

Supplementary Table 1. Covariation of microbiome structure with disease

Dataset	Organism	Supporting class*	Logarithmic LDA score	Wilcoxon p-value
skin	Bacteria.Actinobacteria.Actinobacteria.Actinomyetales.Corynebacteriaceae.Corynebacterium.kroppenstedtii	CMC	4.631622151	0.003756472
skin	Bacteria.Actinobacteria.Actinobacteria.Actinomyetales.Corynebacteriaceae.Corynebacterium.kroppenstedtii.69669	CMC	4.629080995	0.003756472
skin	Bacteria.Actinobacteria.Actinobacteria.Actinomyetales.Intrasporangiaceae	HIES	4.009979633	0.006217028
skin	Bacteria.Actinobacteria.Actinobacteria.Actinomyetales.Intrasporangiaceae.Knoellia	HIES	3.937748037	0.006217028
skin	Bacteria.Actinobacteria.Actinobacteria.Actinomyetales.Intrasporangiaceae.Knoellia.subterranea.581352	HIES	3.930869749	0.006217028
skin	Bacteria.Actinobacteria.Actinobacteria.Actinomyetales.Intrasporangiaceae.Knoellia.subterranea	HIES	3.932277669	0.006217028
skin	Bacteria.Proteobacteria.Gammaproteobacteria.Pseudomonadales.Moraxellaceae	HIES	5.129842085	0.006554949
skin	Bacteria.Actinobacteria.Actinobacteria.Actinomyetales.Corynebacteriaceae	CMC	4.980612716	0.006924502
skin	Bacteria.Actinobacteria.Actinobacteria.Actinomyetales.Corynebacteriaceae.Corynebacterium	CMC	4.980612716	0.006924502
skin	Bacteria.Actinobacteria.Actinobacteria.Actinomyetales.Corynebacteriaceae.Corynebacterium.unclassified.320879	control	4.391101978	0.008765038
skin	Bacteria.Proteobacteria.Gammaproteobacteria.Pseudomonadales	HIES	5.131274856	0.009058854
skin	Bacteria.Proteobacteria.Alphaproteobacteria.Rhodobacterales.Rhodobacteraceae.Paracoccus.unclassified	HIES	3.901385341	0.009214815
skin	Bacteria.Actinobacteria.Actinobacteria.Actinomyetales.Corynebacteriaceae.Corynebacterium.unclassified.358019	CMC	4.150393125	0.013717011
skin	Bacteria.Proteobacteria.Gammaproteobacteria.Pseudomonadales.Moraxellaceae.Acinetobacter.unclassified.2326547	HIES	4.382565904	0.014699754
skin	Bacteria.Proteobacteria.Alphaproteobacteria.Rhodobacterales.Rhodobacteraceae.Paracoccus.unclassified.138528	HIES	4.013770248	0.015610308
skin	Bacteria.Proteobacteria.Gammaproteobacteria	HIES	5.070956172	0.024037738
skin	Bacteria.Actinobacteria.Actinobacteria.Actinomyetales.Micrococcaceae.Micrococcus	HIES	4.110845693	0.034231888
skin	Bacteria.Actinobacteria.Actinobacteria.Actinomyetales.Micrococcaceae.Micrococcus.unclassified	HIES	4.110845693	0.034231888
skin	Bacteria.Actinobacteria.Actinobacteria.Actinomyetales.Micrococcaceae.Micrococcus.unclassified.562170	HIES	4.110845693	0.034231888
skin	Bacteria.Proteobacteria.Gammaproteobacteria.Pseudomonadales.Moraxellaceae.Acinetobacter	HIES	4.810948454	0.03753891
skin	Bacteria.Firmicutes.Bacilli.Lactobacillales.Carnobacteriaceae.Granulicatella.unclassified.162192	CMC	4.293023004	0.039544867
skin	Bacteria.Firmicutes.Bacilli.Bacillales.Staphylococcaceae.Staphylococcus.unclassified.372254	control	3.993289587	0.04566228
oral	Bacteria.Firmicutes.Clostridia.Clostridiales.V	control	2.795815865	0.000936485

	eillonellaceae.unclassified.149091			
oral	Bacteria.Firmicutes.Clostridia.Clostridiales.V eillonellaceae.unclassified	control	3.784188862	0.000942324
oral	Bacteria.Bacteroidetes.Bacteroidia.Bacteroid ales.Prevotellaceae.Prevotella.unclassified	control	4.011245366	0.001565493
