

Figure 1A

| Group  | Status   | Richness | Biodiversity       |
|--------|----------|----------|--------------------|
| IIEE21 | Enriched | 49       | 3.51919173969745   |
| IIEE22 | Enriched | 45       | 3.542208856161321  |
| IIEE23 | Enriched | 48       | 3.953020278878053  |
| IIEE24 | Enriched | 55       | 3.851346509016378  |
| IIEE25 | Enriched | 49       | 3.5857436627859673 |
| IIEE26 | Enriched | 41       | 3.6233283530090934 |
| IIEE27 | Enriched | 43       | 3.830530932967305  |
| IIEE28 | Enriched | 48       | 3.5824283508937658 |
| IIEE29 | Enriched | 50       | 3.7693154122894637 |
| IIEE30 | Enriched | 58       | 3.6855615463568188 |
| IIEE10 | Standard | 65       | 3.835064288732576  |
| IIEE11 | Standard | 74       | 4.356246339869636  |
| IIEE12 | Standard | 64       | 3.798964337666821  |
| IIEE13 | Standard | 62       | 4.1406846833366355 |
| IIEE14 | Standard | 56       | 4.154663921713144  |
| IIEE15 | Standard | 73       | 4.355481213013958  |
| IIEE16 | Standard | 56       | 3.627584413423919  |
| IIEE7  | Standard | 76       | 3.877992410069618  |
| IIEE8  | Standard | 67       | 4.209853725329236  |
| IIEE9  | Standard | 57       | 3.76525586481336   |

Figure 1D

| Species                                 | VIP                | FACE_clist | EDGE_clist |
|---|--------------------|------------|------------|
| Alistipes_senegalensis                  | 1.9217595446705324 | Enriched   | Standard   |
| Alistipes_putredinis                    | 1.9187464544167943 | Standard   | Enriched   |
| Herbinix_hemicellulosilytica            | 1.917947532094504  | Standard   | Enriched   |
| Bacteroides_gallinaceum                 | 1.9177453522089918 | Enriched   | Standard   |
| Clostridium_kluyveri                    | 1.710324122908389  | Enriched   | Standard   |
| Acutalibacter_muris                     | 1.6947356117017245 | Standard   | Enriched   |
| Oscillibacter_ruminantium               | 1.6910268945784275 | Standard   | Enriched   |
| Enterobacter_cloacae                    | 1.6863957166265704 | Enriched   | Enriched   |
| Paludicola_psychrotolerans              | 1.6863687183443714 | Standard   | Standard   |
| Murimonas_intestini                     | 1.5351881133401952 | Standard   | Enriched   |
| Parabacteroides_chartae                 | 1.5331576234939783 | Standard   | Standard   |
| Beduini_massiliensis                    | 1.5205935558028887 | Enriched   | Enriched   |
| Akkermansia_muciniphila                 | 1.5203132194601403 | Standard   | Standard   |
| Cuneatibacter_caecimuris                | 1.4489798236807374 | Standard   | Enriched   |
| Oscillibacter_valericigenes             | 1.3748891719411855 | Standard   | Enriched   |
| Pseudoflavonifractor_capillosus         | 1.365618625925966  | Standard   | Standard   |
| Anaerocolumna_aminovalerica             | 1.3617377282269387 | Standard   | Enriched   |
