 47 (16%) | 180 | 8 (4%) | 2E-04 |
| 21 | Bloating on the day of stool collection | 197 | 20 (10%) | 131 | 3 (2%) | 7E-03 | 305 | 36 (12%) | 179 | 9 (5%) | 0.01 |
| 22 | GI discomfort on the day of stool collection (yes to any item 17-21) | 183 | 104 (57%) | 119 | 26 (22%) | 2E-09 | 305 | 103 (34%) | 176 | 26 (15%) | 4E-06 |
| 23 | Constipation (<3 bowel movements per week) in the past 3 months | 191 | 82 (43%) | 130 | 6 (5%) | 6E-16 | 312 | 138 (44%) | 180 | 31 (17%) | 6E-10 |
| 24 | GI Health |   |   |   |   |   |   |   |   |   |   |
| 25 | Diarrhea in the past 3 months | 189 | 32 (17%) | 127 | 28 (22%) | 0.31 | 306 | 80 (26%) | 181 | 54 (30%) | 0.40 |
| 26 | Colitis | 192 | 9 (5%) | 130 | 2 (2%) | 0.21 | 316 | 54 (17%) | 180 | 24 (13%) | 0.31 |
| 27 | IBS | 191 | 14 (7%) | 130 | 8 (6%) | 0.82 | 312 | 17 (5%) | 178 | 14 (8%) | 0.34 |
| 28 | Crohn's disease | 193 | 4 (2%) | 131 | 1 (1%) | 0.65 | 314 | 3 (1%) | 180 | 0 (0%) | 0.56 |
| 29 | IBD | 193 | 5 (3%) | 130 | 2 (2%) | 0.71 | 307 | 9 (3%) | 178 | 4 (2%) | 0.78 |
| 30 | Ulcers | 192 | 18 (9%) | 130 | 9 (7%) | 0.54 | 314 | 6 (2%) | 180 | 4 (2%) | 1.00 |
| 31 | SIBO | - | - | - | - | - | 305 | 0 (0%) | 177 | 0 (0%) | 1.00 |
| 32 | Celiac | - | - | - | - | - | 314 | 0 (0%) | 177 | 0 (0%) | 1.00 |
| 33 | Disease duration in years | 199 | 13.8±6.7 | - | - | - | 323 | 9.2±7.1 | - | - | - |
| 34 | Intestinal disease (yes to any item 25-32) | 193 | 38 (20%) | 131 | 19 (15%) | 0.24 | 298 | 80 (27%) | 173 | 41 (24%) | 0.51 |
| 35 | Currently taking digestive medication | 192 | 60 (31%) | 126 | 22 (17%) | 6E-03 | - | - | - | - | - |
| 36 | Currently taking antibiotics | 193 | 8 (4%) | 130 | 3 (2%) | 0.54 | 315 | 13 (4%) | 179 | 7 (4%) | 1.00 |
| 37 | Taken antibiotics in past 3 months | 190 | 24 (13%) | 130 | 22 (17%) | 0.33 | 308 | 63 (20%) | 170 | 33 (19%) | 0.81 |
| 38 | Currently taking anti-inflammatory drugs | 190 | 77 (41%) | 128 | 56 (44%) | 0.64 | - | - | - | - | - |
| 39 | Currently taking probiotics | 184 | 42 (23%) | 128 | 33 (26%) | 0.59 | - | - | - | - | - |
| 40 | Disease duration in years | 199 | 13.8±6.7 | - | - | - | 323 | 9.2±7.1 | - | - | - |
| 41 | Patients on carbidopa/levodopa | 187 | 170 (91%) | - | - | - | 313 | 266 (85%) | - | - | - |
| 42 | Levodopa dose, mg/day | 181 | 764±574 | - | - | - | 313 | 563±443 | - | - | - |
| 43 | Patients on dopamine agonist | 187 | 99 (53%) | - | - | - | 303 | 153 (50%) | - | - | - |
### Duration & Medications

| Description                          | N   | Percentage | Mean ± SD | N   | Percentage | Mean ± SD |
|--------------------------------------|-----|------------|-----------|-----|------------|-----------|
| Patients on MAO-B inhibitor          | 187 | 71 (38%)   | -         | 318 | 86 (27%)   | -         |
| Patients on amantadine               | 187 | 49 (26%)   | -         | 315 | 60 (19%)   | -         |
| Patients on COMT inhibitor           | 187 | 37 (20%)   | -         | 320 | 13 (4%)    | -         |
| Patients on anticholinergics         | 187 | 8 (4%)     | -         | 322 | 10 (3%)    | -         |
| Patients not on PD medication        | 187 | 3 (2%)     | -         | 316 | 17 (5%)    | -         |

Column “N with data” shows the number of individuals for whom data on the specified variable was available; for all metadata, only subjects who passed both sequence and metadata quality control (QC) were considered. "Summary statistics" for metadata are shown as mean±SD for quantitative traits, and number and percentage of individuals with positive response (yes) for dichotomous traits. 15 samples (all in dataset 1) yielded no or too few 16S sequences to be analyzed and were removed. Two subjects had unreliable self-reported metadata; they were included in analyses that required only sequences and case-control status but were excluded from all analyses that required any metadata (these subjects are identified as 10122.FP0016201 and 10122.GMWA.1090 in the dataset on NCBI SRA).

P-values are two-sided testing the difference in the distribution of each variable in PD vs. control. Variables that differed in PD vs. control at a conservatively uncorrected two-sided P<0.05 were carried forward and included with case-control status in PERMANOVA and tested for their effects on inter-individual differences in microbiome composition (β diversity). Constipation (no bowel movement) in ≥3 days prior to stool collection, GI pain on day of stool collection, Excess gas on day of stool collection, and Bloating on day of stool collection were captured by GI discomfort on day of stool collection, hence only GI discomfort on day of stool collection was carried forward to PERMANOVA. Currently taking digestive medication (mainly laxatives or antacid) was not carried to PERMANOVA because it was no longer significant when adjusted for GI discomfort on day of stool collection.
Supplementary Table 2. MWAS of dataset 1 conducted using ANCOM

Sample size for ANCOM included subset of samples that had complete data on all covariates tested: N= 171 cases and 117 controls in dataset 1.

W = ANCOM score indicating the number of times a genus achieved FDR<0.05 as compared to other genera (maximum W possible: 444 in dataset 1, 560 in dataset 2).

0.8 = Threshold at which results were considered significant (TRUE).