oral	Bacteria.Firmicutes.Clostridia.Clostridiales.Cl ostridiaceae.unclassified.248474	control	2.907636024	0.003040672
oral	Bacteria.Firmicutes.Clostridia.Clostridiales.L achnospiraceae.unclassified.71387	control	3.903916461	0.003127236
oral	Bacteria.Firmicutes.Clostridia.Clostridiales.V eillonellaceae.Megasphaera.micronuciformis. 521650	control	2.681265457	0.003137152
oral	Bacteria.Firmicutes.Clostridia.Clostridiales.V eillonellaceae.unclassified.511378	control	3.726037001	0.003292464
oral	Bacteria.Firmicutes.Clostridia.Clostridiales.V eillonellaceae.Megasphaera.micronuciformis	control	2.731288951	0.003521693
oral	Bacteria.Firmicutes.Clostridia.Clostridiales.V eillonellaceae.Megasphaera	control	2.731363316	0.003521693
oral	Bacteria.Firmicutes.Clostridia.Clostridiales.V eillonellaceae.Veillonella.unclassified.58541 9	control	3.171774184	0.003966761
oral	Bacteria.Bacteroidetes.Bacteroidia.Bacteroid ales.Prevotellaceae	control	4.9210381	0.004901658
oral	Bacteria.Bacteroidetes.Bacteroidia.Bacteroid ales.Prevotellaceae.Prevotella	control	4.921925841	0.004901658
oral	Bacteria.Bacteroidetes.Bacteroidia.Bacteroid ales._Paraprevotellaceae._Prevotella_unclas sified.93000	control	2.698987499	0.005365495
oral	Bacteria.Bacteroidetes.Bacteroidia.Bacteroid ales.Prevotellaceae.Prevotella.melaninogenic a	control	4.814944764	0.007779152
oral	Bacteria.Firmicutes.Clostridia.Clostridiales.V eillonellaceae.Megasphaera.micronuciformis. 757622	control	2.778111922	0.009373243
oral	Bacteria.Firmicutes.Clostridia.Clostridiales.L achnospiraceae.Butyrivibrio	control	2.752436035	0.009411545
oral	Bacteria.Firmicutes.Clostridia.Clostridiales.L achnospiraceae.Butyrivibrio.unclassified	control	2.757304765	0.009411545
oral	Bacteria.Firmicutes.Clostridia.Clostridiales.L achnospiraceae.Butyrivibrio.unclassified.925 12	control	2.753084586	0.009411545
oral	Bacteria.Bacteroidetes	control	4.905212964	0.009923977
oral	Bacteria.Bacteroidetes.Bacteroidia.Bacteroid ales	control	4.908512194	0.009923977
oral	Bacteria.Bacteroidetes.Bacteroidia	control	4.912890896	0.009923977
oral	Bacteria.Proteobacteria.Gammaproteobacter ia.Pasteurellales.Pasteurellaceae.Aggregatiba cter.unclassified	control	3.085494594	0.010040963
oral	Bacteria.Proteobacteria.Gammaproteobacter ia.Pasteurellales.Pasteurellaceae.Aggregatiba cter.unclassified.891034	control	3.116502366	0.010040963
oral	Bacteria.Bacteroidetes.Bacteroidia.Bacteroid ales.Prevotellaceae.Prevotella.unclassified.8 51822	control	3.886011774	0.010141857
oral	Bacteria.Firmicutes.Clostridia.Clostridiales.V eillonellaceae.Veillonella.parvula.3747214	control	4.001562631	0.011405553
oral	Bacteria.Firmicutes.Clostridia.Clostridiales.V eillonellaceae.Veillonella.parvula	control	4.009219075	0.011405553
oral	Bacteria.Actinobacteria.Actinobacteria.Actin omycetales.Actinomycetaceae.unclassified.3 03554	CMC	3.8292743	0.011533493
oral	Bacteria.Firmicutes.Bacilli.Lactobacillales.Ca rnobacteriaceae.Granulicatella.unclassified.1 62192	CMC	3.449059376	0.013393606
oral	Bacteria.Fusobacteria.Fusobacteria.Fusobact	control	4.158679614	0.014559934

	eriales.Leptotrichiaceae.Leptotrichia.unclassified.31235			