| Parasutterella_excrementihominis        | 1.3493015415075866 | Enriched   | Standard   |
| Kineothrix_alysoides                    | 1.3450023912361515 | Standard   | Enriched   |
| Flintibacter_butyricus                  | 1.341786933698387  | Standard   | Enriched   |
| Agathobacter_ruminis                    | 1.3250440514507111 | Standard   | Enriched   |
| Breznakia_pachnodae                     | 1.3067366536363754 | Enriched   | Standard   |
| Catabacter_hongkongensis                | 1.2962002094366565 | Enriched   | Standard   |
| Barnesiella_intestinihominis            | 1.2901896726111601 | Enriched   | Standard   |
| Hydrogenoanaerobacterium_saccharovorans | 1.2691395488190005 | Standard   | Enriched   |
| Pseudoclostridium_thermosuccinogenes    | 1.2498318368510144 | Enriched   | Standard   |
| Marvinbryantia_formatexigens            | 1.2254888269854993 | Standard   | Enriched   |
| Cohaesibacter_haloalkalitolerans        | 1.2126495220782092 | Standard   | Standard   |
| Clostridium_aestuarii                   | 1.2124026128532064 | Standard   | Standard   |
| Desulfonatronum_lacustre                | 1.2057100134658882 | Standard   | Standard   |
| Prevotellamassilia_timonensis           | 1.2033889684649393 | Standard   | Standard   |
| Micropruina_glycogenica                 | 1.2033119773981547 | Standard   | Standard   |
| Blautia_hominis                         | 1.2029168425547816 | Standard   | Standard   |
| Bacteroides_acidifaciens                | 1.202684706714236  | Standard   | Standard   |
| Clostridium_sphenoides                  | 1.2025936058743827 | Standard   | Standard   |
| Parabacteroides_gordonii                | 1.2023396654058158 | Standard   | Standard   |
| Gemmiger_formicilis                     | 1.2020653080339085 | Standard   | Standard   |
| Flavobacterium_phocarum                 | 1.2016371222105564 | Standard   | Standard   |
| Neglecta_timonensis                     | 1.1669027802106284 | Enriched   | Standard   |
| Peptoanaerobacter_stomatis              | 1.15769587712419   | Standard   | Enriched   |
| Ruminiclostridium_sufflavum             | 1.1524396663210867 | Standard   | Enriched   |
| Peptoniphilus_phoceensis                | 1.1415797189826382 | Enriched   | Standard   |
| Ruminococcus_faecis                     | 1.0901257047088244 | Standard   | Enriched   |
| Bacteroides_mediterraneensis            | 1.0749653574588758 | Enriched   | Standard   |
| Saccharofermentans_acetigenes           | 1.046667644316328  | Standard   | Standard   |
| Parabacteroides_distasonis              | 1.0453325055913394 | Enriched   | Standard   |
| Pseudomonas_helleri                     | 1.0149220622674995 | Standard   | Enriched   |
| Agathobaculum_desmolans                 | 1.0124865381292267 | Enriched   | Standard   |
| Clostridium_herbivorans                 | 1.0014885279701446 | Enriched   | Standard   |

