

Oligonucleotides used for Bacterial and Fungal PCR amplification

Name	Sequence (5')
16S fwd	TCGTCGGCAGCGTCAGATGTGTATAAGAGACAGCCTACGGGNGGCWGCAG
16S rev	GTCTCGTGGGCTCGGAGATGTGTATAAGAGACAGGACTACHVGGGTATCTAATCC
ITS fwd 1	CTTGGTCATTTAGAGGAAGTAA
ITS fwd 2	CTCGGTCATTTAGAGGAAGTAA
ITS fwd 3	CTTGGTCATTTAGAGGAACTAA
ITS fwd 4	CCCGGTCATTTAGAGGAAGTAA
ITS fwd 5	CTAGGCTATTTAGAGGAAGTAA
ITS fwd 6	CTTAGTTATTTAGAGGAAGTAA
ITS fwd 7	CTACGTCATTTAGAGGAAGTAA
ITS fwd 8	CTTGGTCATTTAGAGGTCGTAA
ITS rev 1	GCTGCGTTCTTCATCGATGC
ITS rev 2	GCTGCGTTCTTCATCGATGG
ITS rev 3	GCTACGTTCTTCATCGATGC
ITS rev 4	GCTGCGTTCTTCATCGATGT
ITS rev 5	ACTGTGTTCTTCATCGATGT
ITS rev 6	GCTGCGTTCTTCATCGTTGC
ITS rev 7	GCGTTCTTCATCGATGC

Table S3. Patient Characteristics (normal pancreas vs. pancreatic cyst)

	Bacterial analysis			Fungal analysis		
	Normal pancreas	Pancreas cyst	p value	Normal pancreas	Pancreas cyst	p value
Cases	86	86		53	53	
Age (years); mean (range)	60.0 (34.3 - 79.5)	62.6 (33.5 - 87.3)	0.1087	66.6 (40.7 - 79.5)	67.4 (40.2 - 87.3)	0.5726
Sex			0.7594			0.8455
Male (%)	38 (44.2%)	40 (46.5%)		25 (47.2%)	24 (45.3%)	
Female (%)	48 (55.8%)	46 (53.5%)		28 (52.8%)	29 (54.7%)	
Race			0.3868			0.7358
White (%)	81 (94.2%)	77 (89.5%)		49 (92.5%)	49 (92.5%)	
Non-white (%)	5 (5.8%)	6 (7.0%)		4 (7.5%)	3 (5.6%)	
Missing (%)	0 (0%)	3 (3.5%)		0 (0%)	1 (1.9%)	
Smoking status			0.3759			0.5463
Never smoker (%)	61 (70.9%)	60 (69.8%)		39 (73.6%)	34 (64.2%)	
Former smoker (%)	22 (25.6%)	20 (23.2%)		13 (24.5%)	17 (32.0%)	
Current smoker (%)	3 (3.5%)	3 (3.5%)		1 (1.9%)	2 (3.8%)	
Missing (%)	0 (0%)	3 (3.5%)		0 (0%)	0 (0%)	
Alcohol consumption			0.1431			0.4228
Never or occasional (%)	49 (57.0%)	53 (61.6%)		31 (58.5%)	35 (66.0%)	
Regular or heavy (%)	37 (43.0%)	30 (34.9%)		22 (41.5%)	18 (34.0%)	
Missing (%)	0 (0%)	3 (3.5%)		0 (0%)	0 (0%)	
Diabetes			0.227			0.0641
Yes (%)	8 (9.3%)	14 (16.3%)		6 (11.3%)	10 (18.9%)	
No (%)	78 (90.7%)	71 (82.6%)		47 (88.7%)	43 (81.1%)	
Missing (%)	0 (0%)	1 (1.1%)		0 (0%)	0 (0%)	
PPI use			0.4703			1
Regular (%)	22 (25.6%)	18 (20.9%)		10 (18.9%)	10 (18.9%)	
None (%)	64 (74.4%)	68 (79.1%)		43 (81.1%)	43 (81.1%)	
Probiotics			0.5603			0.1534
Yes (%)	1 (1.2%)	2 (2.3%)		0 (0%)	2 (3.8%)	
No (%)	85 (98.8%)	84 (97.7%)		53 (100%)	51 (96.2%)	
Antibiotics			0.5603			1
Yes (%)	1 (1.2%)	2 (2.3%)		1 (1.9%)	1 (1.9%)	
No (%)	85 (98.8%)	84 (97.7%)		52 (98.1%)	52 (98.1%)	
Cyst location						
head (%)		33 (38.4%)			18 (34.0%)	
body (%)		34 (39.5%)			24 (45.3%)	
tail (%)		19 (22.1%)			11 (20.8%)	
Cyst size (cm); mean (range)		1.24 (0.16-8.0)			1.14 (0.16-8.0)	
Number of cysts; mean (range)		2.2 (1-8)			2.4 (1-8)	
Worrisome features						
Yes (%)		8 (9.3%)			4 (7.5%)	
MPD dilation		4			0	
Mural nodule		4			4	
No (%)		78 (90.7%)			49 (92.5%)	

