

Supplementary materials

Table S1: Biomarkers and discriminative taxa amongst the studied groups

Biomarkers	Group	P value	FDR
Bacteria.Firmicutes.Erysipelotrichi.Erysipelotrichales.Erysipelotrichaceae._Eubacterium_.s__cylindroides	Assuit Control	0.028315	4.201802
Bacteria.Firmicutes.Erysipelotrichi.Erysipelotrichales.Erysipelotrichaceae.Clostridium	Assuit Control	0.041957	3.746634
Bacteria.Firmicutes.Erysipelotrichi.Erysipelotrichales.Erysipelotrichaceae._Eubacterium_	Assuit Control	0.014007	4.210247
Bacteria.Firmicutes.Erysipelotrichi.Erysipelotrichales.Erysipelotrichaceae.Clostridium.s__saccharogumia	Assuit Control	0.041957	3.746634
Bacteria.Tenericutes.Mollicutes.Anaeroplasmatales.Anaeroplasmataceae.s__	Assuit Control	0.006215	4.947985
Bacteria.Tenericutes.Mollicutes.Anaeroplasmatales	Assuit Control	0.006215	4.947985
Bacteria.Tenericutes.Mollicutes.Anaeroplasmatales.Anaeroplasmataceae	Assuit Control	0.006215	4.947985
Bacteria.Tenericutes.Mollicutes.Anaeroplasmatales.Anaeroplasmataceae	Assuit Control	0.006215	4.947985
Bacteria.Proteobacteria.Alphaproteobacteria	Assuit Control	0.002425	5.293802
Bacteria.Proteobacteria.Epsilonproteobacteria.Campylobacteriales.Campylobacteraceae.Campylobacter.s__ureolyticus	Assuit Control	0.02797	3.341706
Bacteria.Proteobacteria.Alphaproteobacteria.RF32	Assuit Control	0.006004	5.05032
Bacteria.Proteobacteria.Alphaproteobacteria	Assuit Control	0.000621	4.916827
Bacteria.Proteobacteria.Alphaproteobacteria.RF32	Assuit Control	0.006004	5.05032
Bacteria.Proteobacteria.Alphaproteobacteria	Assuit Control	0.000621	4.916827
Bacteria.Proteobacteria.Alphaproteobacteria	Assuit Control	0.000621	4.916827
Bacteria.Proteobacteria.Alphaproteobacteria.RF32	Assuit Control	0.006004	5.05032
Bacteria.Lentisphaerae._Lentisphaeria_.Victivallales.Victivallaceae	Assuit DM	0.049218	4.589315
Bacteria.Lentisphaerae._Lentisphaeria_.Victivallales	Assuit DM	0.049218	4.589315
Bacteria.Lentisphaerae._Lentisphaeria_.Victivallales.Victivallaceae.Victivallis.s__vadensis	Assuit DM	0.049218	4.588397
Bacteria.Lentisphaerae._Lentisphaeria_.Victivallales.Victivallaceae.Victivallis	Assuit DM	0.049218	4.588397
Bacteria.Firmicutes.Erysipelotrichi.Erysipelotrichales	Assuit DM	0.013688	4.610511
Bacteria.Firmicutes.Erysipelotrichi.Erysipelotrichales.Erysipelotrichaceae	Assuit DM	0.013688	4.610511
Bacteria.Firmicutes.Erysipelotrichi.Erysipelotrichales.Erysipelotrichaceae.p_75_a5	Assuit DM	0.032316	3.898052
Bacteria.Firmicutes.Erysipelotrichi	Assuit DM	0.013688	4.610511
Bacteria.Firmicutes.Bacilli.Lactobacillales.Lactobacillaceae	Assuit DM	0.047891	4.16816
Bacteria.Firmicutes.Clostridia.Clostridiales.Ruminococcaceae.Ruminococcus.s__callidus	Assuit DM	0.00964	3.161132
Bacteria._Thermi_.Deinococci.Thermales.Thermaceae	Assuit DM	0.0023	4.45731
Bacteria._Thermi_.Deinococci.Thermales	Assuit DM	0.0023	4.45731
Bacteria._Thermi_.Deinococci.Thermales.Thermaceae.Meiothermus.s__	Assuit DM	0.000882	4.45731
Bacteria._Thermi_.Deinococci.Thermales.Thermaceae.Meiothermus	Assuit DM	0.000882	4.45731
Bacteria._Thermi_.Deinococci	Assuit DM	0.003523	4.45731
Bacteria.Actinobacteria.Coriobacteriia.Coriobacteriales.Coriobacteriaceae.Eggerthella.s__	Assuit DM	0.030212	4.275898
Bacteria.Actinobacteria.Actinobacteria.Bifidobacteriales.Bifidobacteriaceae.Bifidobacterium.s__bifidum	Assuit DM	0.011101	4.823824
Bacteria.Actinobacteria.Coriobacteriia.Coriobacteriales.Coriobacteriaceae.Eggerthella	Assuit DM	0.031757	4.275898
Bacteria.Actinobacteria.Coriobacteriia.Coriobacteriales.Coriobacteriaceae.Collinsella	Assuit DM	0.016269	3.223242
Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales.Rikenellaceae.Alistipes	Assuit DM	0.043782	3.927298
Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales.Rikenellaceae.Alistipes.s__indistinctus	Assuit DM	0.035004	3.918124
Bacteria.Firmicutes.Clostridia.Clostridiales.	Ismailia Control	0.006324	

Bacteria.Firmicutes.Clostridia.Clostridiales	Ismailia Control	0.006324	
Bacteria.Firmicutes.Clostridia.Clostridiales.Ruminococcaceae.Faecalibacterium.s__prausnitzii	Ismailia Control	0.006324	3.200659
Bacteria.Firmicutes.Clostridia.Clostridiales.Ruminococcaceae	Ismailia Control	0.006324	3.316053
Bacteria.Firmicutes.Clostridia.Clostridiales.Ruminococcaceae.Faecalibacterium	Ismailia Control	0.009466	3.807804
Bacteria.Firmicutes.Clostridia.Clostridiales.Clostridiaceae.Clostridium.s__perfringens	Ismailia Control	0.006324	3.316053
Bacteria.Firmicutes.Clostridia.Clostridiales.Clostridiaceae.SMB53.s__	Ismailia Control	0.006324	3.316053
Bacteria.Firmicutes.Clostridia.Clostridiales.Veillonellaceae.Veillonella.s__parvula	Ismailia Control	0.006324	3.316053
Bacteria.Firmicutes.Clostridia.Clostridiales.Veillonellaceae.Veillonella	Ismailia Control	0.000157	3.703247
Bacteria.Firmicutes.Clostridia.Clostridiales.Veillonellaceae.Veillonella.s__dispar	Ismailia Control	0.006324	3.200659
Bacteria.Firmicutes.Clostridia.Clostridiales.Veillonellaceae	Ismailia Control	0.006324	3.200659
Bacteria.Firmicutes.Clostridia.Clostridiales.Veillonellaceae.Phascolarctobacterium.s__	Ismailia Control	0.006324	3.200659
Bacteria.Firmicutes.Clostridia.Clostridiales.Veillonellaceae.Phascolarctobacterium	Ismailia Control	0.006324	3.200659
Bacteria.Firmicutes.Clostridia.Clostridiales.Veillonellaceae.Mitsuokella	Ismailia Control	0.01393	5.340812
Bacteria.Firmicutes.Clostridia.Clostridiales.Veillonellaceae.Mitsuokella.s__multacida	Ismailia Control	0.00564	5.340812
Bacteria.Firmicutes.Clostridia.Clostridiales.Lachnospiraceae	Ismailia Control	0.006324	3.200659
Bacteria.Firmicutes.Clostridia.Clostridiales.Lachnospiraceae._Ruminococcus.s__torques	Ismailia Control	0.006324	2.842543
Bacteria.Firmicutes.Clostridia.Clostridiales.Lachnospiraceae.Dorea.s__	Ismailia Control	0.006324	3.617083
Bacteria.Firmicutes.Clostridia.Clostridiales.Lachnospiraceae.s__	Ismailia Control	0.006324	3.316053
Bacteria.Firmicutes.Clostridia.Clostridiales.Peptostreptococcaceae.Clostridium.s__maritimum	Ismailia Control	0.027833	3.563207
Bacteria.Firmicutes.Clostridia.Clostridiales.Peptostreptococcaceae.Peptostreptococcus	Ismailia Control	0.044417	3.904638
Bacteria.Firmicutes.Clostridia.Clostridiales.Peptostreptococcaceae.Peptostreptococcus.s__anaerobius	Ismailia Control	0.029675	3.904638
Bacteria.Firmicutes.Clostridia.Clostridiales.Peptostreptococcaceae	Ismailia Control	0.006324	3.316053
Bacteria.Firmicutes.Clostridia.Clostridiales.Peptostreptococcaceae.s__	Ismailia Control	0.006324	3.316053
Bacteria.Firmicutes.Bacilli.Bacillales.Staphylococcaceae.Staphylococcus.s__	Ismailia Control	1.34E-05	3.618892
Bacteria.Firmicutes.Bacilli.Bacillales.Staphylococcaceae.Staphylococcus	Ismailia Control	0.04052	3.618892
Bacteria.Firmicutes.Bacilli.Bacillales.Bacillaceae.Geobacillus.s__	Ismailia Control	0.006324	3.200659
Bacteria.Firmicutes.Bacilli.Lactobacillales.Lactobacillaceae.Lactobacillus.s__	Ismailia Control	0.006324	3.143573
Bacteria.Firmicutes.Bacilli.Lactobacillales.Lactobacillaceae.Lactobacillus.s__reuteri	Ismailia Control	0.006324	3.200659
