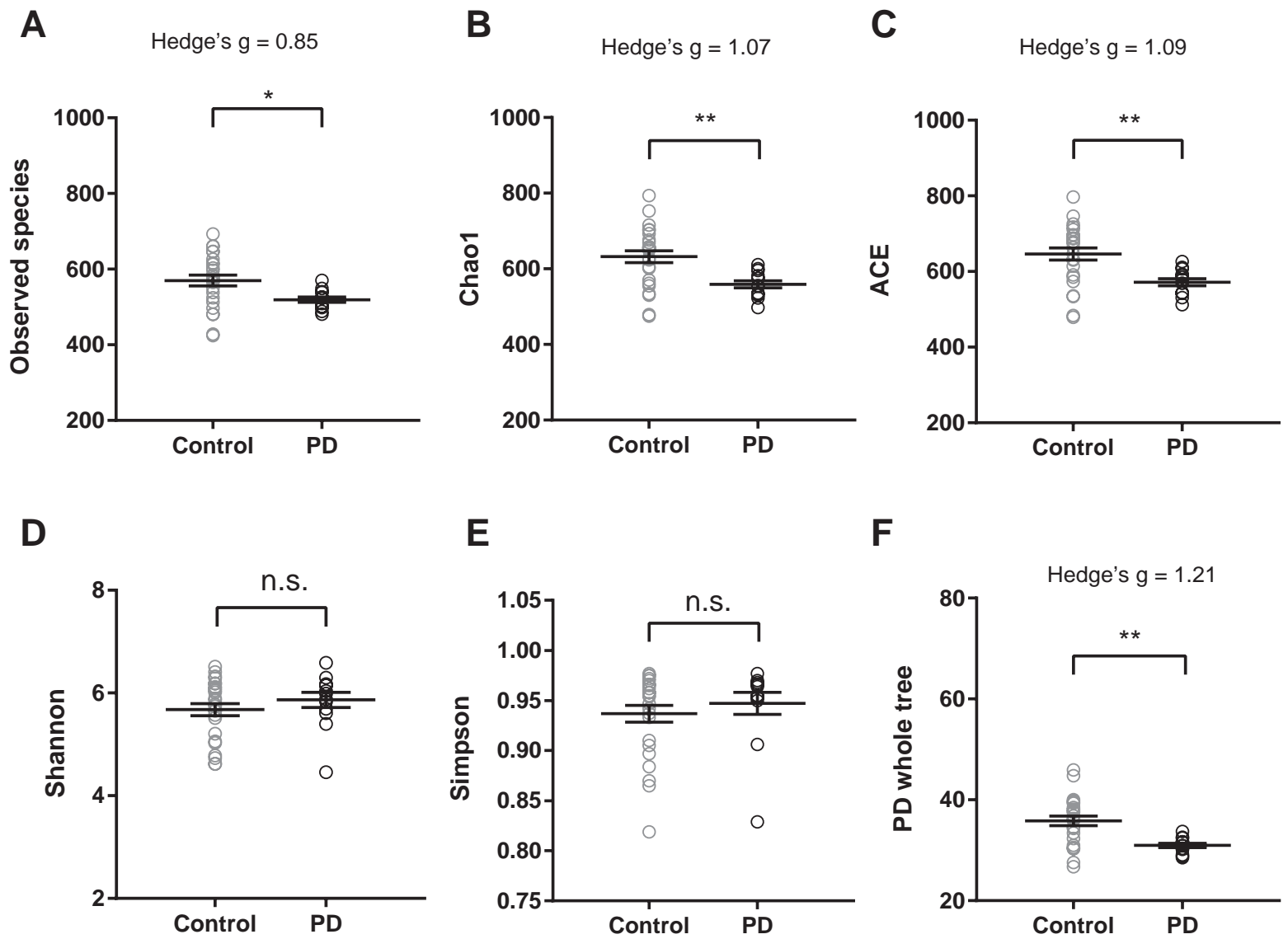