Table S2; PPI use and age in normal controls

	non-users	low dose users
<i>for analysis of bacteria</i>		
Cases	98	10
Age (years)	53.8 (20.3-79.5)	53.0 (34.3-76.4)
<i>for analysis of fungal</i>		
Cases	31	4
Age (years)	57.0 (40.7-79.5)	58.7 (48.0-76.4)

regular or high dose users	p value
19 56.8 (38.9-77.3)	0.60
6 56.6 (44.2-77.3)	0.91

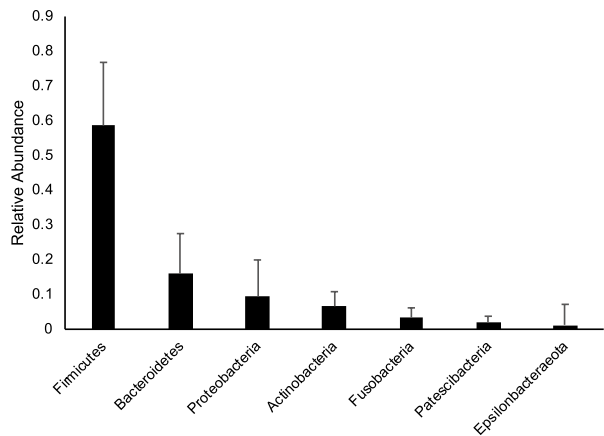
Table S4. Tumor microbiome analysis patient Characteristics

		Bacterial and fungal analysis
		PDAC
Cases		12
Age (years); mean (range)		64.4 (47.5 - 80.1)
Sex		
Male (%)		9 (75%)
Female (%)		3 (25%)
Race		
White (%)		11 (91.7%)
Non-white (%)		1 (8.3%)
Smoking status		
Never smoker (%)		4 (33.3%)
Former smoker (%)		8 (66.7%)
Current smoker (%)		0 (0%)
Alcohol consumption		
Never or occasional (%)		6 (50%)
Regular or heavy (%)		5 (41.7%)
Missing (%)		1 (8.3%)
Diabetes		
Yes (%)		7 (58.3%)
No (%)		5 (41.7%)
PPI use		
Regular (%)		3 (25%)
None (%)		9 (75%)
Probiotics		
Yes (%)		0 (0%)
No (%)		12 (100%)
Antibiotics		
Yes (%)		2 (16.7%)
No (%)		10 (83.3%)
Tumor location		
head (%)		9 (75%)
body (%)		3 (25%)
tail (%)		0 (0%)
Biliary obstruction*		1 (8.3%)
Stage		
IA (%)		0 (0%)
IB (%)		3 (25%)
IIA (%)		2 (16.7%)
IIB (%)		6 (50%)
III (%)		1 (8.3%)
IV (%)		0 (0%)