Bacteria.Firmicutes.Bacilli.Lactobacillales.Lactobacillaceae.Lactobacillus.s__iners	Ismailia Control	0.000529	3.75801
Bacteria.Firmicutes.Bacilli.Lactobacillales.Streptococcaceae.Streptococcus.s__minor	Ismailia Control	0.006324	3.200659
Bacteria.Firmicutes.Bacilli.Bacillales	Ismailia Control	0.021884	3.892972
Bacteria.Firmicutes.Bacilli.Bacillales.Planococcaceae	Ismailia Control	0.006324	3.316053
Bacteria.Firmicutes.Clostridia.Clostridiales._Tissierellaceae_Peptoniphilus.s__	Ismailia Control	1.34E-05	3.53935
Bacteria.Firmicutes.Clostridia.Clostridiales._Tissierellaceae_Peptoniphilus	Ismailia Control	1.34E-05	3.53935
Bacteria.Firmicutes.Clostridia.Clostridiales._Tissierellaceae_	Ismailia Control	0.025491	3.853526
Bacteria.Actinobacteria.Actinobacteria.Actinomycetales.Propionibacteriaceae.Propionibacterium.s__granulosum	Ismailia Control	0.006324	3.316053
Bacteria.Actinobacteria.Actinobacteria.Actinomycetales.Micrococcaceae.Arthrobacter.s__	Ismailia Control	0.006324	3.316053
Bacteria.Actinobacteria.Actinobacteria.Actinomycetales.Micrococcaceae.Arthrobacter	Ismailia Control	0.006324	3.316053
Bacteria.Actinobacteria.Actinobacteria.Actinomycetales.Actinomycetaceae.Mobiluncus.s__	Ismailia Control	0.006324	3.316053
Bacteria.Actinobacteria.Thermoleophila	Ismailia Control	0.006324	3.316053
Bacteria.Actinobacteria.Thermoleophila.Gaiellales	Ismailia Control	0.006324	3.316053

Bacteria.Actinobacteria.Thermoleophilia.Gaiellales	Ismailia Control	0.006324	3.316053
Bacteria.Actinobacteria.Thermoleophilia.Gaiellales	Ismailia Control	0.006324	3.316053
Bacteria.Actinobacteria.Actinobacteria.Actinomycetales.Brevibacteriaceae.Brevibacterium	Ismailia Control	0.006324	3.316053
Bacteria.Actinobacteria.Actinobacteria.Actinomycetales.Brevibacteriaceae.Brevibacterium.s__	Ismailia Control	0.006324	3.316053
Bacteria.Actinobacteria.Actinobacteria.Actinomycetales.Brevibacteriaceae	Ismailia Control	0.006324	3.316053
Bacteria.Actinobacteria.Actinobacteria.Actinomycetales.Micrococcaceae.Rothia.s__dentocariosa	Ismailia Control	0.006324	3.200659
Bacteria.Actinobacteria.Actinobacteria.Actinomycetales.Corynebacteriaceae.Corynebacterium.s__	Ismailia Control	0.006324	3.316053
Bacteria.Actinobacteria.Actinobacteria.Actinomycetales.Propionibacteriaceae.Propionibacterium	Ismailia Control	1.34E-05	3.441897
Bacteria.Actinobacteria.Actinobacteria.Actinomycetales.Propionibacteriaceae	Ismailia Control	0.010733	3.441897
Bacteria.Actinobacteria.Coriobacteriia.Coriobacteriales.Coriobacteriaceae	Ismailia Control	0.006324	3.143573
Bacteria.Actinobacteria.Actinobacteria.Actinomycetales.Actinomycetaceae.Mobiluncus	Ismailia Control	0.006324	3.316053
Bacteria.Proteobacteria.Betaproteobacteria.Rhodocyclales.Rhodocyclaceae	Ismailia Control	0.006324	3.316053
Bacteria.Proteobacteria.Betaproteobacteria.Rhodocyclales.Rhodocyclaceae.Zoogloea.s__	Ismailia Control	0.006324	3.316053
Bacteria.Proteobacteria.Betaproteobacteria.Burkholderiales.Oxalobacteraceae	Ismailia Control	0.006324	3.200659
Bacteria.Proteobacteria.Betaproteobacteria.Burkholderiales.Oxalobacteraceae.s__	Ismailia Control	0.006324	3.200659
Bacteria.Proteobacteria.Betaproteobacteria.Burkholderiales.Comamonadaceae	Ismailia Control	0.006324	
Bacteria.Proteobacteria.Betaproteobacteria.Burkholderiales.Comamonadaceae.s__	Ismailia Control	0.006324	3.200659
Bacteria.Proteobacteria.Gammaproteobacteria.Pseudomonadales.Pseudomonadaceae	Ismailia Control	0.001627	4.015023
Bacteria.Proteobacteria.Gammaproteobacteria.Pseudomonadales.Pseudomonadaceae.Pseudomonas	Ismailia Control	0.001627	3.918113