Figure 1D

| FR                   | FRI_cond | P_KW                   | Padj_KW               |
|----------------------|----------|------------------------|-----------------------|
| 688.127817965232     | 0.9      | 7.512694073244469e-05  | 0.0012888459813239729 |
| 2796.872110177676    | 0.9      | 7.412694073244469e-05  | 0.001287845981323973  |
| 132.12828397349574   | 0.9      | 7.712694073244468e-05  | 0.0012908459813239727 |
| 43.872599490683804   | 0.9      | 7.612694073244468e-05  | 0.0012898459813239728 |
| 424.737137147361     | 0.9      | 0.00032537323075879673 | 0.0018437816409665147 |
| 14.202616384906886   | 0.6      | 0.00011254523364623292 | 0.001286845981323973  |
| 110.11006407178621   | 0.9      | 0.00011354523364623292 | 0.0012918459813239726 |
| 0.05709310738080161  | 0.3      | 0.0006428854484116768  | 0.003037106835565631  |
| 0.10369579108192939  | 0.3      | 0.0006438854484116768  | 0.003038106835565631  |
| 15.790806511011697   | 0.9      | 0.001995806569520813   | 0.005904645509887621  |
| 0.023412530194087428 | 0.3      | 0.0019082573973886515  | 0.005905645509887621  |
| 0.16109202030952888  | 0.3      | 0.0019072573973886516  | 0.0059016455098876205 |
| 0.04997195486408386  | 0.3      | 0.0019062573973886517  | 0.00590064550988762   |
| 6.364894114756107    | 0.6      | 0.0017909202489868204  | 0.005902645509887621  |
| 8.066702388576234    | 0.6      | 0.0001580522842307523  | 0.0013444444159613942 |
| 0.07006745819669656  | 0.3      | 0.005175294762573181   | 0.013535386302114472  |
| 8.491406365205961    | 0.6      | 0.0001570522842307523  | 0.0013434444159613943 |
| 10.26277365049396    | 0.6      | 0.00021318287122257907 | 0.0014506435243135376 |
| 4.18018222279271     | 0.3      | 0.00021218287122257907 | 0.0014496435243135377 |
| 3.638318196074964    | 0.3      | 0.0002851180836316128  | 0.0017625481533590608 |
| 24.23887094985065    | 0.9      | 0.005555297789693249   | 0.013991120359227442  |
| 7.081174724691435    | 0.6      | 0.002593445588143144   | 0.007348095833072241  |
| 23.01851665798456    | 0.9      | 0.0011323536315035036  | 0.004608180392568717  |
| 5.343347641308657    | 0.6      | 0.0006697294490218304  | 0.003036106835565631  |
| 3.873626286173437    | 0.3      | 0.006866004558361617   | 0.01667458249887821   |
| 2.691080221068535    | 0.3      | 0.0011520450981421793  | 0.004609180392568717  |
| 4.7239625442804005   | 0.3      | 0.0019397281129030423  | 0.005903645509887621  |
| 0.06875155816131781  | 0.3      | 0.013006048413295859   | 0.021584958344002883  |
| 0.05821001891082097  | 0.3      | 0.01300404841329586    | 0.02158295834400288   |
| 0.36241827564226176  | 0.3      | 0.013007048413295858   | 0.021585958344002884  |
| 1.0088900608942413   | 0.3      | 0.013012048413295854   | 0.02159295834400289   |
| 0.44079210910969324  | 0.3      | 0.013010048413295856   | 0.021588958344002887  |
| 0.018426496449439427 | 0.3      | 0.01300304841329586    | 0.02158195834400288   |
| 0.2887495694323474   | 0.3      | 0.013002048413295862   | 0.02158095834400288   |
| 0.1828344734773482   | 0.3      | 0.01300504841329586    | 0.021583958344002882  |
| 0.22911347832929127  | 0.3      | 0.013011048413295855   | 0.02159095834400289   |
| 0.01740312881204503  | 0.3      | 0.013009048413295856   | 0.021587958344002886  |
| 0.12066060518387352  | 0.3      | 0.013008048413295857   | 0.021586958344002885  |
| 14.223887946838657   | 0.6      | 0.01300730613969631    | 0.021589958344002888  |
| 44.78851768341066    | 0.9      | 0.010314133248478345   | 0.02159195834400289   |
| 3.2069480740316547   | 0.3      | 0.026481566359748757   | 0.039146663314411204  |
| 36.1186572684627     | 0.9      | 0.021101057281082296   | 0.03336911383985106   |
| 10.12005516791144    | 0.6      | 0.041342886646123476   | 0.05111584167157084   |
| 2.8050374606691197   | 0.3      | 0.02334220201289096    | 0.036074312201740566  |
| 0.12911331474522414  | 0.3      | 0.030570457632885458   | 0.0432234247712219    |
| 1.658208865325338    | 0.3      | 0.01910992220684442    | 0.030939874049176683  |
| 3.0043020774586857   | 0.3      | 0.09954497203419421    | 0.09670082997607436   |
| 1.289491520267278    | 0.3      | 0.15371000698253326    | 0.1323073477824337    |
| 18.74474378346649    | 0.9      | 0.045097987491227516   | 0.054761841953633414  |