oral	Bacteria.Fusobacteria.Fusobacteria.Fusobacteriales.Leptotrichiaceae.Leptotrichia.buccalis	CMC	2.647545894	0.014562617
oral	Bacteria.Fusobacteria.Fusobacteria.Fusobacteriales.Leptotrichiaceae.Leptotrichia.buccalis.529861	CMC	2.650151393	0.014562617
oral	Bacteria.Proteobacteria.Gammaproteobacteria.Pasteurellales.Pasteurellaceae.Actinobacillus.unclassified.204197	control	3.143394828	0.014588926
oral	Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales.Prevotellaceae.Prevotella.unclassified.2185	control	2.922596287	0.015069969
oral	Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales.Prevotellaceae.Prevotella.melaninogenica.525942	control	3.145587297	0.015318953
oral	Bacteria.Firmicutes.Bacilli.Lactobacillales.Streptococcaceae.Streptococcus.unclassified.584109	CMC	2.838383588	0.015421615
oral	Bacteria.Firmicutes.Bacilli.Bacillales	CMC	2.773508455	0.016422697
oral	Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales.Prevotellaceae.Prevotella.pallens.2222	control	3.439991059	0.017381165
oral	Bacteria.Firmicutes.Erysipelotrichi.Erysipelotrichales.Erysipelotrichaceae.Bulleidia.mooriei	control	3.45231084	0.017433537
oral	Bacteria.Firmicutes.Erysipelotrichi.Erysipelotrichales	control	3.454168148	0.017433537
oral	Bacteria.Firmicutes.Erysipelotrichi.Erysipelotrichales.Erysipelotrichaceae.Bulleidia	control	3.453426515	0.017433537
oral	Bacteria.Firmicutes.Erysipelotrichi.Erysipelotrichales.Erysipelotrichaceae	control	3.456228282	0.017433537
oral	Bacteria.Firmicutes.Erysipelotrichi.Erysipelotrichales.Erysipelotrichaceae.Bulleidia.mooriei.4030370	control	3.456011374	0.017433537
oral	Bacteria.Firmicutes.Erysipelotrichi	control	3.455809191	0.017433537
oral	Bacteria.Proteobacteria.Gammaproteobacteria.Pasteurellales.Pasteurellaceae.Actinobacillus.unclassified	control	3.223958358	0.018716878
oral	Bacteria.Firmicutes.Clostridia.Clostridiales.Clostridiaceae.Mogibacterium.unclassified	control	3.197155442	0.020876302
oral	Bacteria.Firmicutes.Clostridia.Clostridiales.Clostridiaceae.Mogibacterium.unclassified.46159	control	3.198164419	0.020876302
oral	Bacteria.Firmicutes.Clostridia.Clostridiales.Clostridiaceae.Mogibacterium	control	3.198218584	0.020876302
oral	Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales.Prevotellaceae.Prevotella.melaninogenica.958078	control	4.552690686	0.021376683
oral	Bacteria.Firmicutes.Clostridia.Clostridiales.Peptococcaceae.Peptococcus.unclassified	control	2.913498567	0.026326774
oral	Bacteria.Firmicutes.Clostridia.Clostridiales.Peptococcaceae.Peptococcus	control	2.913459661	0.026326774
oral	Bacteria.Firmicutes.Clostridia.Clostridiales.Peptococcaceae	control	2.913309239	0.026326774
oral	Bacteria.Firmicutes.Clostridia.Clostridiales.Peptococcaceae.Peptococcus.unclassified.68340	control	2.913555887	0.026326774
oral	Bacteria.Firmicutes.Clostridia.Clostridiales.Veillonellaceae.Veillonella.unclassified.573384	control	3.315319947	0.026491697
oral	Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales.Prevotellaceae.Prevotella.nigrescens.747980	control	2.77441066	0.026513127
oral	Bacteria.Bacteroidetes.Bacteroidia.Bacteroid	control	2.778592926	0.026513127

	ales.Prevotellaceae.Prevotella.nigrescens				