| W  | 0.8 | Kingdom     | Phylum   | Class     | Order        | Family          | Genus                      |
|----|-----|-------------|----------|-----------|--------------|-------------------|----------------------------|
| 441 | TRUE | Bacteria    | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae   | Agathobacter               |
| 426 | TRUE | Bacteria    | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae   | Lachnospira                |
| 418 | TRUE | Bacteria    | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae   | Lachnospiraceae_ND3007_group |
| 411 | TRUE | Bacteria    | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae   | Faecalibacterium           |
| 410 | TRUE | Bacteria    | Firmicutes | Clostridiales | Blautia       |                   |                            |
| 407 | TRUE | Bacteria    | Firmicutes | Bacilli    | Lactobacillales | Lactobacillaceae | Lactobacillus              |
| 406 | TRUE | Bacteria    | Bacteroidetes | Bacteroidia | Bacteroidales | Porphyromonadaceae | Porphyromonas                |
| 400 | TRUE | Bacteria    | Bacteroidetes | Bacteroidia | Bacteroidales | Prevotelliaceae   | Prevotella                 |
| 393 | TRUE | Bacteria    | Firmicutes | Clostridiales | Lachnospiraceae | Lachnospiraceae   | Roseburia                   |
| 391 | TRUE | Bacteria    | Firmicutes | Clostridiales | Lachnospiraceae | Lachnospiraceae   | Fusicatenibacter            |
| 388 | TRUE | Bacteria    | Firmicutes | Clostridiales | Lachnospiraceae | Lachnospiraceae   | Fusicatenibacter            |
| 384 | TRUE | Bacteria    | Firmicutes | Clostridiales | Lachnospiraceae | Lachnospiraceae   | Butyricoccus                |
| 382 | TRUE | Bacteria    | Firmicutes | Clostridiales | Clostridiales | Ruminococcaceae   | Butyricoccus                |
| 378 | TRUE | Bacteria    | Firmicutes | Clostridiales | Clostridiales | Family_XI         | Ezakiella                   |
| 376 | TRUE | Bacteria    | Synergistetes | Synergistia | Synergistales | Synergistaceae   | Cloacibacillus              |
| 374 | TRUE | Bacteria    | Firmicutes | Negativicutes | Selenomonadales | Veillonellaceae   | Megasphaera                 |
| 372 | TRUE | Bacteria    | Firmicutes | Clostridiales | Clostridiales | Lachnospiraceae   | Coprococcus_3               |
| 368 | TRUE | Bacteria    | Firmicutes | Erysipelotrichia | Erysipelotrichales | Erysipelotrichaceae | Coprobacillus               |
| 367 | TRUE | Bacteria    | Firmicutes | Clostridiales | Clostridiales | Ruminococcaceae   | Oscillospira                |
| 365 | TRUE | Bacteria    | Verrucomicrobia | Verrucomicrobialia | Verrucomicrobia | Akkermansiaceae   | Akkermansi                  |
| 360 | TRUE | Bacteria    | Actinobacteria | Actinobacteria | Corynebacteriales | Corynebacteriaceae | Corynebacterium_1           |
| 356 | TRUE | Bacteria    | Proteobacteria | Gammaproteobacteria | Pasteurellales | Pasteurellaceae   | Haemophilus                 |
| 347 | FALSE | Bacteria    | Firmicutes | Clostridiales | Clostridiales | Lachnospiraceae   | Anaerostipes                |
| 331 | FALSE | Bacteria    | Firmicutes | Erysipelotrichia | Erysipelotrichales | Erysipelotrichaceae | NA                         |
| 327 | FALSE | Archaea     | Euryarchaeota | Methanobacteria | Methanobacteriales | Methanobacteriaceae | Methanobrevibacter          |
| 326 | FALSE | Bacteria    | Firmicutes | Clostridiales | Clostridiales | Ruminococcaceae   | UBA1819                     |
| 323 | FALSE | Bacteria    | Firmicutes | Clostridiales | Clostridiales | Ruminococcaceae   | Ruminococcaceae_UCG-013     |
| 319 | FALSE | Bacteria    | Firmicutes | Clostridiales | Clostridiales | Family_XI         | Anaerococcus                |
| 318 | FALSE | Bacteria    | Firmicutes | Clostridiales | Clostridiales | Ruminococcaceae   | Ruminococcaceae_UCG-004     |
| 306 | FALSE | Bacteria    | Firmicutes | Clostridiales | Clostridiales | Ruminococcaceae   | Anaerotrunclus              |
| Rank | Reference | Kingdom | Phylum | Subphylum | Class | Order | Family | Genus |
|------|-----------|---------|--------|-----------|-------|-------|--------|-------|
| 302  | FALSE     | Bacteria| Actinobacteria | Actinobacteria | Actinomycetales | Actinomycetaceae | Varibaculum |
| 293  | FALSE     | Bacteria| Firmicutes | Clostridia | Clostridiales | Ruminococccaceae | NA |
| 275  | FALSE     | Bacteria| Actinobacteria | Actinobacteria | Actinomycetales | Actinomycetaceae | Mobiluncus |
| 263  | FALSE     | Bacteria| Firmicutes | Clostridia | Clostridiales | NA | NA |
| 252  | FALSE     | Bacteria| Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Lachnospiraceae_NK4B4_group |
| 249  | FALSE     | Bacteria| Firmicutes | Clostridia | Clostridiales | Family_XI | Peptoniphilus |
| 65   | FALSE     | Bacteria| Actinobacteria | Actinobacteria | Bifidobacteriales | Bifidobacteriaceae | NA |
| 31   | FALSE     | Bacteria| Tenericutes | Mollicutes | Anaeroplasmatales | Anaeroplasmataceae | Anaeroplasm |
| 20   | FALSE     | NA | NA | NA | NA | NA | NA |
| 19   | FALSE     | Bacteria| Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Fournierella |
| 17   | FALSE     | Bacteria| Proteobacteria | Gammaproteobacteria | Betaproteobacteriales | Burkholderiaceae | Alcaligenes |
| 16   | FALSE     | Bacteria| Bacteroidetes | Bacteroidia | Bacteroidiales | Prevotellaceae | Prevotellaceae_UCG-001 |
| 15   | FALSE     | Bacteria| Bacteroidetes | Bacteroidia | Bacteroidiales | Prevotellaceae | Prevotella_6 |
| 15   | FALSE     | Bacteria| Bacteroidetes | Bacteroidia | Bacteroidiales | NA | NA |
| 15   | FALSE     | Bacteria| Firmicutes | Bacilli | Lactobacillales | Aerococcaceae | NA |
| 14   | FALSE     | Bacteria| Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | NA |
| 14   | FALSE     | Bacteria| Proteobacteria | Delta proteobacteria | Desulfovibrionales | Desulfovibrionaceae | Bilophila |
| 14   | FALSE     | Bacteria| Firmicutes | Clostridia | Clostridiales | Peptostreptococcaceae | Peptoclostridium |
| 14   | FALSE     | Bacteria| Actinobacteria | Coriobacteria | Coriobacteriales | Eggerthellaceae | CHKCI002 |
| 14   | FALSE     | Bacteria| Proteobacteria | Gammaproteobacteria | Betaproteobacteriales | Burkholderiaceae | Paenalcaligenes |
| 14   | FALSE     | Bacteria| Bacteroidetes | Bacteroidia | Bacteroidiales | env.OPS_17 | NA |
| 14   | FALSE     | Bacteria| Proteobacteria | Gammaproteobacteria | Enterobacteriales | Enterobacteriaceae | Pseudocitrobacter |
| 14   | FALSE     | Bacteria| Firmicutes | Bacilli | Lactobacillales | Leuconostocaceae | Leuconostoc |
| 14   | FALSE     | Bacteria| Actinobacteria | Actinobacteria | Propionibacteriales | Nocardoidiaceae | Nocardoides |
| 14   | FALSE     | Bacteria| Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Ruminiclostridium |
| 14   | FALSE     | Bacteria| Proteobacteria | Gammaproteobacteria | Betaproteobacteriales | Burkholderiaceae | Pelomonas |
| 14   | FALSE     | Bacteria| Proteobacteria | Gammaproteobacteria | Pseudomonadales | Moraxellaceae | Enhydrobacter |
| 14   | FALSE     | Bacteria| Firmicutes | Erysipelotrichia | Erysipelotrichiales | Erysipelotrichaceae | Erysipelothrix |
| 14   | FALSE     | Bacteria| Dependencia | Babelia | Babeliales | Vermiphilaceae | NA |
| 14   | FALSE     | Bacteria| Actinobacteria | Actinobacteria | Micrococcales | Intrasporangiaceae | Ornithinimicrobium |
| 14   | FALSE     | Bacteria| Firmicutes | Bacilli | Lactobacillales | Enterococcaceae | Melissococcus |
| 14   | FALSE     | Bacteria| Proteobacteria | Gammaproteobacteria | Betaproteobacteriales | Methylophilaceae | Methylobacillus |
| 14   | FALSE     | Bacteria| Actinobacteria | Actinobacteria | Corynebacteriales | Nocardiaeae | Rhodococcus |
| 14   | FALSE     | Bacteria| Firmicutes | Clostridia | Clostridiales | Eubacteriaceae | Anaerofustis |
| 14   | FALSE     | Bacteria| Bacteroidetes | Bacteroidia | Bacteroidales | Tannereilaceae | NA |
| 13   | FALSE     | Bacteria| Bacteroidetes | Bacteroidia | Bacteroidales | Rikenellaceae | Alistipes |
| 13   | FALSE     | Bacteria| Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Selliomonas |
| 13   | FALSE     | Bacteria| Bacteroidetes | Bacteroidia | Flavobacteriales | Crocinitomicaceae | NA |
| 13   | FALSE     | Bacteria| Proteobacteria | Gammaproteobacteria | Enterobacteriales | Enterobacteriaceae | Yersinia |
| 13   | FALSE     | Bacteria| Actinobacteria | Actinobacteria | Streptosporangiaceae | Nocardiopsaceae | Nocardiopsis |
| 13   | FALSE     | Bacteria| Proteobacteria | Gammaproteobacteria | Enterobacteriales | Enterobacteriaceae | Hafnia-Obesumbacterium |
| FALSE | Bacteria | Firmicutes | Actinobacteria | Actinobacteria | Clostridia | Clostridiales | Micrococcales | Micrococcaceae | Glutamicibacter |
|-------|---------|-----------|----------------|----------------|------------|---------------|---------------|---------------|----------------|
| FALSE | Bacteria | Proteobacteria | Gammaproteobacteria | Betaproteobacteriales | Burkholderiaceae | Xylophilus |
| FALSE | Bacteria | Actinobacteria | Micrococcales | Microbacteriaceae | Pseudoclavibacter |
| FALSE | Bacteria | Bacteroidetes | Bacteroidia | Betacardiales | Prevotellaceae | Prevotellaceae_Ga6A1_group |
| FALSE | Bacteria | Proteobacteria | Alphaproteobacteria | Rhizobiales | Xanthobacteriaceae | Bradyrhizobium |
| FALSE | Bacteria | Actinobacteria | Actinobacteria | Micrococcales | Microbacteriaceae | Leucobercter |
| FALSE | Bacteria | Actinobacteria | Actinobacteria | NA | NA | NA |
| FALSE | Bacteria | Actinobacteria | Micrococcales | Micrococcaceae | Paenarthrobacter |
| FALSE | Bacteria | Betaproteobacteria | Bacillales | Enterococcaceae | NA |
| FALSE | Bacteria | Firmicutes | Bacilli | Lactobacillales | Enterococcaceae | NA |
| FALSE | Bacteria | Firmicutes | Bacilli | Bacillales | Family_X | Thermicanus |
| FALSE | Bacteria | Firmicutes | Bacilli | Lactobacillales | Enterococcaceae | NA |
| FALSE | Bacteria | Firmicutes | Bacilli | Bacillales | Family_X | Thermicanus |
| FALSE | Bacteria | Epsilonbacteraeota | Campylobacteriaceae | Family_X | NA | NA |
| FALSE | Bacteria | Firmicutes | Bacilli | Bacillales | Family_X | Thermicanus |
| FALSE | Bacteria | Proteobacteria | Gammaproteobacteria | Betaproteobacteriales | Burkholderiaceae | Comamonas |
| FALSE | Bacteria | Firmicutes | Bacilli | Bacillales | Family_X | Thermicanus |
| FALSE | Bacteria | Proteobacteria | Alphaproteobacteria | Paracardibacteriales | Paracardibacteriaceae | Candidatus_Odyssella |
| FALSE | Bacteria | Actinobacteria | Actinobacteria | Corynebacteriaceae | Sphingobacteriaceae | Lawsonella |
| FALSE | Bacteria | Actinobacteria | Actinobacteria | Corynebacteriaceae | Sphingobacteriaceae | NA |
| FALSE | Bacteria | Firmicutes | Bacilli | Bacillales | Family_X | Thermicanus |
| FALSE | Bacteria | Firmicutes | Bacilli | Bacillales | Family_X | Thermicanus |
| FALSE | Bacteria | Firmicutes | Bacilli | Bacillales | Family_X | Thermicanus |
| FALSE | Bacteria | Firmicutes | Clostridiales | Clostridiales | Ruminococcaceae | Phocea |
| FALSE | Bacteria | Firmicutes | Clostridiales | Clostridiales | Family_XIII | Family_XIII_UCG-001 |
| FALSE | Bacteria | Firmicutes | Clostridiales | Clostridiales | Lachnospiraceae | Morayella |
| FALSE | Bacteria | Firmicutes | Clostridiales | Lachnospiraceae | Moryella |
| FALSE | Bacteria | Firmicutes | Negativicutes | Selenomonadales | Veillonellaceae | Mitsuokella |
| FALSE | Bacteria | Fusobacteria | Fusobacteriaceae | Fusobacteriaceae | Fusobacteriaceae | Cetobacterium |
| FALSE | Bacteria | Proteobacteria | Deltaeaproteobacteria | Bdelloibionales | Bdelloibionaceae | Bdelloibio |
| 12 | FALSE | Bacteria | Proteobacteria | Alphaproteobacteria | Rhizobiales | Rhizobiaceae | Allorhizobium-Neorhizobium-Pararhizobium-Rhizobium |
| 12 | FALSE | Bacteria | Proteobacteria | Deltaproteobacteria | Bdellovibrionales | Bacteriovoracaceae | Paredobacter |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Ruminococcaceae_UCG-008 |
| 12 | FALSE | Bacteria | Bacteroidetes | Bacteroidia | Bacteroidales | Prevotellaceae | Prevotellaceae_UCG-003 |
| 12 | FALSE | Bacteria | Actinobacteria | Actinobacteria | Actinomycetaceae | Actinomycetaceae | Actinotignum |
| 12 | FALSE | Bacteria | Proteobacteria | Alphaproteobacteria | Rhizobiales | Rhizobiaceae | Ochrobactrum |
| 12 | FALSE | Bacteria | Firmicutes | Bacilli | Lactobacillales | Aerococcaceae | Facklamia |
| 12 | FALSE | Bacteria | Proteobacteria | Gammaproteobacteria | Salinisphaerales | Solimonadaceae | Nevsikia |
| 12 | FALSE | Bacteria | Proteobacteria | Gammaproteobacteria | Betaproteobacteriales | Burkholderiaceae | Simplicispira |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Peptostreptococcaceae | Peptostreptococcus |
| 12 | FALSE | Bacteria | Actinobacteria | Coriobacteria | Coriobacteriales | Eggerthellaceae | Enterorhabdus |
| 12 | FALSE | Bacteria | Bacteroidetes | Bacteroidia | Bacteroidales | Rikenellaceae | Rikenella |
| 12 | FALSE | Bacteria | Proteobacteria | Alphaproteobacteria | Caulobacterales | Caulobacteraceae | NA |
| 12 | FALSE | Bacteria | Tenericutes | Mollicutes | NA | NA | NA |
| 12 | FALSE | Bacteria | Lentisphaerae | Oligosphaera | Oligosphaerales | Oligosphaeraceae | Z20 |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Herbinix |
| 12 | FALSE | Bacteria | Bacteroidetes | Bacteroidia | Flavobacteriales | Weeksellaceae | Elizabethkingia |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Family_XI | Helcococcus |
| 12 | FALSE | Bacteria | Actinobacteria | Actinobacteria | Actinomycetaceae | Actinomycetaceae | NA |
| 12 | FALSE | Bacteria | Proteobacteria | Gammaproteobacteria | Betaproteobacteriales | Rhodocyclaceae | Methylloversatilis |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Helic-bacteriaceae | Hydrogenispora |
| 12 | FALSE | Bacteria | Cyanobacteria | Oxyphotobacteria | Chloroplast | NA | NA |
| 12 | FALSE | Bacteria | Proteobacteria | Gammaproteobacteria | Betaproteobacteriales | Burkholderiaceae | Verticia |
| 12 | FALSE | Bacteria | Spirochaetes | Brachyspirae | Brachyspirales | Brachyspiraceae | Brachyspira |
| 12 | FALSE | Bacteria | Firmicutes | Negativicutes | Selenomonadales | Veillonellaceae | Anaerovibrio |
| 12 | FALSE | Bacteria | Proteobacteria | Gammaproteobacteria | Betaproteobacteriales | Burkholderiaceae | Bordetella |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Robinsoniella |
| 12 | FALSE | Bacteria | Actinobacteria | Actinobacteria | Micrococcales | Micrococcaceae | NA |
| 12 | FALSE | Bacteria | Actinobacteria | Actinobacteria | Actinomycetaceae | Actinomycetaceae | Arcanobacterium |
| 12 | FALSE | Bacteria | Proteobacteria | Alphaproteobacteria | Rhizobiales | Rhizobiaceae | Brucella |
| 12 | FALSE | Bacteria | Actinobacteria | Actinobacteria | Micrococcaceae | Micrococcaceae | Nesterenkonia |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | GCA-900066755 |
| 12 | FALSE | Bacteria | Proteobacteria | Gammaproteobacteria | JTB23 | NA | NA |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Family_XIII | Anaerovorax |
| 12 | FALSE | Bacteria | Bacteroidetes | Bacteroidia | Cytophagales | Spirosomaceae | Dyadobacter |
| 12 | FALSE | Bacteria | Bacteroidetes | Rhodothermia | Rhodothermales | Rhodothermales | NA |
| 12 | FALSE | Bacteria | Actinobacteria | Actinobacteria | Micrococcaceae | Microbacteriaceae | Amnibacterium |
| 12 | FALSE | Bacteria | Firmicutes | Bacilli | Lactobacillales | Carnobacteriaceae | Granulicatellia |
| 12 | FALSE | Bacteria | Firmicutes | Bacilli | Lactobacillales | NA | NA |
| 12 | FALSE | Bacteria | Actinobacteria | Actinobacteria | Actinomycetaceae | Actinomycetaceae | Trueperella |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Peptostreptococcaceae | Clostridium | NA | Firmicutes | Clostridia | Clostridiales | Peptostreptococcaceae | Clostridium | NA |
|----|--------|-----------|------------|------------|---------------|---------------------|-------------|----|------------|------------|---------------|---------------------|-------------|----|
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Culectobacteriaceae | NA | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Culectobacteriaceae | NA |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Peptostreptococcaceae | Clostridium | NA | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Culectobacteriaceae | NA |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Peptostreptococcaceae | Clostridium | NA | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Culectobacteriaceae | NA |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Peptostreptococcaceae | Clostridium | NA | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Culectobacteriaceae | NA |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Peptostreptococcaceae | Clostridium | NA | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Culectobacteriaceae | NA |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Peptostreptococcaceae | Clostridium | NA | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Culectobacteriaceae | NA |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Peptostreptococcaceae | Clostridium | NA | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Culectobacteriaceae | NA |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Peptostreptococcaceae | Clostridium | NA | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Culectobacteriaceae | NA |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Peptostreptococcaceae | Clostridium | NA | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Culectobacteriaceae | NA |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Peptostreptococcaceae | Clostridium | NA | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Culectobacteriaceae | NA |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Peptostreptococcaceae | Clostridium | NA | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Culectobacteriaceae | NA |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Peptostreptococcaceae | Clostridium | NA | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Culectobacteriaceae | NA |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Peptostreptococcaceae | Clostridium | NA | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Culectobacteriaceae | NA |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Peptostreptococcaceae | Clostridium | NA | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Culectobacteriaceae | NA |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Peptostreptococcaceae | Clostridium | NA | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Culectobacteriaceae | NA |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Peptostreptococcaceae | Clostridium | NA | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Culectobacteriaceae | NA |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Peptostreptococcaceae | Clostridium | NA | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Culectobacteriaceae | NA |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Peptostreptococcaceae | Clostridium | NA | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Culectobacteriaceae | NA |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Peptostreptococcaceae | Clostridium | NA | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Culectobacteriaceae | NA |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Peptostreptococcaceae | Clostridium | NA | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Culectobacteriaceae | NA |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Peptostreptococcaceae | Clostridium | NA | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Culectobacteriaceae | NA |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Peptostreptococcaceae | Clostridium | NA | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Culectobacteriaceae | NA |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Peptostreptococcaceae | Clostridium | NA | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Culectobacteriaceae | NA |
| 12 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Peptostreptococcaceae | Clostridium | NA | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Culectobacteriaceae | NA |
| FALSE | Bacteria | Firmicutes | Bacillli | NA | NA | NA |
|-------|----------|------------|----------|----|----|----|
| FALSE | Bacteria | Bacteroidetes | NA | NA | NA | NA |
| FALSE | Bacteria | Proteobacteria | Gammaproteobacteria | Xanthomonadales | Rhodanobacteraceae | Rhodanobacter |
| FALSE | Bacteria | Bacteroidetes | Bacteroidia | Flavobacteriales | Weeksellaceae | Moheibacter |
| FALSE | Bacteria | Proteobacteria | Alphaproteobacteria | Rhizobiales | NA | NA |
| FALSE | Bacteria | Firmicutes | Negativicutes | Selenomonadales | Veillonellaceae | Selenomonas_4 |
| FALSE | Bacteria | Proteobacteria | Alphaproteobacteria | NA | NA | NA |
| FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Defluvitaileaceae | NA |
| FALSE | Bacteria | Bacteroidetes | Bacteroidia | Flavobacteriales | Flavobacteriaceae | NA |
| FALSE | Bacteria | Proteobacteria | Delta proteobacteria | Mycococcales | mle1-27 | NA |
| FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Syntrophomonadaceae | NA |
| FALSE | Bacteria | Actinobacteria | Actinobacteria | Actinomycetales | Actinomycetaceae | Actinobaculum |
| FALSE | Bacteria | Bacteroidetes | Bacteroidia | Cytophagales | Spirosomaceae | Rhabdobacter |
| FALSE | Bacteria | Actinobacteria | NA | NA | NA | NA |
| FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Pseudoflavonifractor |
| FALSE | Bacteria | Patescibacteria | Saccharimonada | Saccharimonadales | NA | NA |
| FALSE | Archea | Euryarchaeota | Methanobacteria | Methanobacteriales | Methanobacteriaceae | NA |
| FALSE | Bacteria | Firmicutes | Erysipelotrichia | Erysipelotrichales | Erysipelotrichaceae | Asterolesplasma |
| FALSE | Bacteria | Proteobacteria | Alphaproteobacteria | Rhizobiales | Rhizobiaceae | Mesorhizobium |
| FALSE | Bacteria | Proteobacteria | Alphaproteobacteria | Rickettsiales | Mitochondria | NA |
| FALSE | Bacteria | Proteobacteria | Gammaproteobacteria | Betaproteobacteriales | Rhodocyclaceae | Dechloromonas |
| FALSE | Bacteria | Bacteroidetes | Bacteroidia | Chitinophagales | Chitinophagaceae | Flavihumibacter |
| FALSE | Bacteria | Verrucomicrobia | Verrucomicrobiae | NA | NA | NA |
| FALSE | Bacteria | Proteobacteria | Gammaproteobacteria | Enterobacteriales | Enterobacteraeae | Providencia |
| FALSE | Bacteria | Proteobacteria | Gammaproteobacteria | Aeromonadales | Aeromonadaceae | Aeromonas |
| FALSE | Bacteria | Proteobacteria | Gammaproteobacteria | Betaproteobacteriales | Burkholderiaceae | Achromobacter |
| FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Family XIII | S5-A14a |
| FALSE | Bacteria | Epsilonbacteraeota | Campylobacteria | Campylobacteri | Arcobacteraceae | Arcobacter |
| FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | UC5-1-2E3 |
| FALSE | Bacteria | Actinobacteria | Actinobacteria | Micrococcales | Micrococcaceae | Pseudoglutamicibacter |
| FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Shuttleworthia |
| FALSE | Bacteria | Proteobacteria | Alphaproteobacteria | Sphingomonadales | Sphingomonadaceae | Sphingopyxis |
| FALSE | Bacteria | Actinobacteria | Actinobacteria | Streptomycteales | Streptomycetaceae | Streptomycetes |
| FALSE | Bacteria | Synergistetes | Synergistia | Synergistales | Synergistaceae | Synergistes |
| FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Anaerosporobacter |
| FALSE | Bacteria | Proteobacteria | Gammaproteobacteria | Betaproteobacteriales | Burkholderiaceae | Massilia |
| FALSE | Bacteria | Proteobacteria | Alphaproteobacteria | Rhizobiales | Rhizobiaceae | Pseudochrobactrum |
| FALSE | Bacteria | Bacteroidetes | Bacteroidia | Sphingobacteriales | Sphingobacteriaceae | Nubsella |
| FALSE | Bacteria | Firmicutes | Bacilli | Lactobacillales | Leuconostocaceae | Weissella |
| FALSE | Bacteria | Actinobacteria | Actinobacteria | Bifidobacteriales | Bifidobacteriaceae | Gardnerella |
| FALSE | Bacteria | Proteobacteria | Alphaproteobacteria | Caulobacteriales | Caulobacteriaceae | Caulobacter |
| Rank | Group | Phylum | Class | Order | Family | Genus |
|------|-------|--------|-------|-------|--------|-------|
| 11   | FALSE | Bacteria | Actinobacteria | Coriobacteriales | Lachnospiraceae | Lachnospiraceae_UCG-003 |
| 11   | FALSE | Bacteria | Actinobacteria | Coriobacteriales | Peptococcaceae | Lachnospiraceae_UCG-003 |
| 11   | FALSE | Bacteria | Actinobacteria | Coriobacteriales | Ruminococcaceae | Lachnospiraceae_UCG-003 |
| 11   | FALSE | Bacteria | Actinobacteria | Coriobacteriales | Defluviitaleaceae | Defluviitaleaceae_UCG-003 |
| 11   | FALSE | Bacteria | Actinobacteria | Coriobacteriales | Micrococccaceae | Rothia |
| 11   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Clostridiales | Clostridiales |
| 11   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Ruminococcaceae | Ruminococcaceae_UCG-003 |
| 11   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Burkholderiaceae | Cupriavidus |
| 11   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Microbacteriaceae | NA |
| 10   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Clostridiales | Clostridiales |
| 10   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Peptococcaceae | Lachnospiraceae |
| 10   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Micrococccaceae | Capriociproducs |
| 10   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Succinivibrionaceae | Succinivibrio |
| 10   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Succinivibrionaceae | NA |
| 10   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Clostridiales | Clostridiales |
| 10   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Clostridiales | Lachnospiraceae |
| 10   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Bacillales | Bacillales |
| 10   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Bacillales | Lysinibacillus |
| 10   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Leptotrichiaceae | NA |
| 10   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Synergistaceae | Synergistaceae |
| 10   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Synergistaceae | NA |
| 10   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Atopobiaceae | Olsenella |
| 10   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Rikenellaceae | Millionella |
| 10   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Clostridiales | Clostridiales |
| 10   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Clostridiales_1 | Sarcina |
| 10   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Victivillales | NA |
| 10   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Synergistaceae | Pyramidobacter |
| 10   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Synergistaceae | Jonquetella |
| 10   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Atopobiaceae | Olsenella |
| 10   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Bacillales | Family_XI |
| 10   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Bacillales | Gemella |
| 10   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Elusimicrobiaceae | Elusimicrobiaceae |
| 10   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Elusimicrobiaceae | Elusimicrobiaceum |
| 10   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Rhodobacteraceae | Paracoccus |
| 10   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Selenomonadales | Acidaminococcaceae |
| 10   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Selenomonadales | NA |
| 10   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Enterobacteriaceae | Cosenzaea |
| 10   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Corynebacteriales | NA |
| 10   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | NA | NA |
| 10   | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Rhodobacteraceae | NA |
| 9    | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Bacillales | Lactobacillales |
| 9    | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Bacillales | Streptococcaceae |
| 9    | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Bacteroidales | Bacteroides |
| 9    | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Bacteroidales | Prevotellaceae |
| 9    | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Bacteroidales | Alloprevotella |
| 9    | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Clostridiales | Lachnospiraceae |
| 9    | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Barnesiellaceae | Coprobacter |
| 9    | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Clostridiales | Family_XI |
| 9    | FALSE | Bacteria | Bacteroidetes | Bacteroidales | Clostridiales | Murdochiella |
| Bacteria | Proteobacteria | Gammaproteobacteria | Betaproteobacteria | Burkholderiaceae | Ottowia |
|----------|----------------|---------------------|--------------------|-----------------|--------|
| Bacteria | Firmicutes     | Erysipelotrichia    | Erysipelotrichales | Erysipelotrichaceae | Merdibacter |
| Bacteria | Firmicutes     | Clostridia          | DTU014             | NA              | NA     |
| Bacteria | Firmicutes     | Clostridia          | Clostridiales      | Ruminococcaceae  | Anaerofilum |
| Archaea | Euryarchaeota  | Methanobacteria     | Methanobacteriales | Methanobacteriaceae | Methanosphaera |
| Bacteria | Bacteroidetes  | Bacteroidia         | Bacteroidales      | Rikenellaceae    | NA     |
| Bacteria | Actinobacteria | Actinobacteria      | Corynebacteriales  | Corynebacterium  |        |
| Bacteria | Firmicutes     | Clostridia          | Clostridiales      | Ruminococcaceae  | Ruminococcaceae_UCG-005 |
| Bacteria | Firmicutes     | Gammaproteobacteria | Betaproteobacteria | Burkholderiaceae | Variovorax |
| Bacteria | Firmicutes     | Gammaproteobacteria | Betaproteobacteria | Burkholderiaceae | Oligella |
| Bacteria | Proteobacteria | Gammaproteobacteria | Xanthomonadales    | Xanthomonadaceae | NA     |
| Bacteria | Bacteroidetes  | Bacteroidia         | Bacteroidales      | Muribaculaceae   | CAG-873 |
| Bacteria | Proteobacteria | Alphaproteobacteria | Rhizobiales        | Rhizobiaceae     | NA     |
| Bacteria | Firmicutes     | Bacilli             | Bacillales         | Paenibacillaceae | Bre vibacillus |
| Bacteria | Firmicutes     | Clostridia          | Clostridiales      | Christensenellaceae | NA     |
| Bacteria | Firmicutes     | Bacilli             | Bacillales         | Planococcaceae   | Rummel ibacillus |
| Bacteria | Firmicutes     | Clostridia          | Clostridiales      | Clostridaceae_UCG | Clostridium_sensu_stricto_13 |
| Bacteria | Firmicutes     | Clostridia          | Clostridiales      | Lachnospiraceae  | Cellulosylicum |
| Bacteria | Firmicutes     | Gammaproteobacteria | Betaproteobacteria | Burkholderiaceae | Oxalobacter |
| Bacteria | Firmicutes     | Clostridia          | Clostridiales      | Christensenellaceae | NA     |
| Bacteria | Firmicutes     | Bacilli             | Bacillales         | Planococcaceae   | Rummel ibacillus |
| Bacteria | Firmicutes     | Erysipelotrichia    | Erysipelotrichales | Erysipelotrichaceae | Faecal icoccus |
| Bacteria | Firmicutes     | Clostridia          | Clostridiales      | Ruminococcaceae  | Ruminococcaceae_UCG-009 |
| Bacteria | Firmicutes     | Clostridia          | Clostridiales      | Lachnospiraceae  | Orbacterium |
| Bacteria | Firmicutes     | Bacilli             | Bacillales         | Staphylococcaceae | Nosomomicoccus |
| Bacteria | Actinobacteria | Coriobacteria       | Coriobacteriales   | NA              | NA     |
| Bacteria | Actinobacteria | Coriobacteria       | Coriobacteriales   | NA              | NA     |
| Bacteria | Lentsphaerace  | Lentsphaerace       | Victivallaceae     | Victivallaceae   | NA     |
| Bacteria | Firmicutes     | Erysipelotrichia    | Erysipelotrichales | Erysipelotrichaceae | Allobaculum |
| Bacteria | Firmicutes     | Clostridia          | Clostridiales      | Clostridaceae_1  | NA     |
| Bacteria | Firmicutes     | Clostridia          | Clostridiales      | Lachnospiraceae  | Dorea   |
| Bacteria | Firmicutes     | Bacteroidia         | Bacteroidales      | Prevotellaceae   | Prevotellaceae_NK3B31_group |
| Bacteria | Firmicutes     | Gammaproteobacteria | Desulfovibrionales | Desulfovibronaceae | Desulfovibrio |
| Bacteria | Firmicutes     | Erysipelotrichia    | Erysipelotrichales | Erysipelotrichaceae | Erysipelotrichaceae_UCG-004 |
| Bacteria | Firmicutes     | Erysipelotrichia    | Erysipelotrichales | Erysipelotrichaceae | Candidatus_Stoquefichus |
| Bacteria | Firmicutes     | Erysipelotrichia    | Erysipelotrichales | Erysipelotrichaceae | Holdemania |
| Bacteria | Firmicutes     | Gammaproteobacteria | Betaproteobacteria | Burkholderiaceae | Acidovorax |
| Bacteria | Firmicutes     | Clostridia          | Clostridiales      | Lachnospiraceae  | GCA-900066575 |
| Bacteria | Firmicutes     | Clostridia          | Clostridiales      | Family_XI        | W5053   |
| Bacteria | Firmicutes     | Negativicutes       | Selenomonadales    | Veillonellaceae  | Negativicoccus |
| Bacteria | Firmicutes     | Negativicutes       | Selenomonadales    | Veillonellaceae  | Anaeroglobus |
| Rank | Domain   | phylum       | class        | order                  | family                       | genus            |
|------|----------|--------------|--------------|------------------------|------------------------------|------------------|
| 7    | FALSE   | Bacteria     | Firmicutes   | Clostridia             | Clostridales                 | Peptostreptococcaceae | NA               |
| 6    | FALSE   | Bacteria     | Firmicutes   | Clostridia             | Clostridales                 | Lachnospiraceae   | Lachnoolositroidium |
| 6    | FALSE   | Bacteria     | Firmicutes   | Clostridia             | Clostridales                 | Peptostreptococcaceae | NA               |
| 6    | FALSE   | Bacteria     | Firmicutes   | Clostridia             | Clostridales                 | Ruminococcaceae   | Fastidiosipila     |
| 6    | FALSE   | Bacteria     | Firmicutes   | Clostridia             | Clostridales                 | Family XI         | Gallicola          |
| 6    | FALSE   | Archaea      | Euryarchaeota| Thermoplasmata         | Methanomassiliicoccales      | Methanomassiliicoccales | Methanomassiliicoccus |
| 5    | FALSE   | Bacteria     | Firmicutes   | Clostridia             | Clostridales                 | Lachnospiraceae   | Lachnoolositroidium |
| 5    | FALSE   | Bacteria     | Firmicutes   | Clostridia             | Clostridales                 | Peptostreptococcaceae | Terrisporobacter   |
| 5    | FALSE   | Bacteria     | Firmicutes   | Clostridia             | Clostridales                 | Ruminococcaceae   | Ruminococcaceae_UCG-010 |
| 5    | FALSE   | Bacteria     | Firmicutes   | Clostridia             | Clostridales                 | GCA-900066225     |                  |
| 5    | FALSE   | Bacteria     | Firmicutes   | Clostridia             | Clostridales                 | Pseudoxanthomonas  |                  |
| 5    | FALSE   | Bacteria     | Firmicutes   | Clostridia             | Clostridales                 | Lachnospiraceae   | Marvinbryantia     |
| 5    | FALSE   | Bacteria     | Firmicutes   | Clostridia             | Clostridales                 | Streptococcaceae  | Lactococcus       |
| 5    | FALSE   | Bacteria     | Firmicutes   | Clostridia             | Clostridales                 | Eggerthellaceae   | NA               |
| 5    | FALSE   | Bacteria     | Actinobacteria| Coriobacteriia        | Coriobacteriales             | Ruminococcaceae   | Angelakisella      |
| 5    | FALSE   | Bacteria     | Firmicutes   | Clostridia             | Clostridales                 | Peptococcaceae    | Peptococcus       |
| 5    | FALSE   | Bacteria     | Firmicutes   | Clostridia             | Clostridales                 | Lactobacillales   | NA               |
| 5    | FALSE   | Archaea      | Euryarchaeota| Thermoplasmata         | Methanomassiliicoccales      | Methanomethyphiliaceae | NA               |
| 5    | FALSE   | Bacteria     | Actinobacteria| Actinobacteria        | Micrococcales                | Brevibacteriaceae | Brevibacterium    |
| 5    | FALSE   | Bacteria     | Actinobacteria| Actinomycetales       | Actinomycetaceae             | Actinomycetes     |                  |
| 5    | FALSE   | Bacteria     | Firmicutes   | Clostridia             | Clostridales                 | Eubacteriaceae    | Eubacterium       |
| 5    | FALSE   | Bacteria     | Actinobacteria| Coriobacteriia        | Coriobacteriales             | Atopobacteriaceae | Atopobium         |
| 5    | FALSE   | Bacteria     | Actinobacteria| Coriobacteriia        | Coriobacteriales             | Eggerthellaceae   | Slackia           |
| 4    | FALSE   | Bacteria     | Firmicutes   | Clostridia             | Clostridales                 | Ruminococcaceae   | Oscillbacter      |
| 4    | FALSE   | Bacteria     | Firmicutes   | Clostridia             | Clostridales                 | Clostridium_sensu_stricto_1 |                  |
| 4    | FALSE   | Bacteria     | Firmicutes   | Clostridia             | Clostridales                 | Family XI         | Finegoldia        |
| 4    | FALSE   | Bacteria     | Firmicutes   | Clostridia             | Clostridales                 | Family XIII       | Family_XIII_AD3011_group |
| 4    | FALSE   | Bacteria     | Firmicutes   | Clostridia             | Clostridales                 | Lachnospiraceae   | CAG-56            |
| 4    | FALSE   | Bacteria     | Firmicutes   | Erysipelotrichia       | Erysipelotrichales           | Erysipelotrichaceae | Dielma            |
| 4 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Ruminiclostridium_1 |
|---|-------|----------|------------|------------|---------------|-----------------|-------------------|
| 4 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Family_XIII | NA |
| 4 | FALSE | Bacteria | Bacteroidetes | Bacteroidia | Clostridiales | Family_XIII | NA |
| 4 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Hydrogenoanaerobacterium |
| 4 | FALSE | Bacteria | Actinobacteria | Coriobacteria | Coriobacteriales | Ruminococcaceae | NA |
| 4 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | NA |
| 4 | FALSE | Bacteria | Firmicutes | Bacilli | Bacillales | Staphylococcaceae | Staphylococcus |
| 4 | FALSE | Bacteria | Proteobacteria | Gammaproteobacteria | Pseudomonadales | Pseudomonadaceae | NA |
| 3 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Enterobacteriales | Enterobacteriaceae | Proteus |
| 3 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Acidaminococcaceae | Acidaminococcus |
| 3 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Christensenellaceae | Christensenellaceae_R-7_group |
| 3 | FALSE | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Ruminococcaceae_UCG-003 |
| 3 | FALSE | Bacteria | Clostridiales | Peptostreptococcaceae | Intestinibacter |
| 3 | FALSE | Bacteria | Clostridiales | Ruminococcaceae | CAG-352 |
| 3 | FALSE | Bacteria | Clostridiales | Prevotellaceae | Prevotella_7 |
| 3 | FALSE | Bacteria | Clostridiales | Rikenellaceae | Rikenellaceae_RC9_gut_group |
| 3 | FALSE | Bacteria | Clostridiales | Erysipelotrichaceae | Erysipelotrichaceae | Catenibacterium |
| 3 | FALSE | Bacteria | Clostridiales | Lachnospiraceae | Coprococcus_2 |
| 3 | FALSE | Bacteria | Erysipelotrichaceae | Erysipelotrichaceae | Erysipelotrichaceae | Faecalitalea |
| 3 | FALSE | Bacteria | Clostridiales | Marinilaceae | Butyrivibrionales |
| 3 | FALSE | Bacteria | Clostridiales | Acidaminococcaceae | Phascolarctobacterium |
| 3 | FALSE | Bacteria | Clostridiales | Prevotellaceae | Ruminococcaceae_UCG |
| 3 | FALSE | Bacteria | Clostridiales | Christensenellaceae | Catenibacterium |
| 3 | FALSE | Bacteria | Clostridiales | Acidaminococcaceae | Phascolarctobacterium |
| 3 | FALSE | Bacteria | Clostridiales | Peptostreptococcaceae | Ruminoclostridium_5 |
| 3 | FALSE | Bacteria | Clostridiales | Erysipelotrichaceae | Erysipelotrichaceae | Turicibacter |
| 3 | FALSE | Bacteria | Clostridiales | Xanthomonadales | Xanthomonadaceae | Stenotrophomonas |
| Rank | Kingdom   | Phylum   | Class     | Order     | Family         | Genus         |
|------|-----------|----------|-----------|-----------|----------------|---------------|
| 1    | Bacteria  | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Ruminococcus_UGC-001 |
| 2    | Bacteria  | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | DTU089        |
| 1    | Bacteria  | Firmicutes | Clostridia | Clostridiales | Veillonellaceae | Dialister     |
| 1    | Bacteria  | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Ruminococcaceae_UGC-002 |
| 1    | Bacteria  | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Butyribrio    |
| 1    | Bacteria  | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Lachnospiraceae_NK4A136_group |
| 1    | Bacteria  | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Eisenbergiella |
| 1    | Bacteria  | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Holdemanella  |
| 1    | Bacteria  | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Collinsella   |
| 1    | Bacteria  | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Fusobacterium |
| 1    | Bacteria  | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Coprococcus_1 |
| 1    | Bacteria  | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Tyzzerella_4  |
| 1    | Bacteria  | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Klebsiella    |
| 1    | Bacteria  | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Ruminicolstridium_6 |
| 1    | Bacteria  | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Ruminococcus_1 |
| 1    | Bacteria  | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Erysipelotrichaceae_UCG-003 |
| 1    | Bacteria  | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Flavonifractor |
| 1    | Bacteria  | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Streptococcus |
| 1    | Bacteria  | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Tyzzerella    |
| 1    | Bacteria  | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Delftia       |
| 1    | Bacteria  | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Sutterella    |
| 1    | Bacteria  | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Barnesiella   |
| 1    | Bacteria  | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Ruminicolstridium_9 |
| 1    | Bacteria  | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Ruminococcaceae_UCG-014 |
| 1    | Bacteria  | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Paraprevotella |
| 1    | Bacteria  | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Negativibacillus |
| Rank | Taxonomy      | Phylum         | Class         | Order           | Family          | Genus       |
|------|---------------|----------------|---------------|-----------------|-----------------|-------------|
| 0    | Bacteria      | Tenericutes    | Mollicutes    | Mollicutes_RF39 | NA              | NA          |
| 0    | Bacteria      | Firmicutes     | Bacilli       | Lactobacillales | Enterococcaceae | Enterococcus|
| 0    | Bacteria      | Bacteroidetes  | Bacteroidia   | Bacteroidales   | Muribaculaceae  | NA          |
| 0    | Bacteria      | Firmicutes     | Clostridia    | Clostridiales   | Lachnospiraceae | Lachnospiraceae_UCG-010 |
Supplementary Table 3. MWAS of dataset 2 conducted using ANCOM