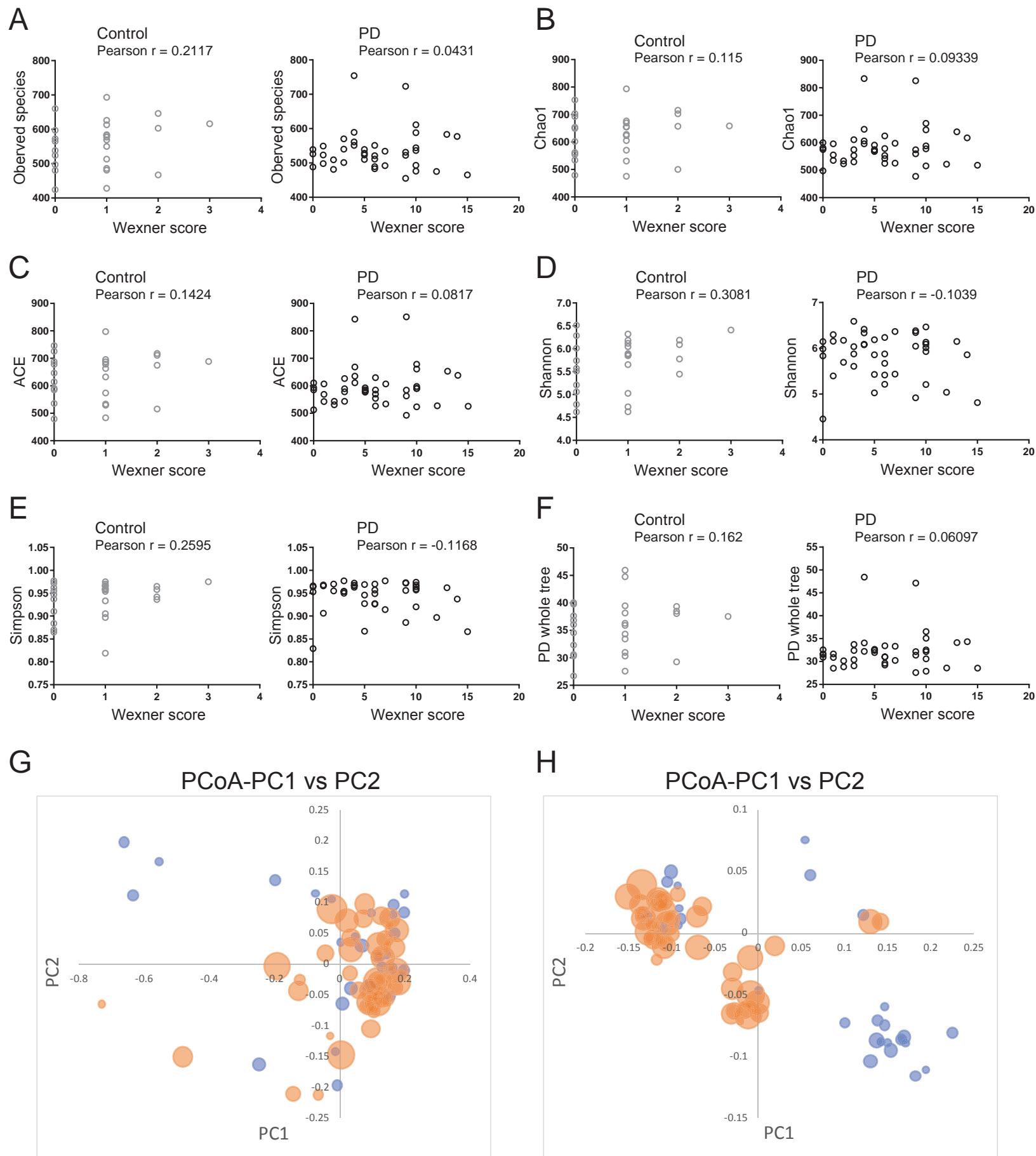