Bacteria.Proteobacteria.Gammaproteobacteria.Pseudomonadales	Ismailia Control	0.000162	4.39764
Bacteria.Proteobacteria.Gammaproteobacteria.Pseudomonadales.Pseudomonadaceae.Pseudomonas.s__	Ismailia Control	0.006324	3.316053
Bacteria.Proteobacteria.Gammaproteobacteria.Pseudomonadales.Pseudomonadaceae.Pseudomonas.s__alcaligenes	Ismailia Control	0.013021	3.617083
Bacteria.Proteobacteria.Gammaproteobacteria.Pseudomonadales.Pseudomonadaceae.s__	Ismailia Control	0.006324	3.316053
Bacteria.Proteobacteria.Gammaproteobacteria.Pseudomonadales.Pseudomonadaceae	Ismailia Control	0.006324	
Bacteria.Proteobacteria.Gammaproteobacteria.Pseudomonadales.Moraxellaceae	Ismailia Control	0.006324	3.200659
Bacteria.Proteobacteria.Gammaproteobacteria.Pseudomonadales.Moraxellaceae.Psychrobacter	Ismailia Control	0.010503	3.563207
Bacteria.Proteobacteria.Gammaproteobacteria.Pseudomonadales.Moraxellaceae.Acinetobacter.s__	Ismailia Control	0.006324	3.200659
Bacteria.Proteobacteria.Gammaproteobacteria.Pseudomonadales.Moraxellaceae.Acinetobacter.s__johnsonii	Ismailia Control	0.006324	3.316053
Bacteria.Proteobacteria.Gammaproteobacteria.Pseudomonadales.Moraxellaceae.Psychrobacter.s__marincola	Ismailia Control	0.006324	3.316053
Bacteria.Proteobacteria.Gammaproteobacteria.Pseudomonadales.Moraxellaceae.s__	Ismailia Control	0.006324	3.200659
Bacteria.Proteobacteria.Gammaproteobacteria.Pseudomonadales.Moraxellaceae	Ismailia Control	0.016256	4.165267
Bacteria.Proteobacteria.Gammaproteobacteria.Alteromonadales.Shewanellaceae.Shewanella.s__	Ismailia Control	0.006324	
Bacteria.Proteobacteria.Gammaproteobacteria.Alteromonadales.Shewanellaceae.Shewanella	Ismailia Control	0.006324	3.316053
Bacteria.Proteobacteria.Gammaproteobacteria.Alteromonadales.Shewanellaceae	Ismailia Control	0.006324	
Bacteria.Proteobacteria.Gammaproteobacteria.Alteromonadales	Ismailia Control	0.006324	3.316053
Bacteria.Proteobacteria.Gammaproteobacteria.Aeromonadales.Aeromonadaceae	Ismailia Control	0.006324	3.802719
Bacteria.Proteobacteria.Gammaproteobacteria.Aeromonadales.Aeromonadaceae	Ismailia Control	0.006324	3.802719
Bacteria.Proteobacteria.Gammaproteobacteria.Pasteurellales.Pasteurellaceae.Haemophilus.s__parainfluenzae	Ismailia Control	0.006324	3.316053
Bacteria.Proteobacteria.Gammaproteobacteria.Pasteurellales.Pasteurellaceae.Haemophilus.s__	Ismailia Control	0.006324	3.501689
Bacteria.Proteobacteria.Gammaproteobacteria.Pasteurellales.Pasteurellaceae.Haemophilus	Ismailia Control	0.001288	3.719745
Bacteria.Proteobacteria.Gammaproteobacteria.Pasteurellales.Pasteurellaceae.Aggregatibacter.s__	Ismailia Control	0.006324	3.200659

Archaea	Ismailia Control	0.02266	3.789136
Archaea.Euryarchaeota.Methanobacteria.Methanobacteriales	Ismailia Control	0.02266	3.789136
Archaea.Euryarchaeota.Methanobacteria.Methanobacteriales.Methanobacteriaceae	Ismailia Control	0.02266	3.789136
Archaea.Euryarchaeota.Methanobacteria.Methanobacteriales.Methanobacteriaceae.Methanosphaera.s__	Ismailia Control	0.02266	3.789136
Archaea.Euryarchaeota.Methanobacteria.Methanobacteriales.Methanobacteriaceae.Methanosphaera	Ismailia Control	0.02266	3.789136
Archaea.Euryarchaeota.Methanobacteria	Ismailia Control	0.02266	3.789136
Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales.Bacteroidaceae.Bacteroides	Ismailia Control	0.03023	3.919019
Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales.Bacteroidaceae.Bacteroides.s__eggerthii	Ismailia Control	0.006324	3.793174
Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales.Bacteroidaceae	Ismailia Control	0.03023	3.919019
Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales	Ismailia Control	0.006324	2.842543
Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales.Rikenellaceae	Ismailia Control	0.023422	4.485751
Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales.Rikenellaceae	Ismailia Control	0.006324	4.444603
Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales.Rikenellaceae.s__	Ismailia Control	0.006324	4.444603
Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales.Porphyromonadaceae.Porphyromonas	Ismailia Control	0.006324	3.143573
Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales.Porphyromonadaceae.Porphyromonas.s__	Ismailia Control	0.006324	3.143573
Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales._Barnesiellaceae_	Ismailia Control	0.006324	3.316053
Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales._Barnesiellaceae.s__	Ismailia Control	0.006324	3.316053
Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales._Paraprevotellaceae.s__	Ismailia Control	0.006324	3.143573
Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales._Paraprevotellaceae._Prevotella.s__	Ismailia Control	0.006324	3.316053
Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales.Prevotellaceae.Prevotella.s__melaninogenica	Ismailia Control	0.006324	3.200659
Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales.Prevotellaceae.Prevotella.s__copri	Ismailia Control	0.006324	3.316053
Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales.Prevotellaceae	Ismailia Control	4.70E-06	3.703247
Bacteria.Bacteroidetes.Bacteroidia.Bacteroidales.Prevotellaceae.Prevotella	Ismailia Control	6.61E-06	3.703247
Bacteria.Fusobacteria.Fusobacteriia.Fusobacteriales.Fusobacteriaceae.Fusobacterium.s__	Ismailia Control	0.006324	3.200659
Bacteria.Fusobacteria.Fusobacteriia.Fusobacteriales.Fusobacteriaceae	Ismailia Control	0.006324	3.200659
Bacteria.Fusobacteria.Fusobacteriia.Fusobacteriales.Leptotrichiaceae	Ismailia Control	0.000735	4.122422
Bacteria.Fusobacteria.Fusobacteriia.Fusobacteriales.Leptotrichiaceae.s__	Ismailia Control	0.000424	4.099003
Bacteria.Fusobacteria.Fusobacteriia.Fusobacteriales.Leptotrichiaceae	Ismailia Control	0.000424	4.099003
Bacteria.Fusobacteria	Ismailia Control	0.000735	4.171539
Bacteria.Fusobacteria.Fusobacteriia	Ismailia Control	0.000735	4.171539
Bacteria.Fusobacteria.Fusobacteriia.Fusobacteriales	Ismailia Control	0.000735	4.171539
Bacteria.Fusobacteria.Fusobacteriia.Fusobacteriales.Fusobacteriaceae.Fusobacterium	Ismailia Control	0.006324	3.200659
Bacteria.Spirochaetes.Spirochaetes.Spirochaetales.Spirochaetaceae.Treponema.s__amylovorum	Ismailia Control	0.006324	3.316053
Bacteria.Spirochaetes	Ismailia Control	0.009648	3.563207
Bacteria.Spirochaetes.Spirochaetes	Ismailia Control	1.34E-05	3.563207
Bacteria.Spirochaetes.Spirochaetes.Spirochaetales.Spirochaetaceae.Treponema	Ismailia Control	1.34E-05	3.563207
Bacteria.Spirochaetes.Spirochaetes.Spirochaetales.Spirochaetaceae.Treponema.s__	Ismailia Control	0.006324	3.200659
Bacteria.Spirochaetes.Spirochaetes.Spirochaetales	Ismailia Control	1.34E-05	3.563207
Bacteria.Spirochaetes.Spirochaetes.Spirochaetales.Spirochaetaceae	Ismailia Control	1.34E-05	3.563207
Bacteria._Thermi_.Deinococci.Thermales.Thermaceae.Thermus	Ismailia Control	0.006324	3.316053
Bacteria._Thermi_.Deinococci.Thermales.Thermaceae.Thermus.s__	Ismailia Control	0.006324	3.316053

Bacteria.Tenericutes.Mollicutes.Mycoplasmatales.Mycoplasmataceae.Ureaplasma.s__	Ismailia Control	0.0003	3.807804