Figure1D

| PvalKW_cond | PvalKW_shad | Pval_sign | PadjKW_cond | PadjKW_shad | Padj_sign |
|-------------|-------------|-----------|-------------|-------------|-----------|
| 0.9         | 1.0         | ***       | 0.6         | 1.0         | **        |
| 0.9         | 1.0         | ***       | 0.6         | 1.0         | **        |
| 0.9         | 1.0         | ***       | 0.6         | 1.0         | **        |
| 0.9         | 1.0         | ***       | 0.6         | 1.0         | **        |
| 0.9         | 1.0         | ***       | 0.6         | 1.0         | **        |
| 0.9         | 1.0         | ***       | 0.6         | 1.0         | **        |
| 0.9         | 1.0         | ***       | 0.6         | 1.0         | **        |
| 0.9         | 1.0         | ***       | 0.6         | 1.0         | **        |
| 0.9         | 1.0         | ***       | 0.6         | 1.0         | **        |
| 0.6         | 1.0         | **        | 0.6         | 1.0         | **        |
| 0.6         | 1.0         | **        | 0.6         | 1.0         | **        |
| 0.6         | 1.0         | **        | 0.6         | 1.0         | **        |
| 0.6         | 1.0         | **        | 0.6         | 1.0         | **        |
| 0.6         | 1.0         | **        | 0.6         | 1.0         | **        |
| 0.9         | 1.0         | ***       | 0.6         | 1.0         | **        |
| 0.6         | 1.0         | **        | 0.3         | 1.0         | *         |
| 0.9         | 1.0         | ***       | 0.6         | 1.0         | **        |
| 0.9         | 1.0         | ***       | 0.6         | 1.0         | **        |
| 0.9         | 1.0         | ***       | 0.6         | 1.0         | **        |
| 0.9         | 1.0         | ***       | 0.6         | 1.0         | **        |
| 0.6         | 1.0         | **        | 0.3         | 1.0         | *         |
| 0.6         | 1.0         | **        | 0.6         | 1.0         | **        |
| 0.6         | 1.0         | **        | 0.6         | 1.0         | **        |
| 0.9         | 1.0         | ***       | 0.6         | 1.0         | **        |
| 0.6         | 1.0         | **        | 0.3         | 1.0         | *         |
| 0.6         | 1.0         | **        | 0.6         | 1.0         | **        |
| 0.6         | 1.0         | **        | 0.6         | 1.0         | **        |
| 0.3         | 1.0         | *         | 0.3         | 1.0         | *         |
| 0.3         | 1.0         | *         | 0.3         | 1.0         | *         |
| 0.3         | 1.0         | *         | 0.3         | 1.0         | *         |
| 0.3         | 1.0         | *         | 0.3         | 1.0         | *         |
| 0.3         | 1.0         | *         | 0.3         | 1.0         | *         |
| 0.3         | 1.0         | *         | 0.3         | 1.0         | *         |
| 0.3         | 1.0         | *         | 0.3         | 1.0         | *         |
| 0.3         | 1.0         | *         | 0.3         | 1.0         | *         |
| 0.3         | 1.0         | *         | 0.3         | 1.0         | *         |
| 0.3         | 1.0         | *         | 0.3         | 1.0         | *         |
| 0.3         | 1.0         | *         | 0.3         | 1.0         | *         |
| 0.3         | 1.0         | *         | 0.3         | 1.0         | *         |
| 0.3         | 1.0         | *         | 0.3         | 1.0         | *         |
| 0.3         | 1.0         | *         | 0.3         | 1.0         | *         |
| 0.3         | 1.0         | *         | 0.3         | 1.0         | *         |
| 0.3         | 1.0         | *         | 0.3         | 1.0         | *         |
| 0.3         | 1.0         | *         | 0.3         | 1.0         | *         |
| 0.2         | 0.3         |           | 0.2         | 0.3         |           |
| 0.2         | 0.3         |           | 0.2         | 0.3         |           |
| 0.3         | 1.0         | *         | 0.2         | 0.3         |           |