Sample size for ANCOM included subset of samples that had complete data on all covariates tested: N= 306 cases and 177 controls in dataset 2.

W= ANCOM score indicating the number of times a genus achieved FDR<0.05 as compared to other genera (maximum W possible: 444 in dataset 1, 560 in dataset 2).

0.8= Threshold at which results were considered significant (TRUE).

| W   | 0.8 | Kingdom     | Phylum     | Class        | Order         | Family             | Genus               |
|-----|-----|-------------|------------|--------------|---------------|--------------------|---------------------|
| 553 | TRUE| Bacteria    | Actinobacteria | Actinobacteria | Bifidobacteriales | Bifidobacteriaceae | Bifidobacterium     |
| 545 | TRUE| Bacteria    | Firmicutes  | Clostridia   | Clostridiales  | Lachnospiraceae   | Agathobacter        |
| 544 | TRUE| Bacteria    | Firmicutes  | Clostridia   | Clostridiales  | Lachnospiraceae   | Lachnospiraceae_UCG-004 |
| 541 | TRUE| Bacteria    | Firmicutes  | Clostridia   | Clostridiales  | Lachnospiraceae   | Roseburia           |
| 541 | TRUE| Bacteria    | Firmicutes  | Clostridia   | Clostridiales  | Ruminococcaceae   | Ruminococcaceae_UCG-001 |
| 538 | TRUE| Bacteria    | Firmicutes  | Clostridia   | Clostridiales  | Lachnospiraceae   | Lachnospiraceae_ND3007_group |
| 536 | TRUE| Bacteria    | Firmicutes  | Clostridia   | Clostridiales  | Lachnospiraceae   | Anaerostipes        |
| 535 | TRUE| Bacteria    | Firmicutes  | Clostridia   | Clostridiales  | Ruminococcaceae   | Faecalibacterium    |
| 533 | TRUE| Bacteria    | Firmicutes  | Clostridia   | Clostridiales  | Lachnospiraceae   | Blautia             |
| 530 | TRUE| Bacteria    | Firmicutes  | Clostridia   | Clostridiales  | Lachnospiraceae   | Aquilinobacter       |
| 525 | TRUE| Bacteria    | Firmicutes  | Clostridia   | Clostridiales  | Ruminococcaceae   | Oscillospira        |
| 524 | TRUE| Bacteria    | Firmicutes  | Clostridia   | Clostridiales  | Ruminococcaceae   | Ruminococcus_2      |
| 521 | TRUE| Bacteria    | Firmicutes  | Clostridia   | Clostridiales  | Lachnospiraceae   | Lachnospira         |
| 521 | TRUE| Bacteria    | Firmicutes  | Clostridia   | Clostridiales  | Lachnospiraceae   | Ruminococcus_6      |
| 521 | TRUE| Bacteria    | Firmicutes  | Clostridia   | Clostridiales  | Ruminococcaceae   | Ruminococcus_1      |
| 505 | TRUE| Bacteria    | Firmicutes  | Clostridia   | Clostridiales  | Ruminococcaceae   | Butyrivibrio        |
| 505 | TRUE| Bacteria    | Proteobacteria | Gammaproteobacteria | Pseudomonadales | Pseudomonadaceae   | Pseudomonas          |
| 503 | TRUE| Bacteria    | Firmicutes  | Clostridia   | Clostridiales  | Lachnospiraceae   | Lachnospiraceae_UCG-001 |
| 496 | TRUE| Bacteria    | Actinobacteria | Actinobacteria | Corynebacteriales | Corynebacteriaceae | Lawsonella          |
| 493 | TRUE| Bacteria    | Proteobacteria | Delta proteobacteria | Desulfovibrionales | Desulfovibrionaceae | Desulfovibrio     |
| 493 | TRUE| Bacteria    | Firmicutes  | Erysipelotrichia | Erysipelotrichiales | Erysipelotrichaceae | Turicibacter        |
| 491 | TRUE| Archaeeae   | Euryarchaeota | Methanobacteriae | Methanobacteriaceae | Methanobacteriaceae | Methanobrevibacter  |
| 479 | TRUE| Bacteria    | Firmicutes  | Clostridia   | Clostridiales  | Ruminococcaceae   | DTU089              |
| 477 | TRUE| Bacteria    | Firmicutes  | Erysipelotrichia | Erysipelotrichiales | Erysipelotrichiaeae | Erysipelotrichiaeae_UCG-003 |
| 468 | TRUE| Bacteria    | Bacteroidetes | Bacteroidiales | Bacteroidiales  | Porphyromonadaceae | Porphyromonas       |
| Id  | Is FALSE | Domain     | Phylum      | Class          | Order            | Family          | Genus                   |
|-----|----------|------------|-------------|----------------|------------------|----------------|-------------------------|
| 465 | TRUE     | Bacteria   | Actinobacteria | Actinobacteria | Corynebacterales | Corynebacteriaceae | Corynebacterium_1       |
| 463 | TRUE     | Bacteria   | Bacteroidetes | Bacteroidia    | Bacteroidales    | Prevotellaceae   | Prevotella              |
| 459 | TRUE     | Bacteria   | Firmicutes   | Clostridia     | Clostridiales    | Lachnospiraceae  | Lachnoclostridium       |
| 458 | TRUE     | Bacteria   | Firmicutes   | Clostridia     | Clostridiales    | Lactobacillae    | Lactobacillus           |
| 458 | TRUE     | Bacteria   | Firmicutes   | Clostridia     | Clostridiales    | Ruminococcaceae  | Ruminococcaceae_UCG-014 |
| 454 | TRUE     | Bacteria   | Firmicutes   | Clostridia     | Clostridiales    | Veillonellaceae  | Veillonella             |
| 452 | TRUE     | Bacteria   | Firmicutes   | Clostridia     | Clostridiales    | Lachnospiraceae  | NA                      |
| 449 | TRUE     | Bacteria   | Firmicutes   | Clostridia     | Clostridiales    | Ruminococcaceae  | Candidatus_Soleaferrea  |
| 440 | FALSE    | Bacteria   | Proteobacteria | Gammaproteobacteria | Pseudomonadales | Moraxellaceae   | Acinetobacter           |
| 439 | FALSE    | Bacteria   | Firmicutes   | Erysipelotrichia | Erysipelotrichales | Erysipelotrichaceae | NA                      |
| 438 | FALSE    | Bacteria   | Firmicutes   | Clostridia     | Clostridiales    | Ruminococcaceae  | Intestimimonas         |
| 433 | FALSE    | Bacteria   | Firmicutes   | Clostridia     | Clostridiales    | Ruminococcaceae  | Ruminiclostridium_9     |
| 428 | FALSE    | Bacteria   | Firmicutes   | Clostridia     | Clostridiales    | Family_XI       | Anaerococcus            |
| 425 | FALSE    | Bacteria   | Firmicutes   | Erysipelotrichia | Erysipelotrichales | Erysipelotrichaceae | Erysipelatoclostridium |
| 422 | FALSE    | Bacteria   | Firmicutes   | Clostridia     | Clostridiales    | Family_XIII     | Family_XIII_UCG-001     |
| 411 | FALSE    | Bacteria   | Firmicutes   | Clostridia     | Clostridiales    | Ruminococcaceae  | Phocea                  |
| 408 | FALSE    | Bacteria   | Firmicutes   | Clostridia     | Clostridiales    | NA              | NA                      |
| 408 | FALSE    | Bacteria   | Firmicutes   | Clostridia     | Clostridiales    | Family_XIII     | S5-A14a                 |
| 407 | FALSE    | Bacteria   | Firmicutes   | Bacteroidia    | Bacteroidales    | Bacteroidaceae  | Bacteroides             |
| 405 | FALSE    | Bacteria   | Firmicutes   | Erysipelotrichia | Erysipelotrichales | Erysipelotrichaceae | Holdemania              |
| 399 | FALSE    | Bacteria   | Firmicutes   | Bacilli        | Lactobacillales  | Carnobacteriaceae | Granulicatella          |
| 395 | FALSE    | Bacteria   | Firmicutes   | Clostridia     | Clostridiales    | Lachnospiraceae  | Cuneatibacter           |
| 388 | FALSE    | Bacteria   | Firmicutes   | Clostridia     | Clostridiales    | Lachnospiraceae  | Lachnospiraceae_UCG-003 |
| 386 | FALSE    | Bacteria   | Firmicutes   | Clostridia     | Clostridiales    | Lachnospiraceae  | GCA-900066575           |
| 364 | FALSE    | Bacteria   | Proteobacteria | Gammaproteobacteria | Betaproteobacteriales | Burkholderiaceae | Delftia                  |
| 356 | FALSE    | Bacteria   | Firmicutes   | Clostridia     | Clostridiales    | Family_XI       | Peptoniphilus           |
| 350 | FALSE    | Bacteria   | Firmicutes   | Clostridia     | Clostridiales    | Lachnospiraceae  | Lachnospiraceae_UCG-008 |
| 348 | FALSE    | Bacteria   | Firmicutes   | Clostridia     | Clostridiales    | Family_XI       | Parvimonas              |
| 344 | FALSE    | Bacteria   | Firmicutes   | Bacilli        | Bacillales       | Family_XI       | Gemella                 |
| 307 | FALSE    | Bacteria   | Actinobacteria | Actinobacteria | Actinomycetales  | Actinomycetaceae | Varibaculum             |
| 299 | FALSE    | Bacteria   | Proteobacteria | Gammaproteobacteria | Xanthomonadales | Xanthomonadaceae | Stenotrophomonas         |
| 268 | FALSE    | Bacteria   | Firmicutes   | Bacilli        | Bacillales       | Bacillaceae     | Bacillus                |
| 218 | FALSE    | Bacteria   | Firmicutes   | Negativicutes  | Selenomonadales  | Veillonellaceae  | Selenomononas_3         |
| 209 | FALSE    | Bacteria   | Firmicutes   | Erysipelotrichia | Erysipelotrichales | Erysipelotrichaceae | Asteroleplasma         |
| 62  | FALSE    | Bacteria   | Lentisphaerae | Lentisphaeria  | Victivallales    | Victivallaceae  | Victivallis             |
| Rank | FALSE/Bacteria | Phylum          | Class              | Order               | Family               | Genus            |
|------|----------------|-----------------|--------------------|---------------------|----------------------|------------------|
| 58   | FALSE Bacteria | Actinobacteria  | Coriobacteria      | Coriobacteriales     | Atopobiaceae         | Olsenella        |
| 54   | FALSE Bacteria | Actinobacteria  | Actinobacteria     | Propionibacteriales  | Propionibacteriaceae | Tessaracoccus    |
| 50   | FALSE Bacteria | Epsilonbacteria  | Campylobacteria    | Campylobacteriales   | Campylobacteriaceae  | Campylobacter     |
| 49   | FALSE Bacteria | Firmicutes      | Clostridia         | Clostridiales        | Family_XI            | Ezakiella        |
| 47   | FALSE Bacteria | Firmicutes      | Actinobacteria     | Propionibacteriales  | Propionibacteriaceae | NA               |
| 44   | FALSE Bacteria | Firmicutes      | Epsilonbacteraeota | Propionibacteriales  | Propionibacteriaceae | NA               |
| 43   | FALSE Bacteria | Firmicutes      | Firmicutes         | Clostridiales        | Clostridiales        | NA               |
| 41   | FALSE Bacteria | Firmicutes      | Bacilli            | Lactobacillales      | Lactobacillaceae     | Pediococcus      |
| 40   | FALSE Bacteria | Firmicutes      | Bacilli            | Lactobacillales      | Lactobacillaceae     | NA               |
| 39   | FALSE Bacteria | Firmicutes      | Clostridia         | Clostridiales        | Family_XI            | Gallicola        |
| 39   | FALSE Bacteria | Firmicutes      | Bacilli            | Lactobacillales      | Lactobacillaceae     | NA               |
| 38   | FALSE Bacteria | Firmicutes      | Bacteroidetes      | Sphingomonadales     | Sphingomonadaceae    | NA               |
| 38   | FALSE Bacteria | Firmicutes      | Bacteroidetes      | Sphingobacteriales   | Sphingobacteriales   | Sphingobacterium |
| 37   | FALSE Bacteria | Firmicutes      | Clostridia         | Clostridiales        | Family_XI            | Murdochella      |
| 37   | FALSE Bacteria | Firmicutes      | Clostridia         | Clostridiales        | Ruminococcaceae      | Ruminococcaceae_UCG-009 |
| 37   | FALSE Bacteria | Firmicutes      | Clostridia         | Clostridiales        | Ruminococcaceae      | Ruminococcaceae_UCG-011 |
| 37   | FALSE Bacteria | Firmicutes      | Actinobacteria     | Bifidobacteriales    | Bifidobacteriaceae   | Scardovia        |
| 36   | FALSE Bacteria | Firmicutes      | Alphaproteobacteria| Sphingomonadales     | Sphingomonadaceae    | NA               |
| 35   | FALSE Bacteria | Firmicutes      | Gammaproteobacteria| Betaproteobacteriales| Burkholderiaceae     | Achromobacter    |
| 35   | FALSE Bacteria | Firmicutes      | Clostridia         | Clostridiales        | Peptostreptococcaceae| Clostridioides   |
| 35   | FALSE Bacteria | Firmicutes      | Actinobacteria     | Micrococcales        | Dermabacteriaceae    | Dermabacter      |
| 35   | FALSE Bacteria | Firmicutes      | Synergistetes      | Synergistases        | Synergistaceae       | Jonquettella     |
| 34   | FALSE Bacteria | Bacteroidetes   | Bacteroides        | Flavobacteriales     | Weeksellaceae        | Chryseobacterium |
| 34   | FALSE Bacteria | Firmicutes      | Clostridia         | Clostridiales        | Ruminococcaceae      | Ruminococcaceae_UCG-008 |
| 33   | FALSE Bacteria | Tenericutes     | Mollicutes         | Anaeroplasmatales    | Anaeroplasmatae      | Anaeroplasma     |
| 32   | FALSE Bacteria | Firmicutes      | Clostridia         | Clostridiales        | Ruminococcaceae      | Anaerotruncus    |
| 32   | FALSE Bacteria | Firmicutes      | Clostridia         | Clostridiales        | Family_XI            | Finegoldia      |
| 32   | FALSE Bacteria | Firmicutes      | Gammaproteobacteria| Enterobacteriales    | Enterobacteriaceae   | Hafnia-Obesumbacterium |
| 31   | FALSE Bacteria | Firmicutes      | Bacilli            | Lactobacillales      | Carnobacteriaceae    | Carnobacterium   |
| 31   | FALSE Bacteria | Firmicutes      | Clostridia         | Clostridiales        | Lachnospiraceae      | Howardella      |
| Rank | Rank | Kingdom          | Phylum     | Class                      | Order                      | Family                      | Genus                  |
|------|------|------------------|------------|---------------------------|----------------------------|-----------------------------|------------------------|
| 31   | FALSE | Bacteria         | Firmicutes | Clostridia                 | Clostridiales              | Lachnospiraceae            | Hungatella             |
| 30   | FALSE | Bacteria         | Actinobacteria | Coriobacteria             | Coriobacteriales_Incertae_Sedis Raoultibacter | UBA1819                  |                       |
| 30   | FALSE | Bacteria         | Firmicutes | Clostridia                 | Clostridiales              | Ruminococcaceae            | Anaerosporobacter      |
| 29   | FALSE | Bacteria         | Actinobacteria | Coriobacteria             | Coriobacteriales_Incertae_Sedis Raoultibacter | Eggerthellaceae            | Cryptobacterium      |
| 29   | FALSE | Bacteria         | Actinobacteria | Acidimicrobiia             | Microtrichales             | NA                         | NA                     |
| 29   | FALSE | Bacteria         | Actinobacteria | Actinobacteria             | Corynebacteriales           | Nocardiaceae               | Rhodococcus            |
| 29   | FALSE | Bacteria         | Actinobacteria | Alphaproteobacteria        | Acetobacteriales            | Acetobacteraceae           | Roseomonas             |
| 28   | FALSE | Bacteria         | Actinobacteria | Propionibacteriales        | Propionibacteriaceae       | Acidipropionibacterium     |                       |
| 28   | FALSE | Bacteria         | Actinobacteria | Bacilli                    | Bacillales                 | Paenibacillaceae           | Ammoniphilus           |
| 28   | FALSE | Bacteria         | Actinobacteria | Alphaproteobacteria        | Caulobacteriales            | Caulobacteraceae           | Brevundimonas          |
| 28   | FALSE | Bacteria         | Actinobacteria | Bacilli                    | Bacillales                 | Paenibacillaceae           | Cohnella               |
| 28   | FALSE | Bacteria         | Actinobacteria | Bacilli                    | Bacillales                 | Planococcaceae             | Domibacillus           |
| 28   | FALSE | Bacteria         | Actinobacteria | Bacilli                    | Lactobacillales            | Aerococcaceae              | Facklamia              |
| 28   | FALSE | Bacteria         | Actinobacteria | Alphaproteobacteria        | Bacillales                 | Burkholderiaceae           | Acidovorax             |
| 28   | FALSE | Bacteria         | Actinobacteria | Bacilli                    | Bacillales                 | Burkholderiaceae           | Kerstersia             |
| 28   | FALSE | Bacteria         | Actinobacteria | Clostridia                 | Clostridiales              | Lachnospiraceae            | Lachnospiraceae_UCG-006 |
| 28   | FALSE | Bacteria         | Actinobacteria | Bacilli                    | Bacillales                 | Micromonosporales          | Micromonospora         |
| 28   | FALSE | Bacteria         | Actinobacteria | Bacteroidetes              | Bacteroidiales             | Micromonosporaceae         | Micromonosporaceae     |
| 28   | FALSE | Bacteria         | Actinobacteria | Coriobacteria              | Coriobacteriales            | NA                         | NA                     |
| 28   | FALSE | Bacteria         | Actinobacteria | Alphaproteobacteria        | Acetobacteriales            | Acetobacteraceae           | NA                     |
| 28   | FALSE | Bacteria         | Actinobacteria | Coriobacteria              | Coriobacteriales            | Atoptobiaceae             | NA                     |
| 28   | FALSE | Bacteria         | Actinobacteria | Bacilli                    | NA                         | NA                         | NA                     |
| 28   | FALSE | Bacteria         | Actinobacteria | Verrucomicrobia            | Opitutales                 | NA                         | NA                     |
| 28   | FALSE | Bacteria         | Cyanobacteria  | Oxyphotobacteria            | Phormidesmiales            | Nodosilineaceae            | NA                     |
| 28   | FALSE | Bacteria         | Firmicutes    | Negativicutes              | Selenomonadales            | NA                         | NA                     |
| 28   | FALSE | Bacteria         | Actinobacteria | Actinobacteria             | Corynebacteriales           | NA                         | NA                     |
| 28   | FALSE | Bacteria         | Acidobacteria  | FFCH5909                   | NA                         | NA                         | NA                     |
| 28   | FALSE | Bacteria         | Actinobacteria | Propionibacteriales        | Nocardioidaceae            | Nocardioide              |
| 28   | FALSE | Bacteria         | Firmicutes    | Clostridia                 | Clostridiales              | Peptostreptococcaceae      | Paraclostridium        |
| 28   | FALSE | Bacteria         | Actinobacteria | Alphaproteobacteria        | Rhizobiales                | Beijerinckiaceae          | Psychroglacicola       |
| 28   | FALSE | Bacteria         | Proteobacteria | Gamma proteobacteria       | Betaproteobacteriales      | Burkholderiaceae           | Acidovorax             |
| 28   | FALSE | Bacteria         | Actinobacteria | Bacilli                    | Bacillales                 | Burkholderiaceae           | Kerstersia             |
| 28   | FALSE | Bacteria         | Firmicutes    | Clostridia                 | Clostridiales              | Lachnospiraceae            | Lachnospiraceae_UCG-006 |
| 28   | FALSE | Bacteria         | Firmicutes    | Bacilli                    | Bacillales                 | Micromonosporaceae         | Micromonospora         |
| 28   | FALSE | Bacteria         | Firmicutes    | Bacilli                    | Bacillales                 | Muribaculaceae             | Muribaculum            |
| 28   | FALSE | Bacteria         | Actinobacteria | Alphaproteobacteria        | Acetobacteriales            | Acetobacteraceae           | NA                     |
| 28   | FALSE | Bacteria         | Actinobacteria | Bacilli                    | Bacillales                 | Atoptobiaceae             | NA                     |
| 28   | FALSE | Bacteria         | Actinobacteria | Alphaproteobacteria        | Rhizobiales                | Beijerinckiaceae          | Psychroglacicola       |
| 28 | FALSE Bacteria | Firmicutes | Bacilli | Bacillales | Bacillaceae | Terribacillus |
|----|----------------|------------|--------|------------|-------------|--------------|
| 28 | FALSE Bacteria | Actinobacteria | Actinobacteria | Actinomycetales | Actinomycetaceae | Trueperella |
| 27 | FALSE Bacteria | Proteobacteria | Gammaproteobacteria | Aeromonadales | Aeromonadaceae | Aeromonas |
| 27 | FALSE Bacteria | Proteobacteria | Gammaproteobacteria | Oceanospirillales | Alcanivoracaceae | Alcanivorax |
| 27 | FALSE Bacteria | Firmicutes | Erysipelotrichia | Erysipelotrichales | Erysipelotrichaceae | Allobaculum |
| 27 | FALSE Bacteria | Firmicutes | Bacilli | Lactobacillales | Carnobacteriaceae | Alloiococcus |
| 27 | FALSE Bacteria | Proteobacteria | Gammaproteobacteria | Enterobacteriales | Enterobacteriaceae | ATCC-39006 |
| 27 | FALSE Bacteria | Spirochaetes | Brachyspirae | Brachyspirales | Brachyspiraceae | Brachyspira |
| 27 | FALSE Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Anaerocolumna |
| 27 | FALSE Bacteria | Proteobacteria | Alphaproteobacteria | Rhizobiales | Rhizobiaceae | Aminobacter |
| 27 | FALSE Bacteria | Proteobacteria | Alphaproteobacteria | Sphingomonadales | Sphingomonadaceae | Blastomonas |
| 27 | FALSE Bacteria | Cyanobacteria | Oxyphotobacteria | Nostocales | Chroococcidiopsaceae | Chroococcidiopsis_SAG_2023 |
| 27 | FALSE Bacteria | Bacteroidetes | Bacteroidia | Flavobacteriales | Weeksellaceae | Cloacibacterium |
| 27 | FALSE Bacteria | Proteobacteria | Gammaproteobacteria | Enterobacteriales | Enterobacteriaceae | Cosenzaea |
| 27 | FALSE Bacteria | Proteobacteria | Gammaproteobacteria | Betaproteobacteriales | Burkholderiaceae | Cupriavidus |
| 27 | FALSE Bacteria | Deinococcus-Thermus | Deinococci | Deinococcales | Deinococcaceae | Deinococcus |
| 27 | FALSE Bacteria | Actinobacteria | Coriobacteriia | Coriobacteriales | Eggerthellaceae | Detitrobacterium |