Supplemental Figure 1. Comparison of dietary intake between PD patients and controls. Unpaired t-test, n=42 for PD, n=23 for control. Data are presented as mean \pm s.e.m.



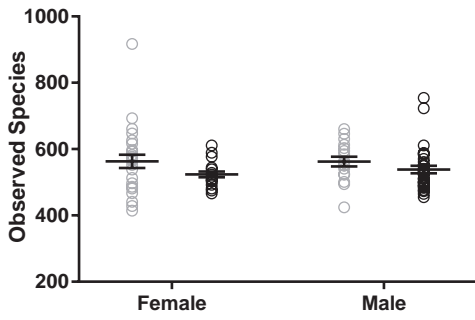
Supplemental Figure 2. Comparison of microbiota richness and diversity indices between PD patients and controls with constipation Wexner score ≤ 3 . A-C: species richness, D-E: α -diversity, F: phylogenetic diversity. $n=13$ for PD, $n=25$ for control. Data are presented as mean \pm s.e.m. with individual replicates also shown. * $p < 0.05$, ** $p < 0.01$, n.s.: not significant, unpaired t-test.



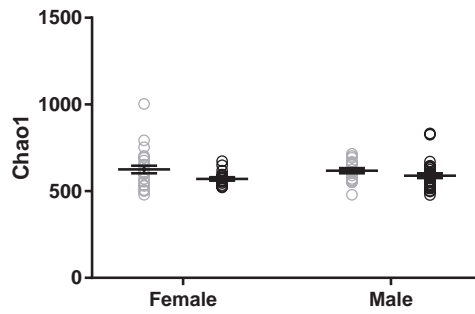
Supplemental Figure 3. Impact of constipation on gut microbiota richness and diversity indices.

A-F: Correlation analysis to assess the impact of constipation on species richness, α -diversity and phylogenetic diversity indices. G,H: Impact of constipation on β -diversity. Data shown are the results of Principal Co-ordinates Analysis (PCoA) plotted with weighted Unifrac (G) and unweighted Unifrac (H) in controls (blue bubbles) and PD patients (orange bubbles). The size of the bubbles indicates the severity of the constipation (Wexner score).

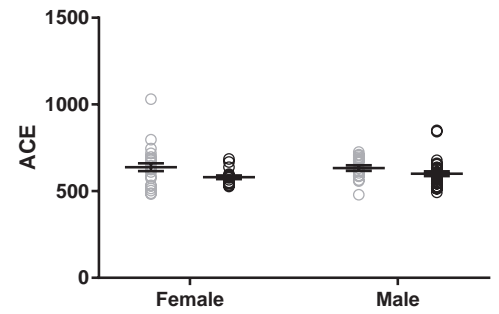
○ Control
○ PD



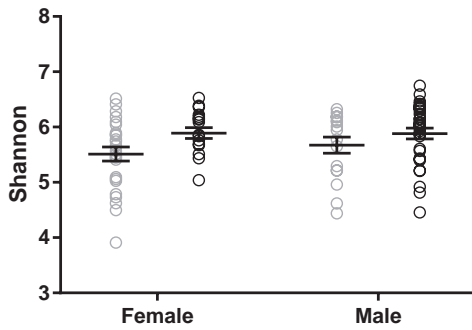
Two-way ANOVA:
Interaction $P=0.6267$
Main effect 1 (Gender) $P=0.6512$
Main effect 2 (PD) $P=0.0436$



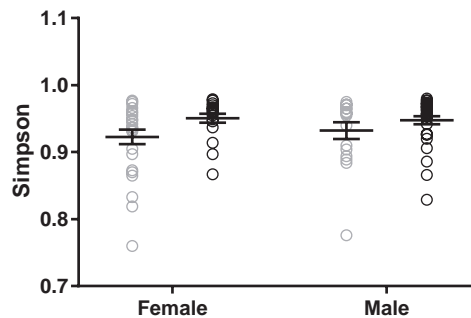
Two-way ANOVA:
Interaction $P=0.4595$
Main effect 1 (Gender) $P=0.7348$
Main effect 2 (PD) $P=0.0181$