Figure1F

| Group  | Status   | Bacteroides_gallinaceum | Alistipes_senegalensis |
|--------|----------|-------------------------|------------------------|
| IIEE21 | Enriched | 0.552466                | 3.314797               |
| IIEE22 | Enriched | 0.333490                | 3.781118               |
| IIEE23 | Enriched | 0.648067                | 0.823814               |
| IIEE24 | Enriched | 0.280105                | 3.908253               |
| IIEE25 | Enriched | 0.225070                | 2.489550               |
| IIEE26 | Enriched | 0.694489                | 3.102899               |
| IIEE27 | Enriched | 0.626751                | 3.310721               |
| IIEE28 | Enriched | 0.191245                | 2.287859               |
| IIEE29 | Enriched | 0.334663                | 1.797093               |
| IIEE30 | Enriched | 0.136871                | 1.379238               |
| Iise10 | Standard | 0.000000                | 0.000000               |
| Iise11 | Standard | 0.000000                | 0.000000               |
| Iise12 | Standard | 0.091702                | 0.000000               |
| IIEE13 | Standard | 0.000000                | 0.000000               |
| IIEE14 | Standard | 0.000000                | 0.000000               |
| IIEE15 | Standard | 0.000000                | 0.000000               |
| IIEE16 | Standard | 0.000000                | 0.000000               |
| Iise7  | Standard | 0.000000                | 0.038068               |
| Iise8  | Standard | 0.000000                | 0.000000               |
| Iise9  | Standard | 0.000000                | 0.000000               |

**PREVALENCE**

| Species                          | Enriched | Standard |
|----------------------------------|----------|----------|
| Alistipes_senegalensis           | 100.0    | 10.0     |
| Bacteroides_gallinaceum          | 100.0    | 10.0     |
| Clostridium_kluyveri             | 90.0     | 10.0     |
| Beduini_massiliensis             | 70.0     | 0.0      |
| Barnesiella_intestinihominis     | 100.0    | 100.0    |
| Enterobacter_cloacae             | 80.0     | 0.0      |
| Parasutterella_excrementihominis | 100.0    | 100.0    |

Figure1F

| RELATIVE ABUNDANCE               |                      |                      |
|----------------------------------|----------------------|----------------------|
| Parasutterella_excrementihominis | Clostridium_kluyveri | Enterobacter_cloacae |
| 13.262821                        | 0.210809             | 0.101770             |
| 15.166745                        | 0.394551             | 0.000000             |
| 15.586555                        | 0.296573             | 0.000000             |
| 10.406152                        | 0.089845             | 0.018497             |
| 11.685269                        | 0.160764             | 0.096459             |
| 3.924817                         | 0.165658             | 0.108315             |
| 9.615101                         | 0.405545             | 0.095856             |
| 12.069698                        | 0.417906             | 0.084998             |
| 6.830789                         | 0.000000             | 0.022922             |
| 2.121499                         | 0.063171             | 0.042114             |
| 2.207876                         | 0.000000             | 0.0                  |
| 0.566251                         | 0.000000             | 0.0                  |
| 0.814840                         | 0.000000             | 0.0                  |
| 1.263890                         | 0.000000             | 0.0                  |
| 0.610813                         | 0.000000             | 0.0                  |
| 0.337989                         | 0.000000             | 0.0                  |
| 0.592885                         | 0.000000             | 0.0                  |
| 1.015712                         | 0.005191             | 0.0                  |
| 1.126613                         | 0.000000             | 0.0                  |
| 1.272317                         | 0.000000             | 0.0                  |

Figure1F

| Barnesiella_intestinihomini: Beduini_massiliensis |          |
|---|----------|
| 5.397448  | 0.000000 |
| 2.296853  | 0.549554 |
| 2.032074  | 0.010984 |
| 8.741379  | 0.031710 |
| 2.048597  | 0.252630 |
| 2.274610  | 0.700860 |
| 4.151305  | 0.000000 |
| 0.545403  | 0.028333 |
| 2.768991  | 0.000000 |
| 1.321331  | 0.036850 |
| 0.911556  | 0.0      |
| 0.466483  | 0.0      |
| 0.555454  | 0.0      |
| 0.326505  | 0.0      |
| 0.545833  | 0.0      |
| 0.450652  | 0.0      |
| 0.503482  | 0.0      |
| 0.588317  | 0.0      |
| 1.192114  | 0.0      |
| 0.369382  | 0.0      |

Figure1F



Figure1F

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