| 27 | FALSE Bacteria | Firmicutes | Clostridia | Clostridiales | Peptococcaceae | Desulfitibacter |
| 27 | FALSE Bacteria | Proteobacteria | Deltaproteobacteria | Desulfobacteriales | Desulfovibulaceae | Desulfovibulus |
| 27 | FALSE Bacteria | Proteobacteria | Alphaproteobacteria | Rhizobiales | Devosiaeae | Devosia |
| 27 | FALSE Bacteria | Proteobacteria | Gammaproteobacteria | Xanthomonadales | Rhodanobacteraceae | Dokdonella |
| 27 | FALSE Bacteria | Bacteroidetes | Bacteroidia | Cytophagales | Spirosomaceae | Dyadobacter |
| 27 | FALSE Bacteria | Proteobacteria | Gammaproteobacteria | Pseudomonadales | Moraxellaceae | Enhydrobacter |
| 27 | FALSE Bacteria | Firmicutes | Erysipelotrichia | Erysipelotrichales | Erysipelotrichaceae | Faecalibacillus |
| 27 | FALSE Bacteria | Firmicutes | Bacilli | Bacillales | Bacillaceae | Fictibacillus |
| 27 | FALSE Bacteria | Chloroflexi | Anaerolineae | Anaerolineales | Anaerolineaceae | Flexilinea |
| 27 | FALSE Bacteria | Synergistetes | Synergistia | Synergistales | Synergistaceae | Fretibacterium |
| Rank | Domain  | Phylum             | Class           | Order              | Family            | Genus               |
|------|---------|--------------------|----------------|--------------------|-------------------|---------------------|
| 27   | Bacteria| Firmicutes         | Bacilli         | Lactobacillales    | Aerococcaceae     | Globicatella        |
| 27   | Bacteria| Actinobacteria     | Actinobacteria  | Micrococcales      | Micrococcaceae    | Glutamicibacter     |
| 27   | Bacteria| Proteobacteria     | Alphaproteobacteria | Rhodobacterales | Rhodobacteraceae | Haematobacter       |
| 27   | Bacteria| Proteobacteria     | Gammaproteobacteria | Oceangroupilales | Halomonadaceae    | Halomonas           |
| 27   | Bacteria| Firmicutes         | Clostridia      | Clostridiales      | Family XI         | Helcococcus         |
| 27   | Bacteria| Proteobacteria     | Gammaproteobacteria | Betaproteobacteria | Burkholderiacae | Hydrogenophaga      |
| 27   | Bacteria| Proteobacteria     | Alphaproteobacteria | Rhizobiales | Hyphomicrobiaceae | Hyphomicrobium      |
| 27   | Bacteria| Proteobacteria     | Clostridia      | Clostridiales      | Lachnospiraceae   | Johnsonella         |
| 27   | Bacteria| Actinobacteria     | Bacilli         | Lactobacillales    | Aerococcaceae     | Ignavigranum       |
| 27   | Bacteria| Actinobacteria     | Micrococcus     | Intrasporangiaceae | Janibacter        |                     |
| 27   | Bacteria| Firmicutes         | Clostridia      | Clostridiales      | Lachnospiraceae   |                     |
| 27   | Bacteria| Firmicutes         | Clostridia      | Clostridiales      | Lachnospiraceae   |                     |
| 27   | Bacteria| Firmicutes         | Bacilli         | Lactobacillales    | Aerococcaceae     |                     |
| 27   | Bacteria| Actinobacteria     | Actinobacteria  | Micrococcales      | Micrococcaceae    |                     |
| 27   | Bacteria| Actinobacteria     | Actinobacteria  | Micrococcales      | Microbacteriaceae | Leucobacter         |
| 27   | Bacteria| Proteobacteria     | Gammaproteobacteria | Beta proteobacteria | Burkholderiacae | Massilia            |
| 27   | Bacteria| Firmicutes         | Erysipelotrichia | Erysipelotrichiales | Erysipelotrichaceae |                     |
| 27   | Bacteria| Actinobacteria     | Actinobacteria  | Propionibacteria   | Propionibacteriaceae | Micropruina         |
| 27   | Bacteria| Actinobacteria     | Gammaproteobacteria | Pseudomonadales | Moraxellaceae    | Moraxella           |
| 27   | Bacteria| Actinobacteria     | Actinobacteria  | Corynebacteria     | Mycobacteriaceae  | Mycobacterium       |
| 27   | Bacteria| Firmicutes         | Clostridia      | Clostridiales      | Family XI         |                     |
| 27   | Bacteria| Firmicutes         | Bacilli         | Bacillales         | Paenibacillae     | NA                  |
| 27   | Bacteria| Proteobacteria     | Gammaproteobacteria | Beta proteobacteria | NA              | NA                  |
| 27   | Bacteria| Actinobacteria     | Coriobacteria   | Coriobacteria      | Coriobacteriaceae | NA                  |
| 27   | Bacteria| Firmicutes         | Clostridia      | Clostridiales      | Syntrophomonadaceae | NA                |
| 27   | Bacteria| Chloroflexi        | Chloroflexia    | Thermomicrobiaceae | JG30-KF-CM45 | NA                  |
| 27   | Bacteria| Actinobacteria     | Actinobacteria  | Propionibacteria   | Propionibacteriaceae | NA              |
| 27   | Bacteria| Verrucomicrobia    | Verrucomicrobia | NA                 | NA                 | NA                  |
| 27   | Bacteria| Actinobacteria     | Actinobacteria  | Micromonosporales | Micromonosporaceae | NA                  |
| 27   | Bacteria| Actinobacteria     | Actinobacteria  | Streptomyces      | Streptomycesaceae | NA                  |
| 27   | Bacteria| Firmicutes         | Bacilli         | Lactobacillales    | Streptococcaceae | NA                  |
| 27   | Bacteria| Proteobacteria     | Alphaproteobacteria | NA            | NA                 | NA                  |
| 27   | Bacteria| Archaea            | Euryarchaeota   | Methanobacteria    | Methanobacteriaceae | NA                |
| 27   | Bacteria| Actinobacteria     | Actinobacteria  | NA                 | NA                 | NA                  |
| 27   | Bacteria| Proteobacteria     | Alphaproteobacteria | Micavibionales | NA              | NA                  |
| 27   | Bacteria| Actinobacteria     | Actinobacteria  | Micrococcales      | NA                 | NA                  |
| 27   | Bacteria| Chloroflexi        | Chloroflexia    | Kallotenuales      | NA                 | NA                  |
| Taxonomy | Order | Family | Genus |
|----------|-------|--------|-------|
| Bacteria | Proteobacteria | Gammaproteobacteria | Rhodocyclaceae |
| Bacteria | Proteobacteria | Gammaproteobacteria | Neisseriaceae |
| Eukaryota | NA | NA | NA |
| Bacteria | Proteobacteria | Gammaproteobacteria | Neisseriaceae |
| Bacteria | Proteobacteria | Betaproteobacteriales | Ralstonia |
| Bacteria | Proteobacteria | Betaproteobacteriales | Pigmentiphaga |
| Bacteria | Firmicutes | Clostridiales | Selenomonas |
| Bacteria | Firmicutes | Bacillales | Solibacillus |
| Bacteria | Firmicutes | Bacillales | Tissierella |
| Bacteria | Firmicutes | Bacillales | Treponema_2 |
| Bacteria | Tenericutes | Mollicutes | Ureaplasma |
| Bacteria | Tenericutes | Mollicutes | Wohlfahrtiimonadaceae |
| Bacteria | Tenericutes | Mollicutes | Xanthobacter |
| Rank | Category       | Class                  | Order                        | Family                      | Genus                        |
|------|----------------|------------------------|------------------------------|-----------------------------|------------------------------|
| 27   | Bacteria       | Firmicutes             | Clostridia                   | Clostridiales               | Lachnospiraceae              | XBB1006                      |
| 27   | Bacteria       | Proteobacteria         | Gammaproteobacteria          | Betaproteobacteriales       | Rhodocyclaceae               | Zoogloeae                     |
| 26   | Bacteria       | Firmicutes             | Bacilli                      | Lactobacillales             | Aerococcaceae                | Abiotrophia                  |
| 26   | Bacteria       | Proteobacteria         | Gammaproteobacteria          | Gammaproteobacteria__Incertae_Sedis__Unknown_Family | Acidibacter                   |
| 26   | Bacteria       | Actinobacteria         | Actinobacteria               | Streptosporangiales         | Thermomonosporaceae          | Actinomadura                  |
| 26   | Bacteria       | Actinobacteria         | Actinobacteria               | Actinomycetaceae            | Actinomycetes                | Actinomyces                   |
| 26   | Bacteria       | Actinobacteria         | Actinobacteria               | Propionibacteriales         | Nocardoidaceae               | Aeromicrobium                 |
| 26   | Bacteria       | Proteobacteria         | Gammaproteobacteria          | Pasteurellales              | Pasteurellaceae              | Aggregatibacter               |
| 26   | Bacteria       | Firmicutes             | Bacilli                      | Carnobacteriales            | Allofustis                   |                                |
| 26   | Bacteria       | Proteobacteria         | Alphaproteobacteria          | Sphingomonadaceae           | Sphingomonadaceae            | Altererythrobacter            |
| 26   | Bacteria       | Firmicutes             | Bacilli                      | Bacillales                  | Bacillaceae                  | Anaerobacillus                |
| 26   | Bacteria       | Firmicutes             | Bacilli                      | Paenibacillaceae            | Aneurinibacillus             |                                |
| 26   | Bacteria       | Epsilonbacteraeota     | Campylobacteria              | Campylobacteriales           | Arcobacteriaceae             | Arcobacter                    |
| 26   | Bacteria       | Actinobacteria         | Coriobacteria                | Coriobacteriales            | Atopobialeae                 | Atopobium                     |
| 26   | Bacteria       | Bacteroidetes          | Bacteroidia                  | Flavobacteriales            | Weeksellaceae                | Bergeyella                    |
| 26   | Bacteria       | Bacteroidetes          | Bacteroidia                  | Cytophagales                | Amoebophilaceae              | Candidatus_Amoebophilus       |
| 26   | Bacteria       | Bacteroidetes          | Bacteroidia                  | Flavobacteriales            | Flavobacteriaceae            | Capnocytophaga                |
| 26   | Bacteria       | Proteobacteria         | Gamma proteobacteria         | Cardiobacteriales           | Cardiobacteriaceae           | Cardiobacterium               |
| 26   | Bacteria       | Firmicutes             | Erysipelotrichia             | Erysipelotrichales          | Erysipelotrichaceae          | Catenisphaera                 |
| 26   | Bacteria       | Actinobacteria         | Actinobacteria               | Micrococcales                | Cellulosamadaceae            | Cellulosomas                  |
| 26   | Bacteria       | Firmicutes             | Clostridia                   | Clostridiales               | Lachnospiraceae              | Cellulosilyticum              |
| 26   | Bacteria       | Fusobacteria           | Fusobacteria                 | Fusobacteriaceae            | Fusobacteriaceae             | Cetobacterium                 |
| 26   | Bacteria       | Actinobacteria         | Coriobacteriales             | Coriobacteriales            | Eggerthellaceae              | CHKCI002                      |
| 26   | Bacteria       | Firmicutes             | Clostridia                   | Clostridiales               | Clostridiaceae_1             | Clostridium_sensu_stricto_11  |
| 26   | Bacteria       | Firmicutes             | Clostridia                   | Clostridiales               | Clostridiaceae_1             | Clostridium_sensu_stricto_7   |
| 26   | Bacteria       | Actinobacteria         | Coriobacteriia               | Coriobacteriales             | Atopobiaeae                  | Coriobacteriaceae__UCG-003   |
| 26   | Bacteria       | Actinobacteria         | Corynebacteriales            | Dietziaceae                 | Dietzia                       |
| 26   | Bacteria       | Proteobacteria         | Gammaproteobacteria          | Betaproteobacteriales       | Neisseriaceae                | Eikenella                     |
| 26   | Bacteria       | Proteobacteria         | Alphaproteobacteria          | Rhizobiales                 | Rhizobiateae                 | Ensifer                       |
| 26   | Bacteria       | Actinobacteria         | Actinomycetaceae             | Actinomycetaceae            | Actinomycetaceae             | F0332                         |
| 26   | Bacteria       | Bacteroidetes          | Bacteroidia                  | Cytophagales                | Spirosomaceae                | Flectobacillus                |
| 26   | Bacteria       | Firmicutes             | Bacilli                      | Bacillales                  | Bacillaceae                  | Geobacillus                   |
| 26   | Bacteria       | Firmicutes             | Bacilli                      | Bacillales                  | Bacillaceae                  | Gracilibacillus               |
| 26 | FALSE Bacteria | Firmicutes | Clostridia | Clostridiales | Clostridiaceae_1 | Hathewaya |
| 26 | FALSE Bacteria | Firmicutes | Bacilli | Bacillales | Staphylococcaceae | Jeotgalicoccus |
| 26 | FALSE Bacteria | Firmicutes | Bacilli | Bacillales | Thermoactinomycetaceae | Kroppenstedtia |
| 26 | FALSE Bacteria | Verrucomicrobia | Verrucomicrobiae | Chthoniobacterales | Chthoniobacteraceae | LD29 |
| 26 | FALSE Bacteria | Actinobacteria | Actinobacteria | Microccocales | Microbacteriaceae | Leifsonia |
| 26 | FALSE Bacteria | Fusobacteria | Fusobacteria | Fusobacteriales | Leptotrichiaceae | Leptotrichia |
| 26 | FALSE Bacteria | Actinobacteria | Coriobacteria | Coriobacteriales | Atopobiacaeae | Libanicoccus |
| 26 | FALSE Bacteria | Firmicutes | Bacilli | Bacillales | Staphylococcaceae | Macroccocus |
| 26 | FALSE Bacteria | Proteobacteria | Alphaproteobacteria | Rhizobiales | Rhizobiacaeae | Mesorhizobium |
| 26 | FALSE Bacteria | Tenericutes | Mollicutes | Mycoplasmatales | Mycoplasmataceae | Mycoplasma |
| 26 | FALSE Bacteria | Actinobacteria | Actinobacteria | Corynebacteriales | Nocardiaeae | NA |
| 26 | FALSE Bacteria | Proteobacteria | Alphaproteobacteria | Rickettsiales | Mitochondria | NA |
| 26 | FALSE Bacteria | Actinobacteria | Actinobacteria | Microccocales | Microbacteriaceae | NA |
| 26 | FALSE Bacteria | Actinobacteria | Actinobacteria | Bifidobacteriales | Bifidobacteriaceae | NA |
| 26 | FALSE Bacteria | Bacteroidetes | Bacteroidia | Bacteroidales | Dysgonomonadaceae | NA |
| 26 | FALSE Bacteria | Actinobacteria | NA | NA | NA | NA |
| 26 | FALSE Bacteria | Verrucomicrobia | Verrucomicrobiae | Opitutales | Puniceicoccaceae | NA |
| 26 | FALSE Bacteria | Proteobacteria | Alphaproteobacteria | Rhizobiales | Xanthobacteraceae | NA |
| 26 | FALSE Bacteria | Firmicutes | Bacilli | Bacillales | Staphylococcaceae | NA |
| 26 | FALSE Bacteria | Spirochaetes | Spirochaetia | Spirochaetales | Spirochaetaeae | NA |
| 26 | FALSE Bacteria | Firmicutes | Bacilli | Lactobacillales | Carnobacteriaceae | NA |
| 26 | FALSE Bacteria | Bacteroidetes | Bacteroidia | Sphingobacteriales | Sphingobacteriaceae | NA |
| 26 | FALSE Bacteria | Proteobacteria | Gammaproteobacteria | NA | NA | NA |
| 26 | FALSE Bacteria | Kirimatiellaeota | Kirimatiellae | WCHB1-41 | NA | NA |
| 26 | FALSE Bacteria | Synergistetes | Synergistia | Synergistales | Synergistaceae | NA |
| 26 | FALSE Bacteria | Bacteroidetes | Bacteroidia | Bacteroidales | Tannerellaceae | NA |
| 26 | FALSE Bacteria | Proteobacteria | Alphaproteobacteria | Rhizobiales | Rhizobiaceae | Neorhizobium |
| 26 | FALSE Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Papillibacter |
| 26 | FALSE Bacteria | Actinobacteria | Coriobacteria | Coriobacteriales | Eggerthellaceae | Paraeggerthella |
| 26 | FALSE Bacteria | Firmicutes | Bacilli | Bacillales | Bacillaceae | Paucisalibacillus |
| 26 | FALSE Bacteria | Firmicutes | Negativicutes | Selenomonadales | Veillonellaceae | Pectinatus |
| 26 | FALSE Bacteria | Proteobacteria | Gammaproteobacteria | Betaproteobacteriales | Burkholderiaeae | Pelomonas |
| 26 | FALSE Bacteria | Proteobacteria | Gammaproteobacteria Enterobacteriales | Enterobacteriaceae | Plesiomonas |
| 26 | FALSE Bacteria | Proteobacteria | Gammaproteobacteria Enterobacteriales | Enterobacteriaceae | Pluralibacter |
| 26 | FALSE Bacteria | Bacteroidetes | Bacteroidia Bacteroidales | Prevotellaceae | Prevotellaceae_Ga6A1_group |
| 26 | FALSE Bacteria | Proteobacteria | Alphaproteobacteria Rhizobiales | Rhizobiaceae | Pseudochrobactrum |
| 26 | FALSE Bacteria | Firmicutes | Clostridia Clostridiales | Ruminococcaceae | Pseudoflavonifractor |
| 26 | FALSE Bacteria | Actinobacteria | Bacillia Bacillales | Planococcaceae | Skermanella |
| 26 | FALSE Bacteria | Actinobacteria | Bacillia Bacillales | Bacillaceae | Virgibacillus |
| 26 | FALSE Bacteria | Actinobacteria | Bacillia Bacillales | Bacillaceae | W5053 |
| 26 | FALSE Bacteria | Actinobacteria | Bacillia Bacillales | Aerococcaceae | Eremococcus |
| 25 | FALSE Bacteria | Firmicutes | Clostridia Clostridiales | Family_XI | W5053 |
| 25 | FALSE Bacteria | Firmicutes | Clostridia Clostridiales | Family_XIII | Anaerovorax |
| 25 | FALSE Bacteria | Firmicutes | Clostridiales Clostridiales | Allorhizobium-Neorhizobium-Pararhizobium-Rhizobium |
| 25 | FALSE Bacteria | Firmicutes | Clostridiales Clostridiales | Clostridium_sensu_stricto_2 |
| 25 | FALSE Bacteria | Firmicutes | Bacillia Bacillales | Aerococcaceae | Eremococcus |
| 25 | FALSE Bacteria | Firmicutes | Erysipelotrichia Erysipelotrichales | Erysipelotrichaceae | Erysipelotrichaceae_UCG-004 |
| Rank | Kingdom   | Phylum          | Class             | Order            | Family             | Genus     |
|------|-----------|-----------------|-------------------|------------------|--------------------|-----------|
| 25   | Bacteria  | Firmicutes      | Erysipelotrichia   | Erysipelotrichales | Erysipelotrichaceae | Erysipelotrichaceae_UCG-006 |
| 25   | Bacteria  | Bacteroidetes   | Bacteroidia       | Flavobacteriales  | Flavobacteriaceae  | Flavobacterium          |
| 25   | Bacteria  | Actinobacteria  | Actinobacteria    | Corynebacteriales | Nocardiaceae       | Gordonia              |
| 25   | Bacteria  | Proteobacteria  | Gammaproteobacteria| Betaproteobacteriales | Burkholderiaceae | Herbaspirillum         |
| 25   | Bacteria  | Firmicutes      | Clostridia        | Clostridiales     | Lachnospiraceae    | Lachnoclostridium_10  |
| 25   | Bacteria  | Proteobacteria  | Deltaproteobacteria| Desulfovirionales | Desulfovirionaceae | Mailhella             |
| 25   | Bacteria  | Firmicutes      | Negativicutes     | Selenomonadiales  | Veillonellaceae    | Mitsuokella            |
| 25   | Bacteria  | Bacteroidetes   | Bacteroidia       | Bacteroidiales    | Rikenellaceae      | NA                    |
| 25   | Bacteria  | Proteobacteria  | NA                | NA               | NA                 | NA                    |
| 25   | Bacteria  | Firmicutes      | Bacillales        | Bacillales        | NA                 | NA                    |
| 25   | Bacteria  | Actinobacteria  | Actinobacteria    | Actinomycetales   | Actinomycetaceae   | NA                    |
| 25   | Bacteria  | Firmicutes      | Bacillales        | Bacillales        | Staphylococcaceae  | Nosocomiicoccus       |
| 25   | Bacteria  | Proteobacteria  | Alphaproteobacteria| Rhizobiales       | Rhizobiaceae       | Ochrobactrum           |
| 25   | Bacteria  | Firmicutes      | Clostridiales     | Clostridiales     | Lachnospiraceae    | Oribacterium           |
| 25   | Bacteria  | Firmicutes      | Bacillales        | Bacillales        | Bacillaceae        | Ornithinibacillus      |
| 25   | Bacteria  | Proteobacteria  | Alphaproteobacteria| Rhodobacteriales  | Rhodobacteraceae   | Paracoccus             |
| 25   | Bacteria  | Actinobacteria  | Propionibacteriales| Propionibacteriales | Propionibacteriaceae | Propionimicrobium |
| 25   | Bacteria  | Firmicutes      | Clostridiales     | Clostridiales     | Ruminococcaceae    | Ruminococcaceae_V9D2013_group |
| 25   | Bacteria  | Firmicutes      | Clostridiales     | Clostridiales     | Clostridaceae_1    | Sarcina               |
| 25   | Bacteria  | Proteobacteria  | Gammaproteobacteria| Enterobacteriales | Enterobacteriaceae | Shimwellia            |
| 25   | Bacteria  | Fusobacteria    | Fusobacteriales   | Fusobacteriales   | Leptotrichiaceae   | Sneathia              |
| 24   | Bacteria  | Synergistetes   | Synergista        | Synergistales     | Synergistaceae     | Synergistes            |
| 24   | Bacteria  | Firmicutes      | Bacillales        | Lactobacillales   | Aerococcaceae      | Aerococcus            |
| 24   | Bacteria  | Bacteroidetes   | Bacteroidales     | Bacteroidales     | Prevotellaceae     | Alloprevotella        |
| 24   | Bacteria  | Actinobacteria  | Bacillales        | Aerococcaceae     | Bifidobacteriaceae | Bifidobacteriaceae     |
| 24   | Bacteria  | Actinobacteria  | Bacillales        | Bacteroides       | Eubacteriaceae     | Anaerofustis          |
| 24   | Bacteria  | Firmicutes      | Bacillales        | Lactobacillales   | Veillonellaceae    | Anaeroglobus          |
| 24   | Bacteria  | Bacteroidetes   | Bacteroidales     | Muribaculaceae    | CAG-873             |
| 24   | Bacteria  | Actinobacteria  | Bacillales        | Micrococcales     | Promicromonosporaceae | Cellulosimicrobium |