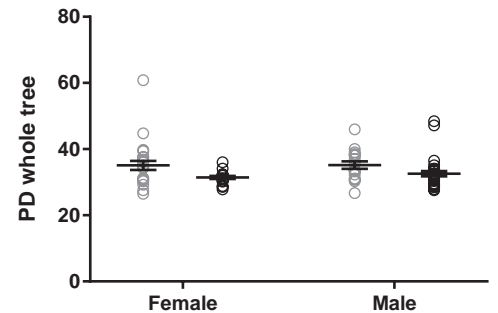
Two-way ANOVA:
Interaction $P=0.4748$
Main effect 1 (Gender) $P=0.6693$
Main effect 2 (PD) $P=0.0131$



Two-way ANOVA:
Interaction $P=0.4805$
Main effect 1 (Gender) $P=0.5196$
Main effect 2 (PD) $P=0.0162$

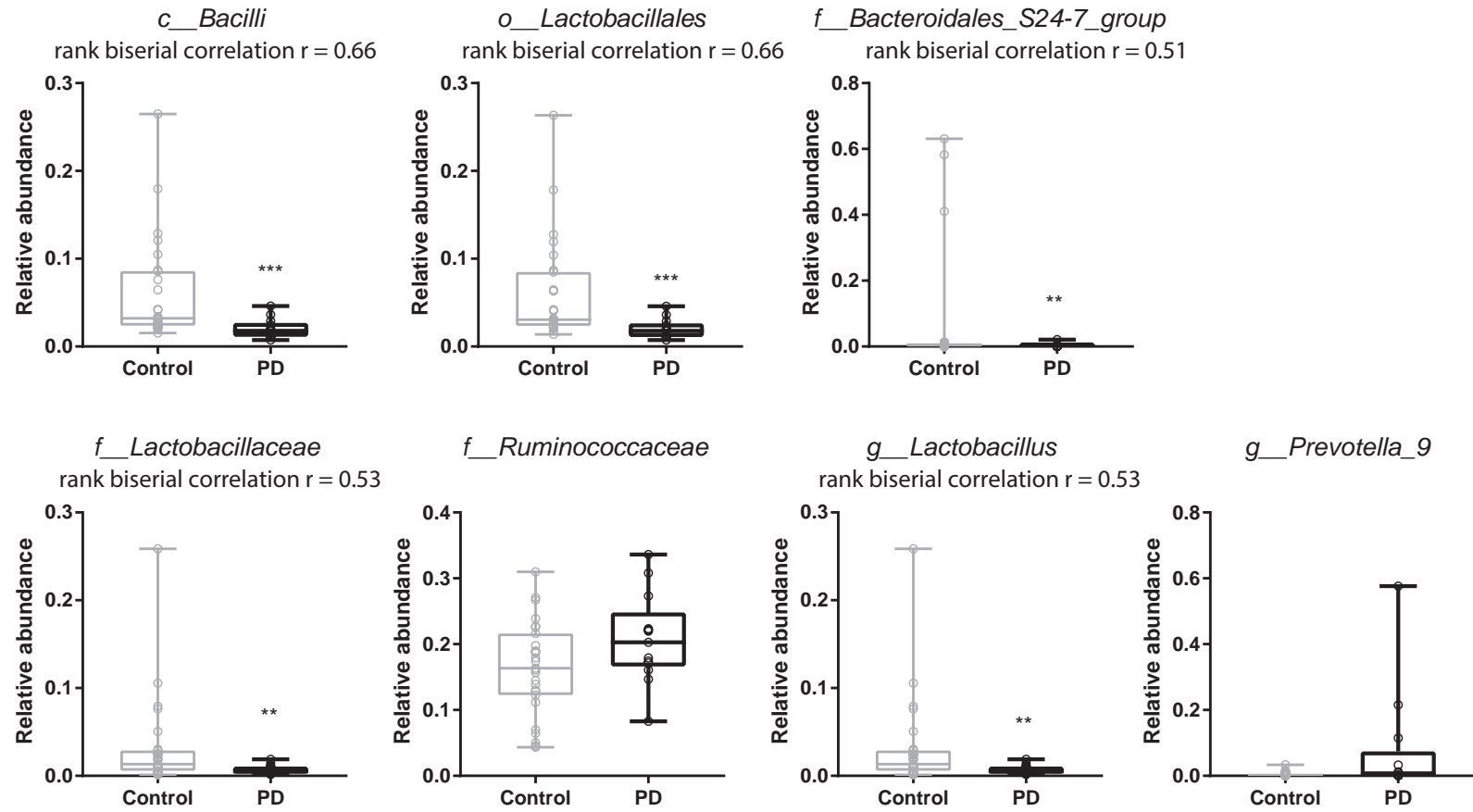


Two-way ANOVA:
Interaction $P=0.5063$
Main effect 1 (Gender) $P=0.7291$
Main effect 2 (PD) $P=0.0215$