Bacteria.Tenericutes.Mollicutes.Mycoplasmatales.Mycoplasmataceae.Ureaplasma	Ismailia Control	0.0003	3.807804
Bacteria.Tenericutes.Mollicutes.Mycoplasmatales	Ismailia Control	0.0003	3.807804
Bacteria.Tenericutes.Mollicutes.Mycoplasmatales.Mycoplasmataceae	Ismailia Control	0.0003	3.807804
Bacteria.Synergistetes.Synergistia.Synergistales	Ismailia Control	0.009244	4.094008
Bacteria.Synergistetes.Synergistia.Synergistales	Ismailia Control	0.009244	4.094008
Bacteria.Actinobacteria	Ismailia DM	0.042062	5.321039
Bacteria.Actinobacteria.Coriobacteriia	Ismailia DM	0.001721	5.218377
Bacteria.Actinobacteria.Coriobacteriia.Coriobacteriales	Ismailia DM	0.001721	5.218377
Bacteria.Actinobacteria.Coriobacteriia.Coriobacteriales.Coriobacteriaceae.Atopobium.s__vaginae	Ismailia DM	7.59E-07	5.212229
Bacteria.Actinobacteria.Coriobacteriia.Coriobacteriales.Coriobacteriaceae.Atopobium	Ismailia DM	7.61E-07	5.213945
Bacteria.Actinobacteria.Coriobacteriia.Coriobacteriales.Coriobacteriaceae	Ismailia DM	0.001721	5.218377
Bacteria.Actinobacteria.Actinobacteria.Actinomycetales.Micrococaceae.Rothia	Ismailia DM	0.018311	3.52236
Bacteria.Actinobacteria.Actinobacteria.Bifidobacteriales.Bifidobacteriaceae.Gardnerella.s__	Ismailia DM	1.05E-05	4.458402
Bacteria.Actinobacteria.Actinobacteria.Bifidobacteriales.Bifidobacteriaceae.Gardnerella	Ismailia DM	1.05E-05	4.458402
Bacteria.Proteobacteria.Alphaproteobacteria.Rickettsiales.mitochondria.Victoria.s__amazonica	Ismailia DM	0.003466	4.131484
Bacteria.Proteobacteria.Alphaproteobacteria.Rickettsiales.mitochondria	Ismailia DM	0.000238	4.556193
Bacteria.Proteobacteria.Alphaproteobacteria.Rickettsiales	Ismailia DM	0.000238	4.556193
Bacteria.Proteobacteria.Alphaproteobacteria.Rickettsiales.mitochondria.Victoria	Ismailia DM	0.003466	4.131484
Bacteria.Proteobacteria.Alphaproteobacteria.Rhizobiales	Ismailia DM	0.042507	3.49132
Bacteria.Proteobacteria.Alphaproteobacteria.Rhodobacterales	Ismailia DM	8.10E-07	4.511143
Bacteria.Proteobacteria.Alphaproteobacteria.Rhodobacterales.Rhodobacteraceae	Ismailia DM	8.10E-07	4.490297
Bacteria.Proteobacteria.Alphaproteobacteria.Rhodobacterales.Rhodobacteraceae.Paracoccus.s__marcusii	Ismailia DM	4.16E-07	4.442823
Bacteria.Proteobacteria.Alphaproteobacteria.Rhodobacterales.Rhodobacteraceae.Paracoccus	Ismailia DM	8.10E-07	4.455576
Bacteria.Proteobacteria.Betaproteobacteria	Ismailia DM	0.006502	4.143947
Bacteria.Proteobacteria.Betaproteobacteria.Neisseriales.Neisseriaceae	Ismailia DM	0.016511	3.55162
Bacteria.Proteobacteria.Betaproteobacteria.Neisseriales	Ismailia DM	0.016511	3.55162
Bacteria.Proteobacteria.Deltaproteobacteria.Desulfovibrionales.Desulfovibrionaceae.Desulfovibrio	Ismailia DM	0.013202	4.031998
Bacteria.Proteobacteria.Deltaproteobacteria.Desulfovibrionales.Desulfovibrionaceae.Desulfovibrio.s__	Ismailia DM	0.009871	3.965862
Bacteria.Proteobacteria.Gammaproteobacteria.Cardibacteriales.Cardibacteriaceae	Ismailia DM	0.001141	3.535291
Bacteria.Proteobacteria.Gammaproteobacteria.Cardibacteriales.Cardibacteriaceae.Suttonella.s__indologenes	Ismailia DM	0.026349	3.38082
Bacteria.Proteobacteria.Gammaproteobacteria.Cardibacteriales.Cardibacteriaceae.Suttonella	Ismailia DM	0.026349	3.38082
Bacteria.Proteobacteria.Gammaproteobacteria.Cardibacteriales	Ismailia DM	0.001141	
Bacteria.Proteobacteria.Gammaproteobacteria.Pseudomonadales.Pseudomonadaceae.Pseudomonas.s__stutzeri	Ismailia DM	0.018029	3.59513
Bacteria.Firmicutes.Clostridia.Clostridiales.Lachnospiraceae.Lachnospira	Ismailia DM	0.003466	4.124701
Bacteria.Firmicutes.Clostridia.Clostridiales.Lachnospiraceae.Lachnospira	Ismailia DM	0.003466	4.124701