oral	Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales._Paraprevotellaceae._Prevotella_unclassified.28952	control	3.540999404	0.027149441	
oral	Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales._Paraprevotellaceae._Prevotella_unclassified	control	3.844412795	0.027866391	
oral	Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales._Paraprevotellaceae_	control	3.828854597	0.027866391	
oral	Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales._Paraprevotellaceae._Prevotella_	control	3.837796335	0.027866391	
oral	Bacteria.Firmicutes.Clostridia.Clostridiales.Lachnospiraceae	control	4.317087739	0.028375054	
oral	Bacteria.Firmicutes.Bacilli.unclassified	HIES	3.38013454	0.028574358	
oral	Bacteria.Firmicutes.Bacilli.unclassified.1935703	HIES	3.369916452	0.028574358	
oral	Bacteria.Actinobacteria.Actinobacteria.Actinomycetales.Actinomycetaceae.Parascardovia	HIES	3.898448889	0.031745636	
oral	Bacteria.Actinobacteria.Actinobacteria.Actinomycetales.Actinomycetaceae.Parascardovia.unclassified	HIES	3.895616362	0.031745636	
oral	Bacteria.Firmicutes.Bacilli.Lactobacillales.Streptococcaceae.Streptococcus.unclassified.736957	CMC	3.233453905	0.032475389	
oral	Bacteria.Fusobacteria.Fusobacteria.Fusobacteriales.Fusobacteriaceae.Fusobacterium.unclassified.545299	control	2.86514049	0.032913364	
oral	Bacteria.Firmicutes.Clostridia.Coriobacteriales.Coriobacteriaceae.Atopobium.unclassified.132328	control	3.623768927	0.03457291	
oral	Bacteria.Firmicutes.Clostridia.Clostridiales.Veillonellaceae.Veillonella.parvula.4200871	control	3.581503403	0.038723223	
oral	Bacteria.Firmicutes.Bacilli.Bacillales.Staphylococcaceae	CMC	2.726254296	0.039244631	
oral	Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales._Paraprevotellaceae._Prevotella_unclassified.539347	control	3.235507946	0.039561609	
oral	Bacteria.Fusobacteria.Fusobacteria	control	4.622317736	0.040225051	
oral	Bacteria.Fusobacteria.Fusobacteria.Fusobacteriales	control	4.622317006	0.040225051	
oral	Bacteria.Fusobacteria	control	4.622317878	0.040225051	
oral	Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales.Prevotellaceae.Prevotella.unclassified.239506	control	2.598316154	0.04365131	
oral	Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales.Porphyromonadaceae.Tannerella.unclassified.254492	control	2.7245435	0.04384112	
oral	Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales.Porphyromonadaceae.Tannerella.unclassified	control	2.709463453	0.04384112	
oral	Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales.Porphyromonadaceae.Tannerella	control	2.722788527	0.04384112	
oral	Bacteria.Firmicutes.Bacilli.Lactobacillales.Streptococcaceae.unclassified.525391	HIES	2.828860652	0.045464825	
oral	Bacteria.Firmicutes.Clostridia.Clostridiales.Clostridiaceae.unclassified	control	2.887108295	0.045814835	
oral	Bacteria.Firmicutes.Clostridia.Coriobacteriales	control	3.630703271	0.04796904	
oral	Bacteria.Firmicutes.Clostridia.Coriobacteriales.Coriobacteriaceae.Atopobium	control	3.62399191	0.04796904	
oral	Bacteria.Firmicutes.Clostridia.Coriobacteriales.Coriobacteriaceae	control	3.627591274	0.04796904	
oral	Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales.Prevotellaceae.Prevotella.nanceiensis.898309	control	3.396504271	0.048672048	