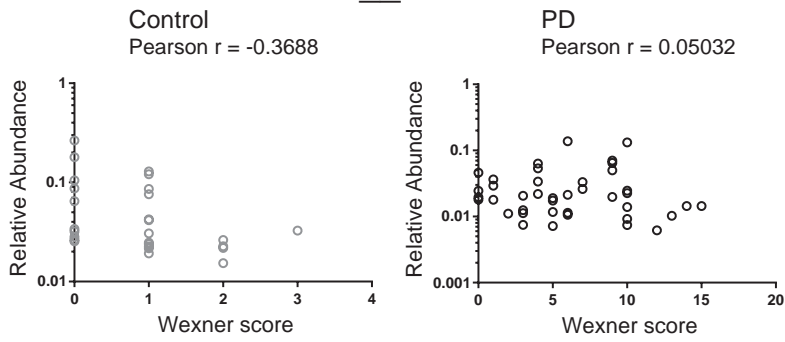
Two-way ANOVA:
Interaction $P=0.6097$
Main effect 1 (Gender) $P=0.5503$
Main effect 2 (PD) $P=0.0042$

Supplemental Figure 4. Two-way ANOVA analysis to assess the impact of gender and PD on species richness, α -diversity and phylogenetic diversity indices.

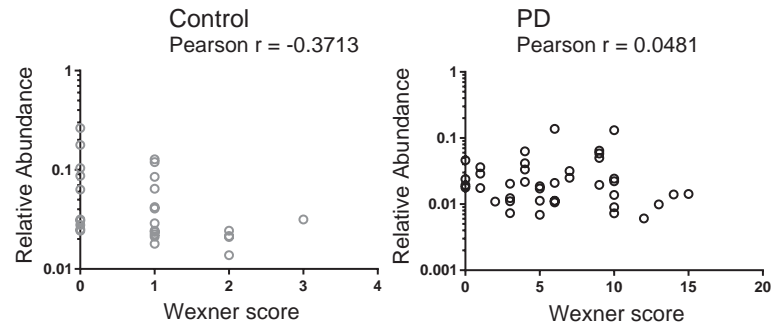


Supplemental Figure 5. Comparison of microbiota abundances between PD patients and controls with constipation Wexner score ≤ 3 . Wilcoxon rank-sum test, $n=13$ for PD, $n=25$ for control. ** $p < 0.01$, *** $p < 0.001$, .