| 24   | Bacteria  | Verrucomicrobia | Verrucomicrobiae  | Opitutales        | Puniceicoccaceae   | Cerasicoccus          |
| Rank | Kingdom  | Phylum          | Class             | Order               | Family               | Genus                        |
|------|----------|-----------------|-------------------|---------------------|----------------------|------------------------------|
| 24   | Bacteria | Firmicutes      | Clostridia        | Clostridiales       | Clostridiaceae_1      | Clostridium_sensu_stricto_3 |
| 24   | Bacteria | Proteobacteria  | Gammaproteobacteria | Betaproteobacteriales | Burkholderiaceae      | Comamonas                   |
| 24   | Bacteria | Actinobacteria  | Coriobacteria     | Coriobacteriales    | Eggerthellaceae       | DNF00809                    |
| 24   | Bacteria | Firmicutes      | Clostridia        | Clostridiales       | Coriobacteriaceae     | Enorma                      |
| 24   | Bacteria | Firmicutes      | Clostridia        | Clostridiales       | Lachnospiraceae       | Herbinix                    |
| 24   | Bacteria | Proteobacteria  | Gammaproteobacteria | Cardiobacteriales   | Wohlfahrtiimonadaceae | Ignatzschineria             |
| 24   | Bacteria | Firmicutes      | Clostridia        | Clostridiales       | Cardiobacteriaceae    | NA                          |
| 24   | Bacteria | Firmicutes      | Clostridia        | Clostridiales       | Mogibacteriaceae      | NA                          |
| 24   | Bacteria | Firmicutes      | Bacilli           | Lactobacillales     | Aerococcaceae         | NA                          |
| 24   | Bacteria | Proteobacteria  | Gammaproteobacteria | Aeromonadales       | Succinivibrionaceae   | NA                          |
| 24   | Bacteria | Proteobacteria  | Alphaproteobacteria | Rhodobacteriales    | Rhodobacteriaceae     | NA                          |
| 24   | Bacteria | Firmicutes      | Clostridia        | Clostridiales       | Peptostreptococcaceae | Paeniclostridium            |
| 24   | Bacteria | Actinobacteria  | Bacteroidiales    | Bacteroidales       | Prevotellaceae_UCG-001| Prevotellaceae_UCG-001      |
| 24   | Bacteria | Firmicutes      | Clostridia        | Clostridiales       | Micrococcaceae        | Pseudoduglamicibacter        |
| 24   | Bacteria | Actinobacteria  | Bacteroidiales    | Bacteroidales       | Rikenellaceae         | Rikenella                   |
| 24   | Bacteria | Firmicutes      | Clostridia        | Clostridiales       | Ruminococcaceae       | Ruminococcaceae_UCG-007     |
| 24   | Bacteria | Firmicutes      | Clostridia        | Clostridiales       | Family_XI             | Sedimentibacter             |
| 23   | Bacteria | Firmicutes      | Negativicutes     | Selenomonadales     | Veillonellaceae       | Allisonella                 |
| 23   | Bacteria | Firmicutes      | Clostridia        | Clostridiales       | Bacteroidales         | Dysgonomonadaceae          | Dysgonomonas                |
| 23   | Bacteria | Firmicutes      | Clostridia        | Clostridiales       | Methanomassiliicoccales | Methanomassiliicoccales   | Methanomassiliicoccus       |
| 23   | Bacteria | Firmicutes      | Clostridia        | Clostridiales       | Bacteroidales         | Veillonellaceae             | Allisonella                 |
| 23   | Bacteria | Firmicutes      | Clostridia        | Clostridiales       | Peptostreptococcaceae | Peptostreptococcus          | Peptostreptococcus          |
| 23   | Bacteria | Firmicutes      | Clostridia        | Clostridiales       | Rikenellaceae         | Rikenellaceae_RC9_gut_group| Rikenellaceae_RC9_gut_group|
| 22   | Bacteria | Firmicutes      | Clostridia        | Clostridiales       | Lactobacillales       | Streptococcaceae           | Streptococcus               |
| 22   | Bacteria | Firmicutes      | Erysipelotrichia  | Erysipelotrichiales | Erysipelotrichiaceae  | Dielma                      |
| 22   | Bacteria | Firmicutes      | Fusobacteria      | Fusobacteriales     | Fusobacteriaceae      | Fusobacterium              |
| 22   | Bacteria | Firmicutes      | Erysipelotrichia  | Erysipelotrichiales | Erysipelotrichiaceae  | Holdemanella               |
| 22   | Bacteria | Firmicutes      | Clostridia        | Clostridiales       | Ruminococcaceae       | NA                         |
| 22   | Bacteria | Firmicutes      | Clostridia        | Clostridiales       | Pseudomonadaceae      | NA                         |
| 22   | Bacteria | Firmicutes      | Clostridia        | Clostridiales       | NA                   | NA                         |
| 22   | Bacteria | Lentisphaerae   | Lentsiphaeria     | Victivallales       | vadinBE97             | NA                         |
| 22   | Bacteria | Firmicutes      | Clostridia        | Clostridiales       | Marinilaceae          | Sanguibacteroides          |
|   | 22 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 20 | 20 | 20 | 20 | 20 | 20 | 19 | 19 | 19 | 19 | 19 | 19 | 18 | 18 | 18 | 18 |
|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
|   | FALSE Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Tyzzerella_4 |
|   | FALSE Bacteria | Firmicutes | Clostridia | Clostridiales | Defluviitaleaceae | Defluviitaleaceae_UCG-011 |
|   | FALSE Bacteria | Actinobacteria | Coriobacteria | Coriobacteriales | Eggerthellaceae | Enterorhabdus |
|   | FALSE Bacteria | Proteobacteria | Gammaproteobacteria | Pasteurellales | Pasteurellaceae | Haemophilus |
|   | FALSE Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Peptococcaceae | Peptococcus |
|   | FALSE Bacteria | Firmicutes | Clostridia | Clostridiales | Xanthomonadaceae | Pseudoxanthomonas |
|   | FALSE Bacteria | Firmicutes | Clostridia | Clostridiales | Enterorhabdus |
|   | FALSE Bacteria | Firmicutes | Bacilli | Bacillales | Paenibacillaceae | Brevibacillus |
|   | FALSE Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Eisenbergiella |
|   | FALSE Bacteria | Firmicutes | Clostridia | Clostridiales | Moryella |
|   | FALSE Bacteria | Firmicutes | Clostridia | Clostridiales | Methanomethylophilaceae | NA |
|   | FALSE Bacteria | Actinobacteria | Streptomyctales | Streptomycetaceae | Streptomyces |
|   | FALSE Bacteria | Firmicutes | Clostridia | Clostridiales | Methanomassiliicoccales | NA |
|   | FALSE Bacteria | Firmicutes | Clostridia | Clostridiales | Christensenellaceae | NA |
|   | FALSE Bacteria | Firmicutes | Clostridia | Clostridiales | Enterobacteriaceae | Providencia |
|   | FALSE Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Ruminiclostridium_1 |
|   | FALSE Bacteria | Firmicutes | Erysipelotrichia | Erysipelotrichales | Erysipelotrichaceae | Solobacterium |
|   | FALSE Bacteria | Actinobacteria | Micrococcales | Micrococcaceae | Brevibacteriaceae | Brevibacterium |
|   | FALSE Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | CAG-352 |
|   | FALSE Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Epulipiscium |
|   | FALSE Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Hydrogenoanaerobacterium |
|   | FALSE Bacteria | Bacteroidetes | Bacteroidia | Bacteroidales | Prevotellaceae | Prevotella_6 |
|   | FALSE Bacteria | Synergistetes | Synergistia | Synergistales | Synergistaceae | Pyramidobacter |
|   | FALSE Bacteria | Firmicutes | Erysipelotrichia | Erysipelotrichales | Erysipelotrichaceae | Catenibacterium |
|   | FALSE Bacteria | Firmicutes | Clostridia | Clostridiales | Enterobacteriaceae | Edwardsiella |
|   | FALSE Bacteria | Firmicutes | Clostridia | Clostridiales | Enterobacteriaceae | GCA-900066225 |
|   | FALSE Bacteria | Firmicutes | Bacilli | Bacillales | Planococcaceae | Lysinibacillus |
|   | FALSE Bacteria | Actinobacteria | Micrococcales | Micrococcaceae | Micrococcus |
|   | FALSE Bacteria | Bacteroidetes | Bacteroidia | Bacteroidales | Prevotellaceae | Prevotella_2 |
|   | FALSE Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Sellimonas |
| Rank | Kingdom     | Phylum          | Class           | Order           | Family            | Genus        |
|------|-------------|-----------------|-----------------|-----------------|-------------------|--------------|
| 17   | Bacteria    | Bacteroidetes   | Bacteroidiales  | Barnesiellacea  | Coprobacter       |              |
| 17   | Bacteria    | Firmicutes      | Negativicutes   | Selenomonadales | Veillonellaceae   | Megasphaera  |
| 17   | Bacteria    | Actinobacteria  | Actinobacteria  | Corynebacteriales| Corynebacteriaceae| NA           |
| 17   | Bacteria    | Actinobacteria  | Bacteroides     | Bacteroidales   | Muralbaculacea    | NA           |
| 17   | Bacteria    | Firmicutes      | Clostridia      | DTU014          | NA                | NA           |
| 16   | Bacteria    | Firmicutes      | Bacilli         | Bacillales      | Bacillaceae       | Pseudogracilibacillus |
| 16   | Bacteria    | Firmicutes      | Clostridia      | Clostridiales   | Peptostreptococcaceae | Terrisporobacter |
| 16   | Bacteria    | Firmicutes      | Negativicutes   | Selenomonadales | Acidaminococcaceae| Acidaminoccus |
| 16   | Bacteria    | Actinobacteria  | Actinobacteria  | Corynebacteriales| Corynebacteriaceae| Corynebacterium |
| 16   | Bacteria    | Actinobacteria  | Clostridia      | Clostridiales   | Lachnospiraceae   | Butyrivirio  |
| 16   | Bacteria    | Actinobacteria  | Clostridia      | Clostridiales   | Bifidobacteriaceae| Gardnerella  |
| 15   | Bacteria    | Firmicutes      | Micrococcales   | Micrococcae     | Kocuria           |              |
| 15   | Bacteria    | Actinobacteria  | Actinobacteria  | Corynebacteriales| Corynebacteriaceae| Corynebacterium |
| 15   | Bacteria    | Actinobacteria  | Propionibacteres| Propionibacteriales| Propionibacterium |
| 15   | Bacteria    | Firmicutes      | Clostridiales   | Clostridiales   | Ruminococcaceae   | Ruminococcaceae_UCG-005 |
| 14   | Bacteria    | Firmicutes      | Clostridiales   | Clostridiales   | Ruminococcaceae   | Acetanaerobacterium |
| 14   | Bacteria    | Firmicutes      | Clostridiales   | Clostridiales   | Ruminococcaceae   | Anaerofilum  |
| 14   | Bacteria    | Synergistetes   | Synergistiales  | Synergistiales  | Synergistaceae    | Cloacibacillus |
| 14   | Bacteria    | Firmicutes      | Bacilli         | Lactobacillales | Leuconostocacae   | Leuconostoc  |
| 14   | Bacteria    | Firmicutes      | Clostridiales   | NA              | NA                |              |
| 14   | Bacteria    | Firmicutes      | Clostridiales   | Peptostreptococcaceae | Peptoclostridium |
| 14   | Bacteria    | Firmicutes      | Clostridiales   | Ruminococcaceae | Ruminiclostridium_5 |
| 14   | Bacteria    | Firmicutes      | Negativicutes   | Selenomonadales | Acidaminococcaceae| Succiniliclasticum |
| 13   | Bacteria    | Proteobacteria  | Alphaproteobacteria | Rhizobiales | Rhizobiaceae | Brucella   |
| 13   | Bacteria    | Firmicutes      | Clostridiales   | Lachnospiraceae | Lactonifactor     |              |
| 13   | Bacteria    | Bacteroidetes   | Bacteroidales   | Barnesiellaceae | NA                |              |
| 13   | Bacteria    | Patescibacteria | Saccharimonadina | Saccharimonadales | NA              |              |
| 13   | Bacteria    | Tenericutes     | Mollicutes      | Mollicutes_RF39 | NA                |              |
| 13   | Bacteria    | Bacteroidetes   | Bacteroidales   | Prevotellaceae  | Prevotellaceae_NK3B31_group |
| 12   | Bacteria    | Firmicutes      | Clostridiales   | Ruminococcaceae | Ruminiclostridium |
| 12   | Bacteria    | Firmicutes      | Clostridiales   | Ruminococcaceae | Angelakisella     |
| Rank | TRUE/FALSE | Domain | Phylum | Subphylum | Class | Order | Familia | Genus | Scientific Name |
|------|------------|--------|--------|-----------|-------|-------|---------|-------|-----------------|
| 12   | FALSE      | Bacteria| Firmicutes| Clostridia| Clostridiales | Ruminococcaceae | Caproiciproducens |
| 12   | FALSE      | Bacteria| Firmicutes| Clostridia| Clostridiales | Christensenellaceae | Catabacter |
| 12   | FALSE      | Bacteria| Firmicutes| Erysipelotrichia| Erysipelotrichales | Erysipelotrichaceae | Coprobacillus |
| 12   | FALSE      | Bacteria| Firmicutes| Clostridia| Clostridiales | Lachnospiraceae | GCA-900066755 |
| 12   | FALSE      | Bacteria| Firmicutes| Clostridia| Clostridiales | Lachnospiraceae | Lachnospiraceae_NK4B4_group |
| 12   | FALSE      | Bacteria| Firmicutes| Erysipelotrichia| Erysipelotrichales | Erysipelotrichaceae | Coprobacillus |
| 12   | FALSE      | Bacteria| Firmicutes| Clostridia| Clostridiales | Ruminococcaceae | Ruminococcaceae_UCG-004 |
| 12   | FALSE      | Bacteria| Firmicutes| Clostridia| Clostridiales | Leuconostocaceae | Weissella |
| 12   | FALSE      | Bacteria| Firmicutes| Bacilli| Lactobacillales | Leuconostocaceae | Oxalobacter |
| 11   | FALSE      | Bacteria| Actinobacteria| Coriobacteriia| Coriobacteriales | Eggerthellaceae | Adlercreutzia |
| 11   | FALSE      | Bacteria| Actinobacteria| Coriobacteriia| Coriobacteriales | Christensenellaceae | Christensenellaceae_R-7_group |
| 11   | FALSE      | Bacteria| Actinobacteria| Coriobacteriia| Coriobacteriales | Eggerthellaceae | Gordonibacter |
| 11   | FALSE      | Bacteria| Actinobacteria| Coriobacteriia| Coriobacteriales | Ruminococcaceae | Harryflintia |
| 11   | FALSE      | Bacteria| Actinobacteria| Coriobacteriia| Coriobacteriales | Lachnospiraceae | Lachnospiraceae_FCS020_group |
| 11   | FALSE      | Bacteria| Actinobacteria| Coriobacteriia| Coriobacteriales | Lachnospiraceae | Lachnospiraceae_UCG-010 |
| 11   | FALSE      | Bacteria| Actinobacteria| Coriobacteriia| Coriobacteriales | NA | NA |
| 11   | FALSE      | Bacteria| Actinobacteria| Coriobacteriia| Coriobacteriales | NA | NA |
| 11   | FALSE      | Bacteria| Actinobacteria| Actinobacteria| Micrococcales | Lachnospiraceae | Shuttleworthia |
| 10   | FALSE      | Bacteria| Firmicutes| Bacilli| Lactobacillales | Streptococcaceae | Lactococcus |
| 10   | FALSE      | Bacteria| Firmicutes| Bacilli| Bacillales | Bacillaceae | NA |
| 10   | FALSE      | Bacteria| Firmicutes| Bacilli| Bacillales | Paenibacillaceae | Paenibacillus |
| 10   | FALSE      | Bacteria| Actinobacteria| Coriobacteriia| Coriobacteriales | Eggerthellaceae | Slackia |
| 9     | FALSE      | Bacteria| Firmicutes| Erysipelotrichia| Erysipelotrichales | Erysipelotrichaceae | Candidatus_Stoquefichus |
| 9     | FALSE      | Bacteria| Firmicutes| Clostridia| Clostridiales | Family_XIII | Family_XIII_AD3011_group |
| 9     | FALSE      | Bacteria| Firmicutes| Negativicutes| Selenomonadales | Veillonellaceae | Megamonas |
| 9     | FALSE      | Bacteria| Patescibacteria| Saccharimonadaceae| Saccharimonadaceae | Saccharimonadaceae | NA |
| 9     | FALSE      | Bacteria| Actinobacteria| Coriobacteriia| Coriobacteriales | Coriobacteriales_Incertae_Sedis | NA |
| 9     | FALSE      | Bacteria| Proteobacteria| Deltaproteobacteria| Desulfovibrionales | Desulfovibrionaceae | NA |
| 9     | FALSE      | Bacteria| Firmicutes| Bacilli| Bacillales | Bacillaceae | Oceanobacillus |
| 9     | FALSE      | Bacteria| Firmicutes| Clostridia| Clostridiales | Ruminococcaceae | Oscillibacter |
| 9     | FALSE      | Bacteria| Firmicutes| Clostridia| Clostridiales | Peptostreptococcaceae | Romboutsia |
| 9     | FALSE      | Bacteria| Proteobacteria| Gammaproteobacteria| Betaproteobacterialae | Burkholderiaceae | Sutterella |
| Rank | phylum         | class          | order            | family            | genus         |
|------|----------------|----------------|------------------|-------------------|---------------|
| 8    | False Bacteria | Actinobacteria | Coriobacteria    | Coriobacteriales  | Eggerthellaceae | Eggerthella  |
| 8    | False Bacteria | Firmicutes     | Clostridia       | Clostridiales     | Ruminococcaceae | Flavonifractor |
| 8    | False Bacteria | Proteobacteria | Gammaproteobacteria Enterobacteriales | Enterobacteriaceae | Morganella  |
| 8    | False Bacteria | Firmicutes     | Bacilli           | Bacillales        | Planococcaceae | NA         |
| 8    | False Bacteria | Bacteroidetes  | Bacteroidia      | Bacteroidales     | NA            | NA         |
| 8    | False Bacteria | Cyanobacteria  | Melainabacteria  | Gastranaerophilales | NA            | NA         |
| 8    | False Bacteria | Firmicutes     | Clostridia       | Clostridiales     | Lachnospiraceae | Tyzzerella_3 |
| 7    | False Bacteria | Firmicutes     | Clostridia       | Clostridiales     | Lachnospiraceae | Coprococcus_1 |
| 7    | False Bacteria | Firmicutes     | Clostridia       | Clostridiales     | Lachnospiraceae | Marvinbryantia |
| 7    | False Bacteria | Bacteroidetes  | Bacteroidia      | Bacteroidales     | Prevotellaceae  | Prevotella_7  |
| 7    | False Bacteria | Firmicutes     | Clostridia       | Clostridiales     | Ruminococcaceae | Ruminococcaceae_UCG-010 |
| 7    | False Bacteria | Firmicutes     | Bacilli           | Bacillales        | Staphylococcaceae | Staphylococcus |
| 7    | False Bacteria | Firmicutes     | Clostridia       | Clostridiales     | UC5-1-2E3      |            |
| 6    | False Bacteria | Proteobacteria | Deltaproteobacteria Desulfovibrionales | Desulfovibrioaceae | Bilophila    |
| 6    | False Bacteria | Firmicutes     | Clostridia       | Clostridiales     | Lachnospiraceae | CAG-56      |
| 6    | False Bacteria | Firmicutes     | Clostridia       | Clostridiales     | Lachnospiraceae | Coprococcus_2 |
| 6    | False Bacteria | Firmicutes     | Clostridia       | Clostridales      | Clostridiales_vadinBB60_group | NA         |
| 6    | False Bacteria | Bacteroidetes  | Bacteroidia      | Bacteroidales     | Tannerellaceae  | Parabacteroides |
| 6    | False Bacteria | Bacteroidetes  | Bacteroidia      | Bacteroidales     | Prevotellaceae  | Prevotella_9  |
| 5    | False Bacteria | Bacteroidetes  | Bacteroidia      | Bacteroidales     | Rikenellaceae   | Alistipes    |
| 5    | False Bacteria | Firmicutes     | Negativicutes    | Selenomonadales   | Veillonellaceae | Dialister    |
| 5    | False Bacteria | Firmicutes     | Clostridia       | Clostridiales     | Lachnospiraceae | Dorea        |
| 4    | False Bacteria | Firmicutes     | Clostridia       | Clostridiales     | Lachnospiraceae | Lachnospiraceae_NK4A136_group |
| 4    | False Bacteria | Firmicutes     | Negativicutes    | Selenomonadales   | Acidaminococcaceae | Phascolarctobacterium |
| 3    | False Bacteria | Proteobacteria | Gammaproteobacteria Enterobacteriales | Enterobacteriaceae | Escherichia/Shigella |
| 3    | False Bacteria | Proteobacteria | Alphaproteobacteria Rhodospirillales | NA | NA |
| 3    | False Bacteria | Proteobacteria | Gammaproteobacteria Betaproteobacteriales | Burkholderiaceae | Parasutterella |
| 2    | False Bacteria | Actinobacteria | Coriobacteria    | Coriobacteriales  | Coriobacteriaceae | Collinsella |
| 2    | False Bacteria | Firmicutes     | Clostridia       | Clostridiales     | Ruminococcaceae | Fournierella |
| 2    | False Bacteria | Proteobacteria | Gammaproteobacteria Enterobacteriales | Enterobacteriaceae | Klebsiella |
| 2    | False Bacteria | Bacteroidetes  | Bacteroidia      | Bacteroidales     | Marinifilaceae  | Odoribacter |
| 2    | False Bacteria | Bacteroidetes  | Bacteroidia      | Bacteroidales     | Prevotellaceae  | Paraprevotella |
| 1    | False Bacteria | Firmicutes     | Clostridia       | Clostridiales     | Clostridiae_m_1 | Clostridium_sensu_stricto_1 |
| 1    | False Bacteria | Firmicutes     | Clostridia       | Clostridiales     | Lachnospiraceae | Coprococcus_3 |
| 1    | False Bacteria | Firmicutes     | Bacilli           | Lactobacillales   | Enterococcaceae | Enterococcus |
| Rank | Kingdom    | Phylum     | Class      | Order       | Family       | Genus       |
|------|------------|------------|------------|-------------|--------------|-------------|
| 1    | Bacteria   | Firmicutes | Clostridia | Clostridiales | Peptostreptococcaceae | Intestinibacter |
| 1    | Bacteria   | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae    | Negativibacillus  |
| 1    | Bacteria   | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae    | Ruminococcaceae_NK4A214_group |
| 1    | Bacteria   | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae    | Ruminococcaceae_UCG-003   |
| 0    | Bacteria   | Verrucomicrobia | Verrucomicrobiae | Verrucomicrobiales | Akkermansiaceae   | Akkermansia          |
| 0    | Bacteria   | Bacteroidetes | Bacteroidia | Bacteroidales  | Barnesiellaceae   | Barnesiella          |
| 0    | Bacteria   | Proteobacteria | Gammaproteobacteria | Enterobacteriales | Enterobacteriaceae | NA                |
| 0    | Bacteria   | Firmicutes | Bacilli    | Bacillales    | NA             | NA                |
| 0    | Bacteria   | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae    | Ruminococcaceae_UCG-002 |
| 0    | Bacteria   | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae    | Subdoligranulum     |
| 0    | Bacteria   | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae   | Tyzzerella          |
**Supplementary Table 4. MWAS of dataset 1 conducted using Kruskal-Wallis**