Bacteria.Firmicutes.Clostridia.Clostridiales.Lachnospiraceae.Butyrvibrio.s__	Ismailia DM	0.026349	3.28559
Bacteria.Firmicutes.Clostridia.Clostridiales.Lachnospiraceae.Butyrvibrio	Ismailia DM	0.026349	3.28559
Bacteria.Firmicutes.Clostridia.Clostridiales.Lachnospiraceae.Epulopiscium.s__	Ismailia DM	0.023233	3.715939
Bacteria.Firmicutes.Clostridia.Clostridiales.Lachnospiraceae.Epulopiscium	Ismailia DM	0.023233	3.715939
Bacteria.Firmicutes.Clostridia.Clostridiales.Lachnospiraceae	Ismailia DM	0.039446	3.421453

Bacteria.Firmicutes.Clostridia.Clostridiales.Clostridiaceae	Ismailia DM	0.000249	3.981235
Bacteria.Firmicutes.Clostridia.Clostridiales.Clostridiaceae.Clostridium.s__	Ismailia DM	0.002479	3.695572
Bacteria.Firmicutes.Clostridia.Clostridiales.Clostridiaceae.Clostridium	Ismailia DM	0.000852	3.970341
Bacteria.Firmicutes.Clostridia.Clostridiales.Clostridiaceae.Clostridium.s__intestinale	Ismailia DM	0.026349	3.223223
Bacteria.Firmicutes.Clostridia.Clostridiales.Peptostreptococcaceae.Clostridium	Ismailia DM	0.015261	3.572338
Bacteria.Firmicutes.Bacilli.Lactobacillales.Aerococcaceae.Alloiococcus.s__otitis	Ismailia DM	0.026349	3.223223
Bacteria.Firmicutes.Bacilli.Lactobacillales.Streptococcaceae.Lactococcus.s__	Ismailia DM	0.003466	4.170531
Bacteria.Firmicutes.Bacilli.Lactobacillales.Carnobacteriaceae	Ismailia DM	0.009871	3.362246
Bacteria.Firmicutes.Bacilli.Turicibacterales.Turicibacteraceae	Ismailia DM	0.026317	3.35635
Bacteria.Firmicutes.Bacilli.Turicibacterales	Ismailia DM	0.026317	3.35635
Bacteria.Firmicutes.Bacilli.Turicibacterales.Turicibacteraceae.Turicibacter.s__	Ismailia DM	0.026317	3.35635
Bacteria.Firmicutes.Bacilli.Turicibacterales.Turicibacteraceae.Turicibacter	Ismailia DM	0.026317	3.35635
Bacteria.Firmicutes.Clostridia.Clostridiales._Tissierellaceae_.Finegoldia.s__	Ismailia DM	0.009777	3.600415
Bacteria.Firmicutes.Clostridia.Clostridiales._Tissierellaceae_.Finegoldia	Ismailia DM	0.009777	3.600415
Bacteria.Firmicutes.Clostridia.Clostridiales.Veillonellaceae.Dialister	Ismailia DM	0.009871	3.297574
Bacteria.Firmicutes.Clostridia.Clostridiales.Veillonellaceae.Dialister.s__	Ismailia DM	0.009871	
Bacteria.Bacteroidetes._Saprosirae_	Ismailia DM	0.006293	3.795629
Bacteria.Bacteroidetes._Saprosirae_._Saprosirales_	Ismailia DM	0.006293	3.795629
Bacteria.Bacteroidetes._Saprosirae_._Saprosirales_._Saprosiraceae	Ismailia DM	0.006293	3.669237
Bacteria.Bacteroidetes._Saprosirae_._Saprosirales_._Saprosiraceae.Aquirestis	Ismailia DM	0.006293	3.498115
Bacteria.Bacteroidetes._Saprosirae_._Saprosirales_._Saprosiraceae.Aquirestis.s__calciphila	Ismailia DM	0.006293	3.498115
Bacteria.Bacteroidetes.Flavobacteriia.Flavobacteriales.Flavobacteriaceae	Ismailia DM	0.015975	3.437002
Bacteria.Bacteroidetes.Flavobacteriia.Flavobacteriales	Ismailia DM	0.015975	3.634732
Bacteria.Bacteroidetes.Flavobacteriia	Ismailia DM	0.015975	3.634732
Bacteria.Bacteroidetes.Cytophagia.Cytophagales.Cytophagaceae.Runella.s__	Ismailia DM	0.026317	3.483034
Bacteria.Bacteroidetes.Cytophagia.Cytophagales.Cytophagaceae.Runella	Ismailia DM	0.026317	3.483034
Bacteria.Bacteroidetes.Cytophagia.Cytophagales.Cyclobacteriaceae.s__	Ismailia DM	0.026317	3.483034
Bacteria.Bacteroidetes.Cytophagia.Cytophagales.Cyclobacteriaceae	Ismailia DM	0.026317	3.483034
Bacteria.Bacteroidetes.Cytophagia.Cytophagales.Cyclobacteriaceae	Ismailia DM	0.026317	3.483034
Bacteria.Fusobacteria.Fusobacteriia.Fusobacteriales.Leptotrichiaceae.Sneathia.s__	Ismailia DM	0.006286	3.583886