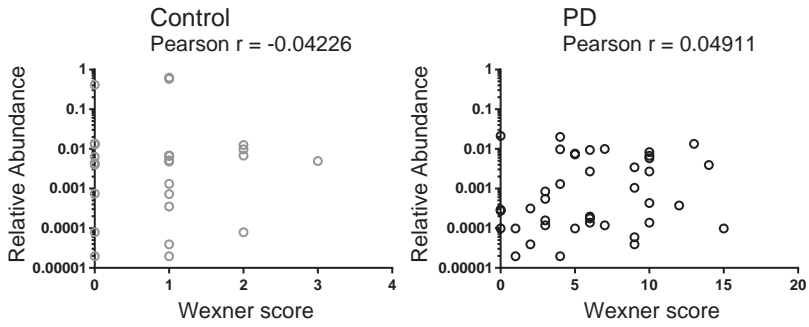
c__Bacilli



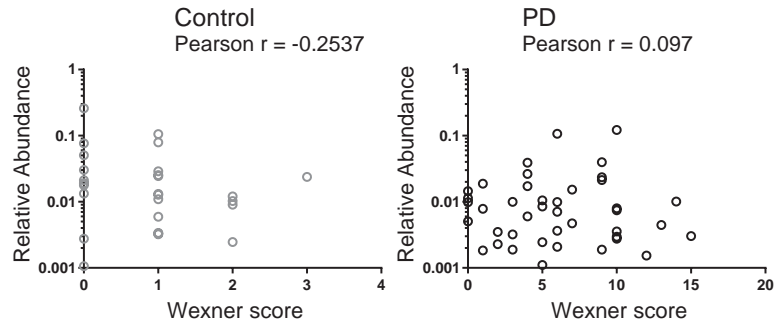
o__Lactobacillales



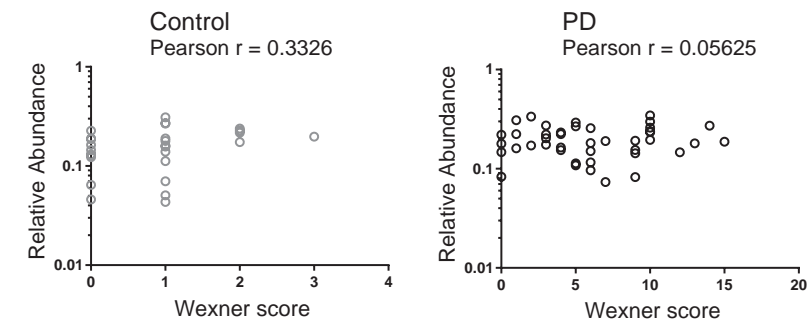
f__Bacteroidales_S24-7_group



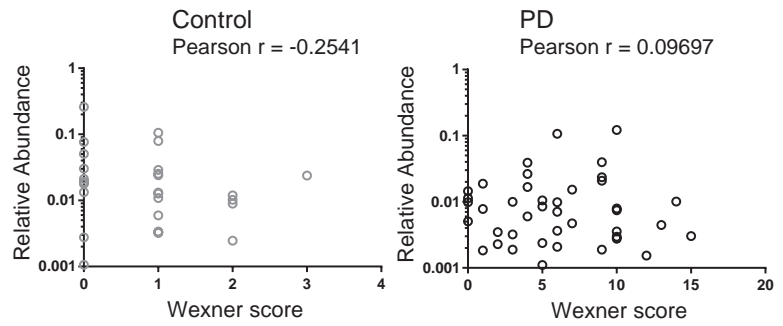
f__Lactobacillaceae



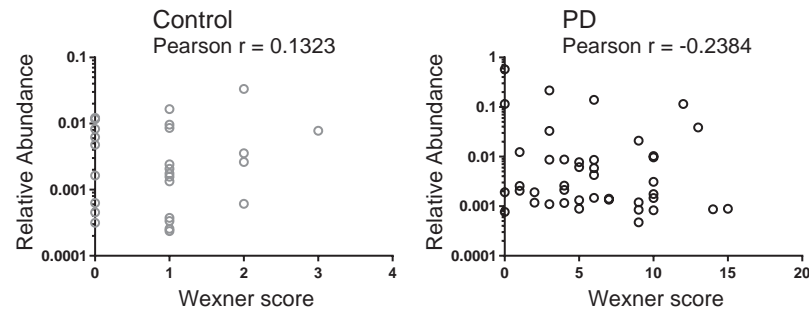
f__Ruminococcaceae



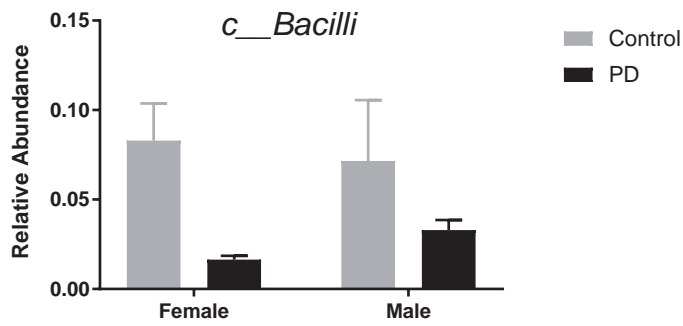
g__Lactobacillus



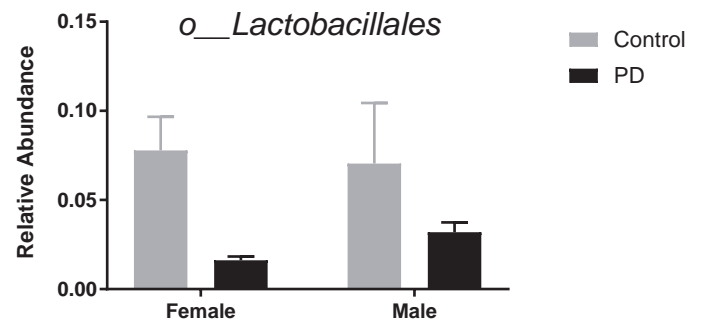
g__Prevotella_9



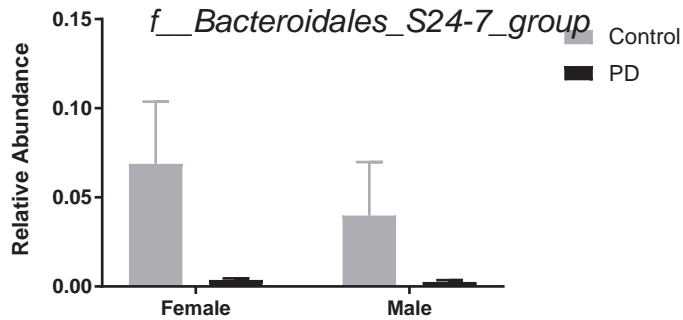
Supplemental Figure 6. Correlation analysis to assess the impact of constipation on the relative abundance of individual taxa. The correlations between the abundances and the Wexner constipation scores are weak, suggesting that the severity of constipation does not have a strong effect on the abundances of these taxa.