Sample size for KW included all samples: N= 201 cases and 132 controls in dataset 1. MRA= mean relative abundance, FC=fold change in patients (PD MRA/control MRA), P= unadjusted significance, FDR (BH)= false discovery rate, adjusted significance. Unclassified genera and genera present in <10% of subjects were excluded from this analysis.

| PD MRA | Control MRA | FC  | P     | FDR (BH) | Kingdom | Phylum | Class | Order                  | Family                   | Genus                        |
|--------|-------------|-----|-------|----------|---------|--------|-------|------------------------|---------------------------|------------------------------|
| 0.0005 | 0.0012      | 0.37| 4E-06 | 2E-04    | Bacteria | Firmicutes | Clostridia | Clostridales | Lachnospiraceae | Lachnospiraceae_ND3007_group |
| 0.0027 | 0.0004      | 6.61| 2E-06 | 2E-04    | Bacteria | Firmicutes | Bacilli | Lactobacillales | Lactobacillaceae | Lactobacillus               |
| 0.0191 | 0.0362      | 0.53| 7E-06 | 2E-04    | Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Agathobacter                 |
| 0.0153 | 0.0084      | 1.83| 5E-05 | 1E-03    | Bacteria | Actinobacteria | Actinobacteria | Bifidobacteriales | Bifidobacteriaceae | Bifidobacterium             |
| 0.0008 | 0.0001      | 13.03| 8E-05 | 1E-03    | Bacteria | Synergistetes | Synergistia | Synergistales | Synergistaceae | Cloacibacterium             |
| 0.0353 | 0.0564      | 0.63| 9E-05 | 1E-03    | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococccaeae | Faecalibacterium            |
| 0.0036 | 0.0004      | 8.14| 9E-05 | 1E-03    | Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Hungatella                  |
| 0.0029 | 0.0037      | 0.80| 1E-04 | 1E-03    | Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Lachnospira                 |
| 0.0047 | 0.0012      | 3.77| 1E-04 | 1E-03    | Bacteria | Firmicutes | Negativicutes | Selenomonadales | Veillonellaceae | Megasphaera                 |
| 0.0034 | 0.0008      | 4.20| 1E-04 | 1E-03    | Bacteria | Bacteroidetes | Bacteroidia | Bacteroidales | Porphyromonadaceae | Porphyromonas               |
| 0.0140 | 0.0205      | 0.68| 2E-04 | 2E-03    | Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Blautia                     |
| 0.0017 | 0.0001      | 12.72| 4E-04 | 4E-03    | Bacteria | Firmicutes | Erysipelotrichia | Erysipelotrichiales | Erysipelotrichaceae | Coprobacillus             |
| 0.0077 | 0.0160      | 0.48| 4E-04 | 4E-03    | Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Roseburia                  |
| 0.0038 | 0.0015      | 2.56| 7E-04 | 6E-03    | Bacteria | Bacteroidetes | Bacteroidia | Bacteroidales | Prevotellaceae | Prevotella                  |
| 0.0541 | 0.0218      | 2.48| 1E-03 | 7E-03    | Bacteria | Verrucomicrobia | Verrucomicrobiae | Verrucomicrobiae | Akkermansiaiae | Akkermansia               |
| 0.0012 | 0.0019      | 0.66| 1E-03 | 7E-03    | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Butyrificoccus             |
| 0.0045 | 0.0023      | 1.95| 1E-03 | 8E-03    | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | UBA1819                   |
| 0.0005 | 0.0001      | 4.95| 2E-03 | 0.01     | Bacteria | Actinobacteria | Actinobacteria | Actinomycetales | Actinomycetaeae | Varibaculum             |
| 0.0020 | 0.0010      | 1.96| 2E-03 | 0.01     | Bacteria | Actinobacteria | Actinobacteria | Corynebacteriales | Corynebacteriaceae | Corynebacterium_1         |
| 0.0006 | 0.0003      | 1.76| 3E-03 | 0.01     | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Ruminococcaceae_UCG-004  |
| 0.0021 | 0.0038      | 0.56| 3E-03 | 0.02     | Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Fusicatenibacter           |
| 0.0003 | 0.0007      | 0.48| 4E-03 | 0.02     | Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Lachnospiraceae_UCG-004  |
| 0.0004 | 0.0006      | 0.65| 4E-03 | 0.02     | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Oscillospira               |
| OTU   | Rank    | Class      | Order     | Family     | Genus          | Species     |
|-------|---------|------------|-----------|------------|----------------|-------------|
| 0.0007 | 0.0040  | 0.69       | 5E-03     | 0.02       | Bacteria       | Firmicutes  |
| 0.0015 | 0.0013  | 1.16       | 5E-03     | 0.02       | Bacteria       | Proteobacteria |
| 0.0006 | 0.0002  | 2.86       | 6E-03     | 0.03       | Bacteria       | Firmicutes  |
| 0.0006 | 0.0004  | 1.37       | 7E-03     | 0.03       | Archaea        | Euryarchaeota |
| 0.0071 | 0.0021  | 3.32       | 8E-03     | 0.03       | Bacteria       | Firmicutes  |
| 0.0003 | 0.0017  | 0.17       | 9E-03     | 0.03       | Bacteria       | Proteobacteria |
| 0.2148 | 0.2479  | 0.87       | 0.01      | 0.04       | Bacteria       | Bacteroidetes |
| 0.0043 | 0.0029  | 1.47       | 0.01      | 0.05       | Bacteria       | Proteobacteria |
| 0.0014 | 0.0018  | 0.77       | 0.02      | 0.07       | Bacteria       | Firmicutes  |
| 0.0008 | 0.0013  | 0.64       | 0.02      | 0.07       | Bacteria       | Firmicutes  |
| 0.0006 | 0.0005  | 1.13       | 0.03      | 0.09       | Bacteria       | Firmicutes  |
| 0.0012 | 0.0009  | 1.32       | 0.03      | 0.10       | Bacteria       | Firmicutes  |
| 0.0013 | 0.0014  | 0.95       | 0.03      | 0.10       | Bacteria       | Firmicutes  |
| 0.0021 | 0.0014  | 1.42       | 0.04      | 0.10       | Bacteria       | Firmicutes  |
| 0.0023 | 0.0009  | 2.58       | 0.04      | 0.10       | Bacteria       | Firmicutes  |
| 0.0008 | 0.0002  | 3.81       | 0.04      | 0.10       | Bacteria       | Epsilonbacteraeota |
| 0.0003 | 0.0001  | 2.12       | 0.04      | 0.11       | Bacteria       | Firmicutes  |
| 0.0052 | 0.0079  | 0.66       | 0.04      | 0.12       | Bacteria       | Firmicutes  |
| 0.0060 | 0.0092  | 0.65       | 0.04      | 0.12       | Bacteria       | Firmicutes  |
| 0.0020 | 0.0005  | 4.09       | 0.05      | 0.13       | Bacteria       | Bacteroidetes |
| 0.0009 | 0.0011  | 0.86       | 0.06      | 0.15       | Bacteria       | Firmicutes  |
| 0.0302 | 0.0233  | 1.29       | 0.07      | 0.15       | Bacteria       | Bacteroidetes |
| 0.0070 | 0.0067  | 1.05       | 0.06      | 0.15       | Bacteria       | Firmicutes  |
| 0.0006 | 0.0001  | 5.47       | 0.07      | 0.16       | Bacteria       | Firmicutes  |
| 0.0015 | 0.0004  | 3.31       | 0.08      | 0.17       | Bacteria       | Firmicutes  |
| 0.0020 | 0.0031  | 0.67       | 0.08      | 0.17       | Bacteria       | Firmicutes  |
| 0.0036 | 0.0032  | 1.14       | 0.08      | 0.17       | Bacteria       | Firmicutes  |
| 0.0015 | 0.0022  | 0.69       | 0.09      | 0.20       | Bacteria       | Firmicutes  |
| 0.0002 | 0.0002  | 0.80       | 0.11      | 0.23       | Bacteria       | Actinobacteria |
| 0.0002 | 0.0001  | 3.08       | 0.11      | 0.23       | Bacteria       | Firmicutes  |
| %   | 0.0020 | 0.0016 | 1.28  | 0.12  | 0.24  | Bacteria | Bacteroidetes | Bacteroidia | Bacteroidales | Marinililaceae | Butyricimonas |
|-----|--------|--------|-------|-------|-------|----------|-------------|-------------|--------------|---------------|---------------|
| %   | 0.0032 | 0.0014 | 2.30  | 0.13  | 0.25  | Bacteria | Fusobacteria | Fusobacteria | Fusobacteriales | Fusobacteriaceae | Fusobacterium |
| %   | 0.0027 | 0.0014 | 1.96  | 0.13  | 0.25  | Bacteria | Firmicutes   | Erysipelotrichia | Erysipelotrichales | Erysipelotrichaceae | Holdemanella |
| %   | 0.0038 | 0.0024 | 1.60  | 0.14  | 0.27  | Bacteria | Firmicutes   | Clostridia   | Clostridiales  | Ruminococaceae  | Ruminoclostridium_5 |
| %   | 0.0039 | 0.0022 | 1.74  | 0.15  | 0.27  | Bacteria | Firmicutes   | Negativicutes | Selenomonadales | Acidaminococcaceae | Acidaminococcus |
| %   | 0.0058 | 0.0034 | 1.69  | 0.15  | 0.27  | Bacteria | Firmicutes   | Clostridia   | Clostridiales  | Lachnospiraceae  | Tyzzerella_4   |
| %   | 0.0386 | 0.0337 | 1.15  | 0.16  | 0.28  | Bacteria | Bacteroidetes | Bacteroidia | Bacteroidiales | Rikenellaceae   | Alistipes |
| %   | 0.0015 | 0.0004 | 3.79  | 0.16  | 0.28  | Bacteria | Firmicutes   | Erysipelotrichia | Erysipelotrichales | Erysipelotrichaceae | Faecalitalea |
| %   | 0.0003 | 0.0005 | 4.63  | 0.16  | 0.28  | Bacteria | Lentisphaerae | Lentisphaeraceae | Victivallaceae | Victivallis |
| %   | 0.0003 | 0.0005 | 5.71  | 0.17  | 0.29  | Bacteria | Firmicutes   | Clostridiales | Clostridiales  | Lachnospiraceae  | CAG-56 |
| %   | 0.0006 | 0.0009 | 0.64  | 0.18  | 0.30  | Bacteria | Firmicutes   | Clostridiales | Clostridiales  | Ruminococaceae  | Ruminococaceae_UCG-002 |
| %   | 0.0100 | 0.0071 | 1.45  | 0.24  | 0.39  | Bacteria | Firmicutes   | Clostridiales | Clostridiales  | Family_XI       | Finegoldia |
| %   | 0.0002 | 0.0003 | 0.65  | 0.25  | 0.40  | Bacteria | Firmicutes   | Clostridiales | Clostridiales  | Ruminococaceae  | GCA-900066225 |
| %   | 0.0065 | 0.0046 | 1.41  | 0.26  | 0.42  | Bacteria | Firmicutes   | Clostridiales | Clostridiales  | Christensenellaceae | Christensenellaceae_R-7_group |
| %   | 0.0004 | 0.0001 | 3.97  | 0.27  | 0.42  | Bacteria | Firmicutes   | Erysipelotrichia | Erysipelotrichales | Erysipelotrichaceae | Dielma |
| %   | 0.0072 | 0.0071 | 1.02  | 0.28  | 0.44  | Bacteria | Firmicutes   | Clostridiales | Clostridiales  | Ruminococaceae  | Ruminococcus_1 |
| %   | 0.0024 | 0.0029 | 0.83  | 0.29  | 0.45  | Bacteria | Firmicutes   | Clostridiales | Clostridiales  | Ruminococaceae  | Dorea |
| %   | 0.0002 | 0.0003 | 0.75  | 0.31  | 0.48  | Bacteria | Firmicutes   | Clostridiales | Clostridiales  | Ruminococaceae  | DTU089 |
| %   | 0.0015 | 0.0013 | 1.15  | 0.32  | 0.48  | Bacteria | Firmicutes   | Clostridiales | Clostridiales  | Peptostreptococcaceae | Intestinibacter |
| %   | 0.0038 | 0.0032 | 1.19  | 0.32  | 0.48  | Bacteria | Firmicutes   | Clostridiales | Clostridiales  | Ruminococaceae  | Ruminococaceae_UCG_0024 |
| %   | 0.0033 | 0.0040 | 0.82  | 0.34  | 0.50  | Bacteria | Proteobacteria | Gammaproteobacteria | Betaproteobacteriales | Burkholderiaceae | Sutterella |
| %   | 0.0077 | 0.0082 | 0.94  | 0.36  | 0.52  | Bacteria | Firmicutes   | Clostridiales | Clostridiales  | Ruminococaceae  | Ruminococaceae_UCG_014 |
| %   | 0.0023 | 0.0023 | 0.99  | 0.39  | 0.55  | Bacteria | Bacteroidetes | Bacteroidia | Bacteroidiales | Marinililaceae | Odoribacter |
| %   | 0.0004 | 0.0004 | 0.94  | 0.43  | 0.59  | Bacteria | Firmicutes   | Erysipelotrichia | Erysipelotrichales | Erysipelotrichaceae | Holdemania |
| %   | 0.0015 | 0.0012 | 1.26  | 0.43  | 0.60  | Bacteria | Firmicutes   | Clostridiales | Clostridiales  | Peptostreptococcaceae | Romboutsia |
| %   | 0.0006 | 0.0005 | 1.19  | 0.44  | 0.60  | Bacteria | Firmicutes   | Clostridiales | Clostridiales  | Lachnospiraceae  | Coprococcus_1 |
| %   | 0.0087 | 0.0126 | 0.69  | 0.45  | 0.60  | Bacteria | Proteobacteria | Gammaproteobacteria | Pseudomonadales | Moraxellaceae | Acinetobacter |
| %   | 0.0005 | 0.0008 | 0.66  | 0.45  | 0.60  | Bacteria | Firmicutes   | Erysipelotrichia | Erysipelotrichales | Erysipelotrichaceae | Erysipelotoclostridium |
| %   | 0.0003 | 0.0005 | 0.51  | 0.47  | 0.61  | Bacteria | Bacteroidetes | Bacteroidia | Bacteroidiales | Barnesiellaceae | Coprobacter |
| Percentage | Relative Abundance | Bacteria | Phylum | Class | Order | Family | Genus | Species |
|------------|--------------------|----------|-------|-------|-------|--------|-------|---------|
| 0.0002     | 1.36               | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Negativibacillus |
| 0.0010     | 1.10               | Bacteria | Firmicutes | Bacteroidetes | Bacteroidia | Bacteroidiales | Prevotellaceae | Prevotella_7 |
| 0.0042     | 0.46               | Bacteria | Firmicutes | Clostridiales | Clostridiales | Lachnospiraceae | Lachnospiraceae_NK4A136_group |
| 0.0040     | 0.50               | Bacteria | Firmicutes | Bacilli | Lactobacillales | Streptococcaceae | Streptococcus |
| 0.0064     | 0.52               | Bacteria | Firmicutes | Bacteroidetes | Bacteroidia | Bacteroidiales | barnesiellaceae | barnesiella |
| 0.0121     | 0.52               | Bacteria | Firmicutes | Clostridiales | Clostridiales | Ruminococcaceae | Subdoligranulum |
| 0.0007     | 0.56               | Bacteria | Firmicutes | Erysipelotrichia | Erysipelotrichiales | Erysipelotrichaceae |
| 0.0024     | 0.58               | Bacteria | Firmicutes | Bacillia | Lactobacillales | Enterococcaceae | Enterococcus |
| 0.0010     | 0.59               | Bacteria | Firmicutes | Actinobacteria | Coriobacteria | Coriobacteriales | Barnesiella |
| 0.0026     | 0.60               | Bacteria | Firmicutes | Clostridiales | Clostridiales | Ruminococcaceae | Ruminiclostridium_9 |
| 0.0012     | 0.61               | Bacteria | Firmicutes | Negativicutes | Selenomonadales | Veillonellaceae |
| 0.0008     | 0.62               | Bacteria | Firmicutes | Bacilli | Lactobacillales | Enterococcaceae | Enterococcus |
| 0.0001     | 0.63               | Bacteria | Firmicutes | Clostridiales | Clostridiales | Ruminococcaceae | Angelakisella |
| 0.1131     | 0.64               | Bacteria | Proteobacteria | Gammaproteobacteria | Enterobacteriales | Enterobacteriaceae | Escherichia/Shigella |
| 0.0021     | 0.64               | Bacteria | Firmicutes | Clostridiales | Clostridiales | Lachnospiraceae | Tyzzerella |
| 0.0017     | 0.74               | Bacteria | Firmicutes | Clostridiales | Clostridiales | Ruminococcaceae | CAG-352 |
| 0.0211     | 0.78               | Bacteria | Proteobacteria | Gammaproteobacteria | Selenomonadales | Pseudomonadaceae |
| 0.0079     | 0.81               | Bacteria | Firmicutes | Negativicutes | Selenomonadales | Veillonellaceae | Dialister |
| 0.0024     | 0.81               | Bacteria | Firmicutes | Clostridiales | Clostridiales | Ruminococcaceae | Flavonifractor |
| 0.0390     | 0.82               | Bacteria | Proteobacteria | Gammaproteobacteria | Betaproteobacteriales | Burkholderiaceae | Parasutterella |
| 0.0115     | 0.81               | Bacteria | Firmicutes | Clostridiales | Clostridiales | Ruminococcaceae | Ruminiclostridium_2 |
| 0.0040     | 0.85               | Bacteria | Firmicutes | Clostridiales | Clostridiales | Ruminococcaceae | Ruminiclostridium_6 |
| 0.0006     | 0.88               | Bacteria | Firmicutes | Clostridiales | Clostridiales | Lachnospiraceae | Lachnospiraceae_UCG-001 |
| 0.0106     | 0.88               | Bacteria | Bacteroidetes | Bacteroidia | Bacteroidiales | Prevotellaceae | Prevotella_9 |
| 0.0002     | 0.91               | Bacteria | Firmicutes | Clostridiales | Clostridiales | Lachnospiraceae | GCA-900066575 |
| 0.0020     | 1.00               | Bacteria | Firmicutes | Clostridiales | Clostridiales | Lachnospiraceae | Coprococcus_2 |
## Supplementary Table 5. MWAS of dataset 2 conducted using Kruskal-Wallis