Bacteria.Fusobacteria.Fusobacteriia.Fusobacteriales.Leptotrichiaceae.Sneathia	Ismailia DM	0.006286	3.583886
Bacteria.Verrucomicrobia._Spartobacteria_._Chthoniobacteriales_._Chthoniobacteraceae_.CandidatusXiphinematobacter.s__	Ismailia DM	0.009871	3.505864
Bacteria.Verrucomicrobia._Spartobacteria_._Chthoniobacteriales_._Chthoniobacteraceae_.CandidatusXiphinematobacter	Ismailia DM	0.009871	3.505864
Bacteria.Verrucomicrobia._Spartobacteria_	Ismailia DM	0.009871	3.505864
Bacteria.Verrucomicrobia._Spartobacteria_._Chthoniobacteriales_._Chthoniobacteraceae_	Ismailia DM	0.009871	3.505864
Bacteria.Verrucomicrobia._Spartobacteria_._Chthoniobacteriales_	Ismailia DM	0.009871	3.505864

Table S2: Core gut microbiome among the studied groups

Ismailia control (IsC)	Ismailia diabetes (IsDM)	Assiut control (AsC)	Assiut diabetes (AsDM)
Akkermansia	Bacteroides	Anaerovibrio	Akkermansia
Bacteroides	Bifidobacterium	Bacteroides	Bacteroides
Bifidobacterium	Blautia	Bifidobacterium	Bifidobacterium
Blautia	Dialister	Blautia	Blautia
Catenibacterium	Faecalibacterium	Catenibacterium	Catenibacterium
Collinsella	Lachnospira	Collinsella	Collinsella
Coprococcus	Lactobacillus	Coprococcus	Coprococcus
Dialister	Megasphaera	Dialister	Dialister
Eubacterium	Prevotella	Eubacterium	Eubacterium
Faecalibacterium	Roseburia	Faecalibacterium	Faecalibacterium
Haemophilus	Ruminococcus	Lachnospira	Lachnospira
Lachnospira	Succinivibrio	Megasphaera	Lactobacillus
Lactobacillus	Sutterella	Mitsuokella	Megasphaera
Megasphaera	Prevotella	Mitsuokella	
Mitsuokella	Roseburia	Parabacteroides	
Parabacteroides	Ruminococcus	Phascolarctobacterium	
Phascolarctobacterium	Streptococcus	Prevotella	
Prevotella	Succinivibrio	Roseburia	
Roseburia	Sutterella	Ruminococcus	
Ruminococcus	Treponema	SMB53	
SMB53		Succinivibrio	
Streptococcus		Sutterella	
Succinivibrio		Treponema	
Sutterella			

Table S3: Characteristic enterotype of each sample

Sample ID	Enterotype
AsC1	E1
AsC2	E1
AsC3	E1
AsC4	E1
AsC5	E1
AsC6	E1
AsC7	E1
AsC8	E1
AsD1	E5
AsD2	E5
AsD3	E5
AsD4	E5
AsD5	E5
AsD6	E5
AsD7	E5
AsD8	E5
AsD9	E5
AsD10	E5
AsD11	E5
AsD12	E5
AsD13	E5
AsD14	E4
AsD15	E4
AsD16	E4
AsD17	E4
IsC1	E3
IsC2	E3
IsC3	E3
IsC4	E3
IsC5	E3
IsC6	E3
IsC7	E3
IsC8	E3
IsD1	E2
IsD2	E2
IsD3	E2
IsD4	E2
IsD5	E2
IsD6	E2
IsD7	E2
IsD8	E2
IsD9	E2
IsD10	E2
IsD11	E2
IsD12	E2
IsD13	E2
IsD14	E2
IsD15	E2

Table S4: Bacterial communities' characteristic enterotypes

Enterotype 1 (AsC)	Enterotype 2 (IsDM)	Enterotype 3 (IsC)	Enterotype4 (AsDM with giardia)	Enterotype5 (AsDM)
Prevotella	Faecalibacterium	Prevotella	Bacteroides	Prevotella
Succinivibrio	Prevotella	Faecalibacterium	Dialister	Faecalibacterium
Faecalibacterium	Bacteroides	Succinivibrio	Lachnospira	Succinivibrio
Bacteroides	Lachnospira	Dialister	Bifidobacterium	Bifidobacterium
Dialister	Roseburia	Lachnospira	Blautia	Lactobacillus
Lachnospira	Blautia	Bacteroides	Roseburia	Bacteroides
Ruminococcus	Lactobacillus	Ruminococcus	Coprococcus	Dialister
Bifidobacterium	Sutterella	Megasphaera	Eubacterium	Collinsella
Sutterella	Dialister	Phascolarctobacterium	Sutterella	Blautia
Streptococcus	Bifidobacterium	Roseburia	Megasphaera	Roseburia
Eubacterium	Coprococcus	Blautia	Megasphaera	Coprococcus
Blautia	Ruminococcus	Oscillospira		Lachnospira
Coprococcus	Streptococcus	Lactobacillus		Ruminococcus
Roseburia	Succinivibrio	Coprococcus		Catenibacterium
Catenibacterium	Anaerostipes	Catenibacterium		Eubacterium
Collinsella	Megasphaera	Haemophilus		Sutterella
Phascolarctobacterium	Parabacteroides	Clostridium		Megasphaera
Mitsuokella		Dorea		
		Bifidobacterium		