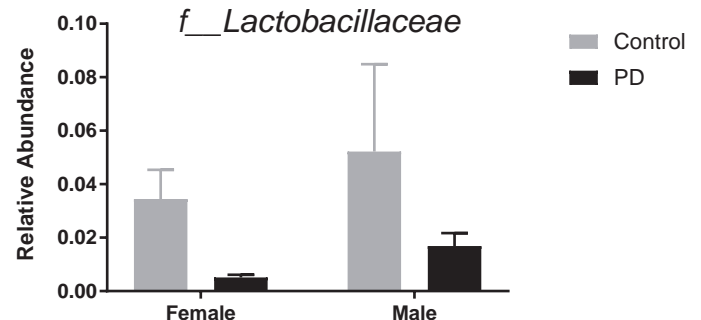
ANOVA table	SS (Type III)	DF	MS	F (DFn, DFd)	P value
Interaction	0.004273	1	0.004273	F (1, 90) = 0.6149	P=0.4350
Sex	0.0001383	1	0.0001383	F (1, 90) = 0.0199	P=0.8881
PD vs control	0.06107	1	0.06107	F (1, 90) = 8.79	P=0.0039
Residual	0.6253	90	0.006948		



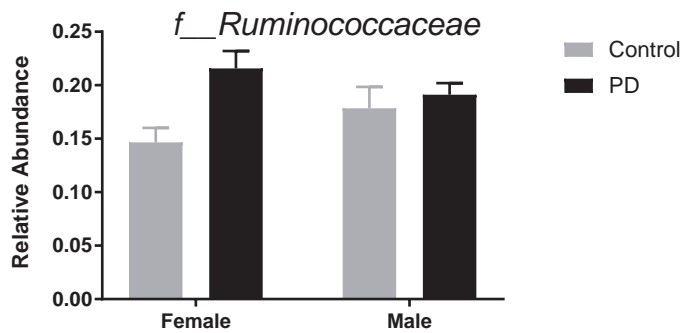
ANOVA table	SS (Type III)	DF	MS	F (DFn, DFd)	P value
Interaction	0.002921	1	0.002921	F (1, 90) = 0.4577	P=0.5004
Sex	0.0003813	1	0.0003813	F (1, 90) = 0.05975	P=0.8074
PD vs control	0.05545	1	0.05545	F (1, 90) = 8.689	P=0.0041
Residual	0.5743	90	0.006381		