Sample size for KW included all samples: N= 323 cases and 184 controls in dataset 2. MRA= mean relative abundance, FC=fold change in patients (PD MRA/control MRA), P= unadjusted significance, FDR (BH)= false discovery rate, adjusted significance. Unclassified genera and genera present in <10% of subjects were excluded from this analysis. MRA values of 0.0000 correspond to MRAs that were <0.0001.

| PD MRA | Control MRA | FC   | P    | FDR (BH) | Kingdom | Phylum | Class          | Order                  | Family                      | Genus                  |
|--------|-------------|------|------|----------|---------|--------|----------------|-------------------------|---------------------------|-------------------------|
| 0.0239 | 0.0088      | 2.72 | 4E-09| 6E-07    | Bacteria | Actinobacteria | Actinobacteria | Bifidobacteriales | Bifidobacteriaceae | Bifidobacterium        |
| 0.0004 | 0.0011      | 0.38 | 2E-07| 1E-05    | Bacteria | Firmicutes    | Clostridia      | Clostridiales          | Lachnospiraceae         | Lachnospiraceae_UCG-004 |
| 0.0097 | 0.0172      | 0.56 | 1E-06| 6E-05    | Bacteria | Firmicutes    | Clostridia      | Clostridiales          | Lachnospiraceae         | Agathobacter            |
| 0.0047 | 0.0078      | 0.60 | 7E-06| 3E-04    | Bacteria | Firmicutes    | Clostridia      | Clostridiales          | Lachnospiraceae         | Roseburia               |
| 0.0002 | 0.0001      | 2.19 | 8E-06| 3E-04    | Bacteria | Firmicutes    | Clostridia      | Clostridiales          | Eubacterium              | Eubacterium             |
| 0.0007 | 0.0011      | 0.59 | 2E-05| 6E-04    | Bacteria | Firmicutes    | Clostridia      | Clostridiales          | Lachnospiraceae         | Lachnospiraceae_UCG-3007_group |
| 0.0013 | 0.0018      | 0.73 | 3E-05| 7E-04    | Bacteria | Firmicutes    | Clostridia      | Clostridiales          | Ruminococcaceae         | Ruminococcaceae_UCG-013 |
| 0.0039 | 0.0050      | 0.78 | 7E-05| 1E-03    | Bacteria | Firmicutes    | Clostridia      | Clostridiales          | Lachnospiraceae         | Anaerostipes            |
| 0.0003 | 0.0001      | 4.43 | 2E-04| 3E-03    | Bacteria | Firmicutes    | Actinobacteria | Corynebacteriales      | Corynebacteriaceae      | Lawsonella              |
| 0.0276 | 0.0416      | 0.66 | 2E-03| 3E-03    | Bacteria | Firmicutes    | Clostridia      | Clostridiales          | Ruminococcaceae         | Faecalibacterium        |
| 0.0006 | 0.0003      | 2.11 | 4E-04| 0.01     | Bacteria | Firmicutes    | Erysipelotrichia | Erysipelotrichiales    | Erysipelotrichiacae      | Turicibacter             |
| 0.0208 | 0.0258      | 0.81 | 6E-04| 0.01     | Bacteria | Proteobacteria | Gammaproteobacteria | Pseudomonadaceae    | Pseudomonadaceae        | Pseudomonas              |
| 0.0036 | 0.0026      | 1.38 | 7E-04| 0.01     | Bacteria | Firmicutes    | Clostridia      | Clostridiales          | Ruminococcaceae         | UBA1819                 |
| 0.0039 | 0.0015      | 2.53 | 7E-04| 0.01     | Bacteria | Firmicutes    | Actinobacteria | Corynebacteriales      | Corynebacteriaceae      | Corynebacterium_1       |
| 0.0001 | 0.0002      | 0.58 | 8E-04| 0.01     | Bacteria | Firmicutes    | Erysipelotrichia | Erysipelotrichiales    | Erysipelotrichiacae      | Erysipelotrichiacae_UCG-003 |
| 0.0017 | 0.0007      | 2.56 | 1E-03| 0.01     | Bacteria | Firmicutes    | Clostridia      | Clostridiales          | Family_XI                | Anaerococcus             |
| 0.0003 | 0.0007      | 0.39 | 1E-03| 0.01     | Bacteria | Firmicutes    | Clostridia      | Clostridiales          | Lachnospiraceae         | Lachnospiraceae_UCG-001 |
| 0.0015 | 0.0008      | 1.81 | 1E-03| 0.01     | Bacteria | Proteobacteria | Deltaproteobacteria | Desulfovibrionales    | Desulfovibrio            |                       |
| 0.0056 | 0.0036      | 1.57 | 1E-03| 0.01     | Bacteria | Firmicutes    | Bacilli         | Lactobacillales       | Lactobacillaceae        | Lactobacillus            |
| 0.0036 | 0.0053      | 0.68 | 2E-03| 0.01     | Bacteria | Firmicutes    | Clostridia      | Clostridiales          | Lachnospiraceae         | Lachnospira              |
| 0.0003 | 0.0005      | 0.64 | 2E-03| 0.01     | Bacteria | Firmicutes    | Clostridia      | Clostridiales          | Ruminococcaceae         | Oscillospira             |
| 0.0005 | 0.0003      | 1.79 | 2E-03| 0.01     | Bacteria | Actinobacteria | Actinomycetaceae | Actinomycetaceae      | Varibaculum              |                       |
| 0.0027 | 0.0012      | 2.14 | 2E-03| 0.01     | Bacteria | Firmicutes    | Clostridia      | Clostridiales          | Family_XI                | Peptoniphilus            |
| 0.0015 | 0.0008      | 1.77 | 2E-03| 0.02     | Bacteria | Firmicutes    | Clostridia      | Clostridiales          | Lachnospiraceae         | Hungatella               |
| 0.0045 | 0.0028      | 1.61 | 3E-03| 0.02     | Archaee | Euryarchaeota | Methanobacteria  | Methanobacteriales     | Methanobacteriaceae     | Methanobrevibacter       |
| 0.0022 | 0.0000      | 220.2| 3E-03| 0.02     | Bacteria | Proteobacteria | Gammaproteobacteria | Betaproteobacteriales | Burkholderiaceae        | Delftia                 |
| 0.0085 | 0.0086      | 0.99 | 3E-03| 0.02     | Bacteria | Firmicutes    | Bacilli         | Lactobacillales       | Lactobacillaceae        | Streptococcus            |
| 0.0026 | 0.0009      | 2.94 | 3E-03| 0.02     | Bacteria | Bacteroidetes | Bacteroidia     | Bacteroidales         | Porphyromonadaceae      | Porphyromonas            |
| 0.0025 | 0.0006      | 4.39 | 3E-03| 0.02     | Bacteria | Bacteroidetes | Bacteroidia     | Bacteroidales         | Prevotellaceae           | Prevotella               |
| 0.0031 | 0.0046      | 0.69 | 0.01 | 0.03     | Bacteria | Firmicutes    | Clostridia      | Clostridiales          | Lachnospiraceae         | Fusiciatenibacter        |
| 0.0008 | 0.0005      | 1.69 | 0.01 | 0.03     | Bacteria | Firmicutes    | Clostridia      | Clostridiales          | Ruminococcaceae         | Anaerotruncus            |
| 0.0079 | 0.0101      | 0.78 | 0.01 | 0.03     | Bacteria | Firmicutes    | Clostridia      | Clostridiales          | Ruminococcaceae         | Ruminococcus_2           |
| Rank | 16S rRNA (%) | Drs | Kingdom | Phylum | Class | Order | Family | Genus | Species |
|------|--------------|-----|---------|--------|-------|-------|--------|-------|---------|
| 0.0001 | 0.0000 | 34.45 | 0.01 | 0.03 | Bacteria | Firmicutes | Clostridia | Clostridiales | Family_XI | Parvimonas |
| 0.0003 | 0.0002 | 1.72 | 0.01 | 0.04 | Bacteria | Actinobacteria | Actinobacteria | Actinomycetales | Actinomycetaceae | Mobiluncus |
| 0.0005 | 0.0003 | 1.45 | 0.01 | 0.04 | Bacteria | Actinobacteria | Actinobacteria | Actinomycetales | Actinomycetaceae | Actinomyces |
| 0.0012 | 0.0005 | 2.60 | 0.01 | 0.04 | Bacteria | Firmicutes | Clostridia | Clostridiales | Family_XI | Finegoldia |
| 0.0003 | 0.0001 | 2.69 | 0.01 | 0.04 | Bacteria | Firmicutes | Clostridia | Clostridiales | Family_XIII | S5-A14a |
| 0.0017 | 0.0037 | 0.79 | 0.01 | 0.04 | Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Blautia |
| 0.0005 | 0.0002 | 2.25 | 0.01 | 0.04 | Bacteria | Firmicutes | Clostridia | Clostridiales | Family_XI | Murdochii |
| 0.0048 | 0.0015 | 3.18 | 0.01 | 0.04 | Bacteria | Firmicutes | Clostridia | Clostridiales | Family_XI | Ezakiella |
| 0.0004 | 0.0005 | 0.78 | 0.01 | 0.04 | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | DTU089 |
| 0.0000 | 0.0000 | 2.06 | 0.01 | 0.05 | Bacteria | Actinobacteria | Actinobacteria | Propionibacteriales | Propionibacteriaceae | Cutibacterium |
| 0.0013 | 0.0019 | 0.68 | 0.02 | 0.06 | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Butyrivibrio |
| 0.0000 | 0.0000 | 2.91 | 0.02 | 0.07 | Bacteria | Actinobacteria | Actinobacteria | Bifidobacteriales | Bifidobacteriaceae | Scardovia |
| 0.0034 | 0.0053 | 0.64 | 0.02 | 0.07 | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Ruminiclostridium_6 |
| 0.0034 | 0.0044 | 0.79 | 0.02 | 0.07 | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Ruminococcus_1 |
| 0.0000 | 0.0000 | 0.72 | 0.02 | 0.07 | Bacteria | Firmicutes | Bacilli | Bacillales | Family_XI | Gemella |
| 0.0004 | 0.0001 | 2.58 | 0.03 | 0.09 | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Fastidiousipila |
| 0.0038 | 0.0063 | 0.61 | 0.03 | 0.09 | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Ruminococcaceae_UCG-014 |
| 0.0037 | 0.0018 | 2.09 | 0.03 | 0.09 | Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Eisenbergiella |
| 0.0008 | 0.0007 | 1.23 | 0.03 | 0.09 | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Ruminococcaceae_UCG-004 |
| 0.0007 | 0.0002 | 4.09 | 0.03 | 0.09 | Bacteria | Epsilonbacteriaeota | Campylobacteria | Campylobacteriales | Campylobacteraceae | Campylobacter |
| 0.0027 | 0.0045 | 0.61 | 0.03 | 0.09 | Bacteria | Firmicutes | Negativicutes | Selenomonadales | Veillonellaceae | Veillonella |
| 0.0002 | 0.0000 | 11.43 | 0.03 | 0.10 | Bacteria | Lentisphaerae | Lentisphaeria | Victivallales | Victivallaceae | Victivallis |
| 0.0000 | 0.0001 | 0.59 | 0.04 | 0.12 | Bacteria | Firmicutes | Bacilli | Lactobacillales | Carnobacteriaceae | Granulicatella |
| 0.0000 | 0.0000 | 0.95 | 0.04 | 0.13 | Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Cuneatibacter |
| 0.0001 | 0.0001 | 1.45 | 0.04 | 0.13 | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Ruminococcaceae_UCG-009 |
| 0.0000 | 0.0000 | 1.58 | 0.05 | 0.13 | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Ruminococcaceae_UCG-011 |
| 0.0001 | 0.0001 | 0.86 | 0.05 | 0.14 | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Candidatus_Soleaferrea |
| 0.0001 | 0.0002 | 0.73 | 0.05 | 0.14 | Bacteria | Proteobacteria | Gammaproteobacteria | Pasteurellales | Pasteurellaceae | Haemophilus |
| 0.0000 | 0.0000 | 0.51 | 0.05 | 0.14 | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Ruminococcaceae_UCG-008 |
| 0.0001 | 0.0004 | 0.40 | 0.06 | 0.14 | Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Tyzzerella_3 |
| 0.0004 | 0.0003 | 1.40 | 0.06 | 0.15 | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | GCA-900066225 |
| 0.0001 | 0.0002 | 0.58 | 0.06 | 0.16 | Bacteria | Actinobacteria | Actinobacteria | Micrococcales | Brevibacteriaceae | Brevibacterium |
| 0.0002 | 0.0001 | 1.42 | 0.06 | 0.16 | Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Howardella |
| 0.0023 | 0.0017 | 1.37 | 0.07 | 0.16 | Bacteria | Bacteroidetes | Bacteroidia | Bacteroidales | Marinilaceae | Butyrimonas |
| 0.0002 | 0.0001 | 2.00 | 0.07 | 0.17 | Bacteria | Firmicutes | Clostridia | Clostridiales | Family_XIII | Mogibacterium |
| 0.0000 | 0.0000 | 1.46 | 0.07 | 0.17 | Bacteria | Firmicutes | Clostridia | Clostridiales | Eubacteriaceae | Anaerofustis |
| 0.0001 | 0.0001 | 0.75 | 0.07 | 0.17 | Bacteria | Firmicutes | Clostridia | Clostridiales | Family_XIII | Family_XIII_UCG-001 |
| 0.0096 | 0.0047 | 2.06 | 0.07 | 0.17 | Bacteria | Firmicutes | Negativicutes | Selenomonadales | Acidaminococcaceae | Acidaminococcus |
| 0.0003 | 0.0002 | 1.33 | 0.07 | 0.17 | Bacteria | Firmicutes | Negativicutes | Selenomonadales | Veillonellaceae | Anaeroglobus |
| 0.0001 | 0.0001 | 0.82 | 0.08 | 0.17 | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Phoca |
| 0.0001 | 0.0002 | 0.76 | 0.08 | 0.18 | Bacteria | Firmicutes | Clostridia | Clostridiales | Peptococcaceae | Peptococcus |
| Rank   | Abundance | Phylum          | Class            | Order          | Family             | Genus         |
|--------|-----------|----------------|------------------|----------------|--------------------|---------------|
| 0.0373 | 0.0460    | Bacteria       | Firmicutes       | Clostridiales  | Clostridales       | Acidaminococcaceae |
| 0.0000 | 0.0000    | Bacteria       | Firmicutes       | Clostridiales  | Clostridales       | Defluvitalearceae |
| 0.0007 | 0.0004    | Bacteria       | Firmicutes       | Clostridiales  | Clostridiales       | Defluvitalearceae_UCG-011 |
| 0.0041 | 0.0032    | Bacteria       | Firmicutes       | Clostridiales  | Clostridiales       | Ruminococcaceae |
| 0.0000 | 0.0000    | Bacteria       | Firmicutes       | Clostridiales  | Clostridiales       | Ruminococcaceae_UCG-005 |
| 0.0001 | 0.0001    | Bacteria       | Firmicutes       | Clostridiales  | Clostridiales       | Ruminococcaceae_UCG-007 |
| 0.0036 | 0.0084    | Bacteria       | Firmicutes       | Clostridiales  | Clostridiales       | Erysipelotrichaceae |
| 0.0055 | 0.0040    | Bacteria       | Actinobacteria   | Firmicutes     | Clostriodiales      | Lachnospiraceae |
| 0.1610 | 0.1887    | Bacteria       | Proteobacteria   | Gammaproteobacteria | Enterobacteriaceae  | Eschericia/Shigella |
| 0.0028 | 0.0028    | Bacteria       | Firmicutes       | Clostridiales  | Clostridiales       | Erysipelotrichaceae |
| 0.0003 | 0.0003    | Bacteria       | Firmicutes       | Clostridiales  | Clostridiales       | Erysipelotrichaceae_Holdemania |
| 0.0004 | 0.0009    | Bacteria       | Firmicutes       | Clostridiales  | Clostridiales       | Lachnospiraceae |
| 0.0051 | 0.0040    | Bacteria       | Firmicutes       | Clostridiales  | Clostridiales       | Coprococcus_2 |
| 0.0020 | 0.0003    | Bacteria       | Firmicutes       | Clostridiales  | Clostridiales       | Ruminococcaceae_UCG-011 |
| 0.0032 | 0.0034    | Bacteria       | Firmicutes       | Clostridiales  | Clostridiales       | Lachnospiraceae |
| 0.0001 | 0.0001    | Bacteria       | Firmicutes       | Clostridiales  | Clostridiales       | Lachnospiraceae_UCG-005 |
| 0.0199 | 0.0149    | Bacteria       | Firmicutes       | Clostridiales  | Clostridiales       | Lachnospiraceae_UCG-007 |
| 0.0018 | 0.0080    | Bacteria       | Firmicutes       | Clostridiales  | Clostridiales       | Klebsiella |
| 0.0031 | 0.0032    | Bacteria       | Firmicutes       | Clostridiales  | Clostridiales       | Ruminococcaceae_UCG-011 |
| 0.0001 | 0.0001    | Bacteria       | Firmicutes       | Clostridiales  | Clostridiales       | Lachnospiraceae |
| 0.0104 | 0.0114    | Bacteria       | Firmicutes       | Clostridiales  | Clostridiales       | Lachnospiraceae |
| 0.0058 | 0.0051    | Bacteria       | Firmicutes       | Clostridiales  | Clostridiales       | Oscillibacter |
| 0.0001 | 0.0001    | Bacteria       | Firmicutes       | Clostridiales  | Clostridiales       | Lachnospiraceae |
| 0.1960 | 0.2043    | Bacteria       | Bacteroidetes    | Bacteroidiales | Bacteroidiales      | Lachnospiraceae |
| 0.0006 | 0.0006    | Bacteria       | Actinobacteria   | Clostridiales  | Clostridiales       | Erysipelotrichaceae |
| 0.0044 | 0.0033    | Bacteria       | Firmicutes       | Clostridiales  | Clostridiales       | Erysipelotrichaceae |
| 0.0020 | 0.0021    | Bacteria       | Firmicutes       | Clostridiales  | Clostridiales       | Erysipelotrichaceae |
| 0.0000 | 0.0001    | Bacteria       | Firmicutes       | Clostridiales  | Clostridiales       | Erysipelotrichaceae |
| 0.0008 | 0.0007    | Bacteria       | Firmicutes       | Clostridiales  | Clostridiales       | Erysipelotrichaceae |
| 0.0001 | 0.0001    | Bacteria       | Firmicutes       | Clostridiales  | Clostridiales       | Erysipelotrichaceae |
| 0.0042 | 0.0015    | Bacteria       | Synergistetes    | Synergistiae   | Synergistiae        | Synergistiae |
| 0.0018 | 0.0017    | Bacteria       | Proteobacteria   | Gammaresubacteria | Desulfonibrionales | Desulfonibrionales |
| 0.0026 | 0.0027    | Bacteria       | Firmicutes       | Clostridiales  | Clostridiales       | Desulfonibrionales |
| 0.0001 | 0.0001    | Bacteria       | Fusobacteria     | Lachnospiraceae | Lachnospiraceae     | Lachnospiraceae |
| 0.0053 | 0.0037    | Bacteria       | Firmicutes       | Clostridiales  | Clostridiales       | Lachnospiraceae |
| 0.0006 | 0.0003    | Bacteria       | Fusobacteria     | Fusobacteriales | Fusobacteriales     | Fusobacteriales |
| 0.0002 | 0.0001    | Bacteria       | Firmicutes       | Clostridiales  | Clostridiales       | Peptostreptococcaceae |
| 0.0015 | 0.0009    | Bacteria       | Proteobacteria   | Gammaproteobacteria | Burkholderiaeae   | Sutterella |
| 0.0222 | 0.0199 | 1.11 | 0.41 | 0.59 | Bacteria | Bacteroidetes | Bacteroidia | Bacteroidales | Tannerellaceae | Parabacteroides |
| 0.0020 | 0.0024 | 0.83 | 0.42 | 0.59 | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Intestinimonas |
| 0.0006 | 0.0002 | 2.78 | 0.43 | 0.60 | Bacteria | Bacteroidetes | Bacteroidia | Bacteroidales | Prevotellaceae | Prevotella_6 |
| 0.0018 | 0.0020 | 0.92 | 0.43 | 0.60 | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Negativibacillus |
| 0.0086 | 0.0035 | 2.48 | 0.43 | 0.60 | Bacteria | Firmicutes | Negativicutes | Selenomonadaceae | Veillonellaceae | Megasphaera |
| 0.0001 | 0.0001 | 0.41 | 0.45 | 0.61 | Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Lachnospiraceae_NK4B4_group |
| 0.0000 | 0.0001 | 0.76 | 0.45 | 0.61 | Bacteria | Firmicutes | Erysipelotrichia | Erysipelotrichales | Erysipelotrichaceae | Coprobacillus |
| 0.0138 | 0.0112 | 1.24 | 0.46 | 0.62 | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Ruminococcaceae_UCG-002 |
| 0.0076 | 0.0131 | 0.58 | 0.49 | 0.64 | Bacteria | Proteobacteria | Gammaproteobacteria | Enterobacteriales | Enterobacteriaceae | Proteus |
| 0.0027 | 0.0020 | 1.39 | 0.49 | 0.64 | Bacteria | Firmicutes | Clostridia | Clostridiales | Peptostreptococcaceae | Romboutsia |
| 0.0001 | 0.0000 | 1.32 | 0.49 | 0.64 | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Anaerofilum |
| 0.0008 | 0.0004 | 2.10 | 0.50 | 0.64 | Bacteria | Bacteroidetes | Bacteroidia | Bacteroidales | Barnesiellaceae | Coprobacter |
| 0.0006 | 0.0005 | 1.29 | 0.52 | 0.67 | Bacteria | Firmicutes | Bacilli | Bacillales | Staphylococcaceae | Staphylococcus |
| 0.0000 | 0.0000 | 1.08 | 0.52 | 0.67 | Bacteria | Firmicutes | Clostridia | Clostridiales | Christensenellaceae | Catabacter |
| 0.0000 | 0.0000 | 1.19 | 0.53 | 0.67 | Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | GCA-900066755 |
| 0.0004 | 0.0003 | 1.56 | 0.54 | 0.68 | Bacteria | Synergistetes | Synergistia | Synergistales | Synergistaceae | Pyramidobacter |
| 0.0001 | 0.0000 | 2.06 | 0.55 | 0.68 | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Ruminiclostridium_1 |
| 0.0001 | 0.0000 | 1.58 | 0.55 | 0.68 | Bacteria | Firmicutes | Erysipelotrichia | Erysipelotrichales | Erysipelotrichaceae | Candidatus_Stoqufichus |
| 0.0004 | 0.0003 | 1.20 | 0.57 | 0.69 | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Angelakissella |
| 0.0007 | 0.0006 | 1.26 | 0.57 | 0.70 | Bacteria | Firmicutes | Clostridia | Clostridiales | Family_XIII | Family_XIII_AD3011_group |
| 0.0009 | 0.0010 | 0.89 | 0.58 | 0.70 | Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Coprococcus_3 |
| 0.0032 | 0.0033 | 0.97 | 0.59 | 0.71 | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Flavonifractor |
| 0.0000 | 0.0000 | 1.12 | 0.62 | 0.73 | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Acetanaerobacterium |
| 0.0002 | 0.0001 | 1.31 | 0.62 | 0.73 | Bacteria | Actinobacteria | Coriobacteria | Coriobacteriales | Eggerthellaceae | Slackia |
| 0.0001 | 0.0001 | 0.63 | 0.62 | 0.73 | Bacteria | Actinobacteria | Actinobacteria | Micrococcales | Micrococcaceae | Rothia |
| 0.0000 | 0.0000 | 3.20 | 0.63 | 0.73 | Bacteria | Firmicutes | Erysipelotrichia | Erysipelotrichales | Erysipelotrichaceae | Dielma |
| 0.0041 | 0.0055 | 0.75 | 0.64 | 0.74 | Bacteria | Bacteroidetes | Bacteroidia | Bacteroidales | Prevotellaceae | Prevotella_9 |
| 0.0005 | 0.0002 | 2.14 | 0.65 | 0.75 | Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Marvinbryantia |
| 0.0004 | 0.0005 | 0.92 | 0.66 | 0.75 | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Fournierella |
| 0.0004 | 0.0003 | 1.30 | 0.67 | 0.75 | Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Coprococcus_1 |
| 0.0007 | 0.0007 | 0.93 | 0.68 | 0.77 | Bacteria | Firmicutes | Clostridia | Clostridiales | Peptostreptococcaceae | Intestinibacter |
| 0.0001 | 0.0001 | 2.34 | 0.70 | 0.78 | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Hydrogenoanaerobacterium |
| 0.0052 | 0.0044 | 1.18 | 0.72 | 0.80 | Bacteria | Bacteroidetes | Bacteroidia | Bacteroidales | Barnesiellaceae | Barnesiella |
| 0.0000 | 0.0000 | 1.48 | 0.73 | 0.80 | Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | Lactonifactor |
| 0.0001 | 0.0001 | 1.16 | 0.74 | 0.80 | Bacteria | Actinobacteria | Coriobacteria | Coriobacteriales | Eggerthellaceae | Gordonibacter |
| 0.0016 | 0.0017 | 0.98 | 0.74 | 0.80 | Bacteria | Firmicutes | Bacilli | Lactobacillales | Enterococcaceae | Enterococcus |
| 0.0003 | 0.0002 | 1.25 | 0.75 | 0.80 | Bacteria | Actinobacteria | Coriobacteria | Coriobacteriales | Eggerthellaceae | Adlercreutzia |
| 0.0002 | 0.0002 | 0.79 | 0.75 | 0.80 | Bacteria | Firmicutes | Clostridia | Clostridiales | Lachnospiraceae | UC5-1-2E3 |
| 0.0170 | 0.0159 | 1.07 | 0.79 | 0.84 | Bacteria | Firmicutes | Clostridia | Clostridiales | Ruminococcaceae | Subdoligranulum |
| 0.0028 | 0.0015 | 1.82 | 0.80 | 0.84 | Bacteria | Firmicutes | Clostridia | Clostridiales | Clostridiaceae_1 | Clostridium_sensu_stricto_1 |
| 0.0015 | 0.0011 | 1.33 | 0.88 | 0.92 | Bacteria | Bacteroidetes | Bacteroidia | Bacteroidales | Prevotellaceae | Prevotella_7 |
| Pseudocount | Pseudocount | Relative Abundance | Relative Abundance | Abundance | Abundance | Abundance | Abundance |
|-------------|-------------|--------------------|--------------------|-----------|-----------|-----------|-----------|
| 0.0202      | 0.0206      | 0.98               | 0.88               | 0.92      | Bacteria  | Bacteroidetes | Bacteroidia |
| 0.0006      | 0.0005      | 1.05               | 0.91               | 0.95      | Bacteria  | Firmicutes   | Clostridia  |
| 0.0000      | 0.0000      | 1.34               | 0.95               | 0.98      | Bacteria  | Firmicutes   | Clostridia  |
| 0.0053      | 0.0049      | 1.09               | 0.98               | 0.99      | Bacteria  | Bacteroidetes | Bacteroidia |
| 0.0012      | 0.0015      | 0.80               | 0.99               | 0.99      | Bacteria  | Bacteroidetes | Bacteroidia |

- Bacteria
- Bacteroidetes
- Bacteroidia
- Bacteroidales
- Rikenellaceae
- Alistipes
- Firmicutes
- Clostridia
- Clostridiales
- Ruminococcaceae
- Ruminococcaceae_UCG-010
- Caproiciproducens
- Bacilli
- Lactobacillales
- Leuconostocaceae
- Weissella
- Lachnospiraceae
- Tyzzerella
- Ruminococcaceae
- Harryflintia
- Marinifilaceae
- Odoribacter
- Prevotellaceae
- Paraprevotella
Species that comprised each genus (and accounted for at least 80% of the ASVs in the genus) were identified based on 100% sequence identity using DADA2-SILVA reference database or 100% or >99% identity and high statistical confidence using NCBI 16S rRNA database. Then each species was searched in PubMed using "genus species" as search term. Search filters: Humans, English, Title/abstract. The citations were tabulated for articles that addressed function, characteristics or relevance to human health; method papers were omitted. All infections are in human samples, except C. lactis (newly discovered) was found in an abscess in a companion dog.

| Search term                          | PubMed Return                                      | Subject matter                                                                 |
|--------------------------------------|----------------------------------------------------|--------------------------------------------------------------------------------|
| Corynebacterium amycolatum           | https://www.ncbi.nlm.nih.gov/pubmed/10342655        | septic arthritis                                                              |
| Corynebacterium amycolatum           | https://www.ncbi.nlm.nih.gov/pubmed/10482033        | surgical or catheter related infection, pilonidal cyst                          |
| Corynebacterium amycolatum           | https://www.ncbi.nlm.nih.gov/pubmed/11749760        | endocarditis                                                                   |
| Corynebacterium amycolatum           | https://www.ncbi.nlm.nih.gov/pubmed/12235925        | blood cultures                                                                 |
| Corynebacterium amycolatum           | https://www.ncbi.nlm.nih.gov/pubmed/12439810        | mastitis                                                                       |
| Corynebacterium amycolatum           | https://www.ncbi.nlm.nih.gov/pubmed/12565065        | infective endocarditis                                                         |
| Corynebacterium amycolatum           | https://www.ncbi.nlm.nih.gov/pubmed/15315020        | opportunistic infections                                                       |
| Corynebacterium amycolatum           | https://www.ncbi.nlm.nih.gov/pubmed/15786829        | Peritonitis                                                                    |
| Corynebacterium amycolatum           | https://www.ncbi.nlm.nih.gov/pubmed/17284316        | endocarditis                                                                   |
| Corynebacterium amycolatum           | https://www.ncbi.nlm.nih.gov/pubmed/18174873        | infections in pediatric oncology                                              |
| Corynebacterium amycolatum           | https://www.ncbi.nlm.nih.gov/pubmed/18809563        | endocarditis                                                                   |
| Corynebacterium amycolatum           | https://www.ncbi.nlm.nih.gov/pubmed/19153032        | response to antibiotic tigecycline                                             |
| Corynebacterium amycolatum           | https://www.ncbi.nlm.nih.gov/pubmed/19876565        | predominant species in infections in cancer patients                           |
| Corynebacterium amycolatum           | https://www.ncbi.nlm.nih.gov/pubmed/20624090        | resistance to antibiotic macrolide                                             |
| Corynebacterium amycolatum           | https://www.ncbi.nlm.nih.gov/pubmed/22361761        | clinical diphtheroid samples                                                  |
| Corynebacterium amycolatum           | https://www.ncbi.nlm.nih.gov/pubmed/23806703        | surgical site infection                                                       |
| Corynebacterium amycolatum           | https://www.ncbi.nlm.nih.gov/pubmed/26324578        | vaginosis                                                                      |
| Corynebacterium amycolatum           | https://www.ncbi.nlm.nih.gov/pubmed/28011352        | blood stream infection                                                        |
| Corynebacterium amycolatum           | https://www.ncbi.nlm.nih.gov/pubmed/28264610        | breast abscess                                                                |
| Corynebacterium amycolatum           | https://www.ncbi.nlm.nih.gov/pubmed/28700261        | infection of orbital implant                                                  |
| Corynebacterium amycolatum           | https://www.ncbi.nlm.nih.gov/pubmed/29793964        | respiratory infection after lung transplant                                     |
| Corynebacterium amycolatum           | https://www.ncbi.nlm.nih.gov/pubmed/30102894        | Bloodstream and venous catheter-related infections                             |
| Corynebacterium amycolatum           | https://www.ncbi.nlm.nih.gov/pubmed/30248572        | cystic neutrophilic granulomatous mastitis                                     |
| Corynebacterium amycolatum           | https://www.ncbi.nlm.nih.gov/pubmed/30803027        | bacteremia                                                                     |
| Corynebacterium amycolatum           | https://www.ncbi.nlm.nih.gov/pubmed/8727888         | clinical isolates, multiple sources                                           |
| Corynebacterium amycolatum           | https://www.ncbi.nlm.nih.gov/pubmed/8874085         | sepsis                                                                         |
| Corynebacterium amycolatum           | https://www.ncbi.nlm.nih.gov/pubmed/9157120         | neonatal sepsis fatal in premature infant                                       |
| Corynebacterium amycolatum           | https://www.ncbi.nlm.nih.gov/pubmed/9488824         | wound, bloodstream, and urinary tract infections                              |
| Organism                             | PubMed Link                                                                 | Description                                                                 |
|-------------------------------------|------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| Corynebacterium amycolatum          | https://www.ncbi.nlm.nih.gov/pubmed/9505178                                  | infection after orthopedic surgery                                          |
| Corynebacterium amycolatum          | https://www.ncbi.nlm.nih.gov/pubmed/9868692                                  | Cardioverter-Lead Electrode Infection                                        |
| Corynebacterium lactis              | https://www.ncbi.nlm.nih.gov/pubmed/25937144                                  | Infection in companion dog                                                   |
| Porphyromonas asaccharolytica       | https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5896039/                        | colorectal cancer                                                            |
| Porphyromonas asaccharolytica       | https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6247719/                        | causes Lemierre's syndrome                                                    |
| Porphyromonas asaccharolytica       | https://www.ncbi.nlm.nih.gov/pubmed/15528728                                  | clinical isolates                                                            |
| Porphyromonas asaccharolytica       | https://www.ncbi.nlm.nih.gov/pubmed/15722627                                  | Clinical isolates, multiple sources                                          |
| Porphyromonas asaccharolytica       | https://www.ncbi.nlm.nih.gov/pubmed/15888469                                  | predominant in polymicrobial flora in 48 inflamed sinuses                    |
| Porphyromonas asaccharolytica       | https://www.ncbi.nlm.nih.gov/pubmed/15897651                                  | Lemierre's syndrome                                                          |
| Porphyromonas asaccharolytica       | https://www.ncbi.nlm.nih.gov/pubmed/16887693                                  | liver abscess                                                                |
| Porphyromonas asaccharolytica       | https://www.ncbi.nlm.nih.gov/pubmed/19390440                                  | causes Lemierre's syndrome                                                    |
| Porphyromonas asaccharolytica       | https://www.ncbi.nlm.nih.gov/pubmed/21407153                                  | tubo-ovarian abscess                                                         |
| Porphyromonas asaccharolytica       | https://www.ncbi.nlm.nih.gov/pubmed/23435719                                  | causes Lemierre's syndrome (acute otopjaryngeal infection)                   |
| Porphyromonas asaccharolytica       | https://www.ncbi.nlm.nih.gov/pubmed/23474186                                  | pleural empyema in immunocompetent diabetic patient                         |
| Porphyromonas asaccharolytica       | https://www.ncbi.nlm.nih.gov/pubmed/24679105                                  | polymicrobial foot infection                                                  |
| Porphyromonas asaccharolytica       | https://www.ncbi.nlm.nih.gov/pubmed/7548548                                   | extraoral infections                                                         |
| Porphyromonas asaccharolytica       | https://www.ncbi.nlm.nih.gov/pubmed/7752213                                   | 418 children with infection, found in infections across body sites           |
| Porphyromonas asaccharolytica       | https://www.ncbi.nlm.nih.gov/pubmed/7857230                                  | cause chest wall abscess in one woman                                        |
| Porphyromonas asaccharolytica       | https://www.ncbi.nlm.nih.gov/pubmed/8126176                                   | bacterial vaginosis                                                          |
| Porphyromonas asaccharolytica       | https://www.ncbi.nlm.nih.gov/pubmed/8518760                                   | male and female genital ulcers                                               |
| Porphyromonas asaccharolytica       | https://www.ncbi.nlm.nih.gov/pubmed/8907604                                   | female genital tract infection                                               |
| Porphyromonas asaccharolytica       | https://www.ncbi.nlm.nih.gov/pubmed/9200028                                   | intravenous catheter related bacteremia in child with cancer                 |
| Porphyromonas asaccharolytica       | https://www.ncbi.nlm.nih.gov/pubmed/9772922                                   | infected cardiac myxoma                                                      |
| Porphyromonas bennonis              | https://www.ncbi.nlm.nih.gov/pubmed/19542133                                  | identification and characterization in clinical specimen from various body sites |
| Porphyromonas somerae               | https://www.ncbi.nlm.nih.gov/pubmed/16145091                                  | chronic skin, soft tissue and bone infections                                |
| Porphyromonas somerae               | https://www.ncbi.nlm.nih.gov/pubmed/30541687                                  | abscesses, biopsies, wounds                                                  |
| Porphyromonas uenonis               | https://www.ncbi.nlm.nih.gov/pubmed/15528728                                  | identification as pathogen                                                   |
| Prevotella bivia                    | https://www.ncbi.nlm.nih.gov/pubmed/10823756                                  | enhanced HIV expression                                                      |
| Prevotella bivia                    | https://www.ncbi.nlm.nih.gov/pubmed/10875323                                  | septic arthritis                                                            |
| Prevotella bivia                    | https://www.ncbi.nlm.nih.gov/pubmed/11368254                                  | bacterial vaginosis                                                          |
| Prevotella bivia                    | https://www.ncbi.nlm.nih.gov/pubmed/11707013                                  | septic arthritis                                                            |
| Prevotella bivia                    | https://www.ncbi.nlm.nih.gov/pubmed/14532256                                  | Paronychia                                                                  |
| Prevotella bivia                    | https://www.ncbi.nlm.nih.gov/pubmed/15722627                                  | Clinical specimens                                                           |
| Prevotella bivia                    | https://www.ncbi.nlm.nih.gov/pubmed/16192439                                  | abdominal cutaneous ulcer                                                    |
| Prevotella bivia                    | https://www.ncbi.nlm.nih.gov/pubmed/16316686                                  | Lemierre's syndrome                                                          |
| Prevotella bivia                    | https://www.ncbi.nlm.nih.gov/pubmed/17367470                                  | virulence                                                                   |
| Prevotella bivia                    | https://www.ncbi.nlm.nih.gov/pubmed/1747864                                   | bacterial vaginosis                                                          |
| Prevotella bivia                    | https://www.ncbi.nlm.nih.gov/pubmed/17982605                                  | penile abscess                                                              |
Prevoitella bivia
https://www.ncbi.nlm.nih.gov/pubmed/18237241
Chorionic plate inflammation

Prevoitella bivia
https://www.ncbi.nlm.nih.gov/pubmed/19053926
Oral lichen planus

Prevoitella bivia
https://www.ncbi.nlm.nih.gov/pubmed/19271076
septic arthritis

Prevoitella bivia
https://www.ncbi.nlm.nih.gov/pubmed/19283879
chest wall abscess

Prevoitella bivia
https://www.ncbi.nlm.nih.gov/pubmed/20711427
bacterial vaginosis in HIV infected women

Prevoitella bivia
https://www.ncbi.nlm.nih.gov/pubmed/21214658
amniotic fluid infection

Prevoitella bivia
https://www.ncbi.nlm.nih.gov/pubmed/21376823
Skin and soft tissue infection

Prevoitella bivia
https://www.ncbi.nlm.nih.gov/pubmed/22375046
inguinal bubo

Prevoitella bivia
https://www.ncbi.nlm.nih.gov/pubmed/23001520
Abdominal wall phlebitis following renal transplant

Prevoitella bivia
https://www.ncbi.nlm.nih.gov/pubmed/24452170
empyema

Prevoitella bivia
https://www.ncbi.nlm.nih.gov/pubmed/24787738
Pelvic inflammatory disease

Prevoitella bivia
https://www.ncbi.nlm.nih.gov/pubmed/25114266
Necrotizing fasciitis

Prevoitella bivia
https://www.ncbi.nlm.nih.gov/pubmed/28008411
Proctitis

Prevoitella bivia
https://www.ncbi.nlm.nih.gov/pubmed/28931859
bacterial vaginosis

Prevoitella bivia
https://www.ncbi.nlm.nih.gov/pubmed/29772525
bacterial vaginosis

Prevoitella bivia
https://www.ncbi.nlm.nih.gov/pubmed/29803530
multi-center survey of multi-drug resistant isolates

Prevoitella bivia
https://www.ncbi.nlm.nih.gov/pubmed/8013486
endocarditis

Prevoitella bivia
https://www.ncbi.nlm.nih.gov/pubmed/8205934
obstetrics gynecology specimen

Prevoitella bivia
https://www.ncbi.nlm.nih.gov/pubmed/8270797
association with cervical cancer

Prevoitella bivia
https://www.ncbi.nlm.nih.gov/pubmed/8324131
bacterial vaginosis in pregnant women

Prevoitella bivia
https://www.ncbi.nlm.nih.gov/pubmed/8677085
bacteremia after C-section

Prevoitella bivia
https://www.ncbi.nlm.nih.gov/pubmed/8907604
female genital tract infection

Prevoitella bivia
https://www.ncbi.nlm.nih.gov/pubmed/9003606
dog/cat bite wound

Prevoitella bivia
https://www.ncbi.nlm.nih.gov/pubmed/9745330
Periodontal abscesses

Prevoitella buccalis
https://www.ncbi.nlm.nih.gov/pubmed/14662931
urinary tract infection after renal transplant

Prevoitella buccalis
https://www.ncbi.nlm.nih.gov/pubmed/24565649
Endodontic infections

Prevoitella buccalis
https://www.ncbi.nlm.nih.gov/pubmed/9266340
Periodontitis

Prevoitella disiens
https://www.ncbi.nlm.nih.gov/pubmed/15508748
Periodontitis

Prevoitella disiens
https://www.ncbi.nlm.nih.gov/pubmed/1747864
bacterial vaginosis

Prevoitella disiens
https://www.ncbi.nlm.nih.gov/pubmed/19161595
bacterial vaginosis

Prevoitella disiens
https://www.ncbi.nlm.nih.gov/pubmed/24565649
Endodontic infections

Prevoitella disiens
https://www.ncbi.nlm.nih.gov/pubmed/26183701
cranioplasty infection

Prevoitella disiens
https://www.ncbi.nlm.nih.gov/pubmed/8205934
obstetrics gynecology specimen

Prevoitella disiens
https://www.ncbi.nlm.nih.gov/pubmed/8324131
bacterial vaginosis in pregnant women

Prevoitella disiens
https://www.ncbi.nlm.nih.gov/pubmed/8907604
female genital tract infection

Prevoitella timonensis
https://www.ncbi.nlm.nih.gov/pubmed/17392225
breast abscess

Prevoitella timonensis
https://www.ncbi.nlm.nih.gov/pubmed/29307650
various sites mostly genital and wound
Supplementary Figure 1. Correlation Network Analysis.

Dataset 2 Cases

Dataset 2 Controls
We calculated pairwise correlations in relative abundances for all genera microbiome-wide, for each dataset and in cases and controls separately. Sample size: dataset 1 cases= 201, dataset 1 controls=132, dataset 2 cases= 323, dataset controls =184. To display, we set an arbitrary threshold of correlation coefficient at $r \geq |0.4|$ to connect genera that were correlated. At $r \geq |0.4|$ all correlations were significant at $P<3E-4$ (the limit for 3,000
The graphics denoted by “a” display the algorithm-predicted clusters in different colors. Graphics denoted by “b” are identical to their “a” counterpart except algorithm generated colors are now shown in grey and PD-associated taxa are highlighted in blue (if increased in PD) or red (if decreased in PD). Dataset 2 has more power due to larger sample size, and has greater resolution due to deeper sequencing, nonetheless, the general patterns are similar in the two datasets. Generally, the 15 PD-associated genera fall in 3 clusters. As best seen in dataset 2 cases, which has the largest sample size and power, Porphyromonas, Prevotella, and Corynebacterium_1 co-occur in cluster 1. Eight of the 10 in cluster 2 also connect at $r \geq 0.4$, the other two, Oscillospira connects to cluster 2 at $r=0.25$ (P<3E-4) and Lachnospiraceae_UCG-004 connects at $r=0.35$ (P<3E-4). Lactobacillus and Bifidobacterium connect to each other (cluster 3) at $r=0.33$ (P<3E-4).