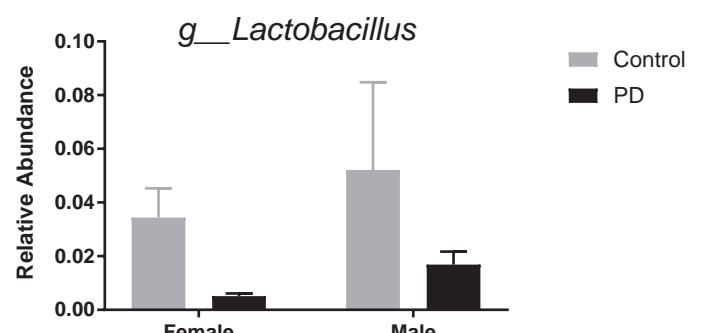
ANOVA table	SS (Type III)	DF	MS	F (DFn, DFd)	P value
Interaction	0.004315	1	0.004315	F (1, 90) = 0.3744	P=0.5422
Sex	0.004997	1	0.004997	F (1, 90) = 0.4336	P=0.5119
PD vs control	0.05778	1	0.05778	F (1, 90) = 5.013	P=0.0276
Residual	1.037	90	0.01152		



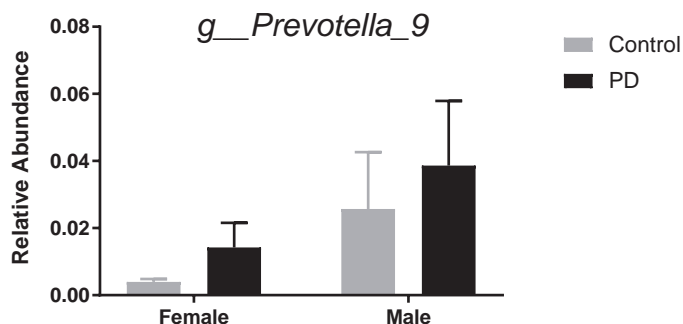
ANOVA table	SS (Type III)	DF	MS	F (DFn, DFd)	P value
Interaction	0.0001958	1	0.0001958	F (1, 90) = 0.045	P=0.8325
Sex	0.004801	1	0.004801	F (1, 90) = 1.103	P=0.2964
PD vs control	0.02309	1	0.02309	F (1, 90) = 5.306	P=0.0236
Residual	0.3917	90	0.004352		



ANOVA table	SS (Type III)	DF	MS	F (DFn, DFd)	P value
Interaction	0.01754	1	0.01754	F (1, 90) = 3.639	P=0.0596
Sex	0.0003045	1	0.0003045	F (1, 90) = 0.0632	P=0.8021
PD vs control	0.03713	1	0.03713	F (1, 90) = 7.707	P=0.0067
Residual	0.4336	90	0.004818		



ANOVA table	SS (Type III)	DF	MS	F (DFn, DFd)	P value
Interaction	0.0002024	1	0.0002024	F (1, 90) = 0.04656	P=0.8297
Sex	0.004815	1	0.004815	F (1, 90) = 1.108	P=0.2954
PD vs control	0.02301	1	0.02301	F (1, 90) = 5.293	P=0.0237
Residual	0.3913	90	0.004348		



ANOVA table	SS (Type III)	DF	MS	F (DFn, DFd)	P value
Interaction	0.00003773	1	3.773E-05	F (1, 90) = 0.007314	P=0.9320
Sex	0.01176	1	0.01176	F (1, 90) = 2.279	P=0.1347
PD vs control	0.002972	1	0.002972	F (1, 90) = 0.576	P=0.4498
Residual	0.4643	90	0.005159		

Supplemental Figure 7. Two-way ANOVA analysis to assess the impact of gender and PD on gut microbiota taxa identified by LDA scores >4 in LEfSe analysis.