* at the time of sampling

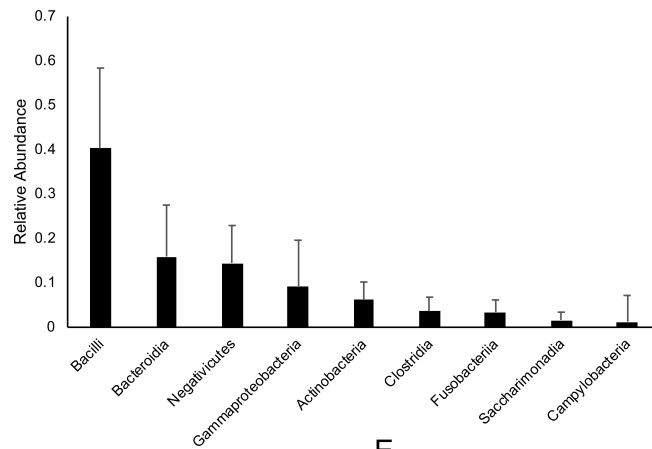
A

Phylum



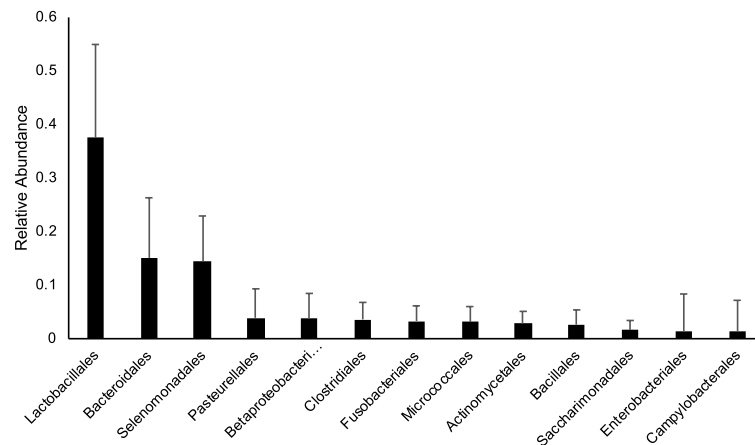
B

Class



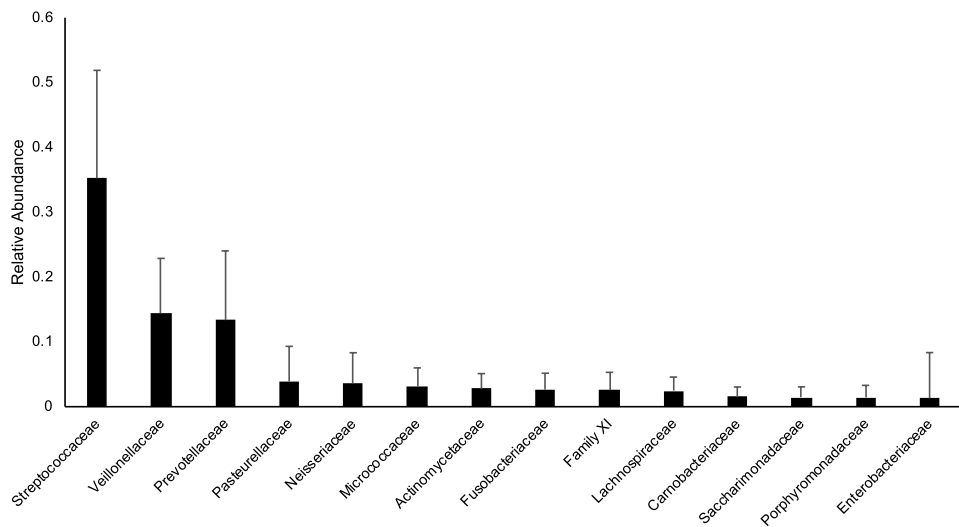
C

Order



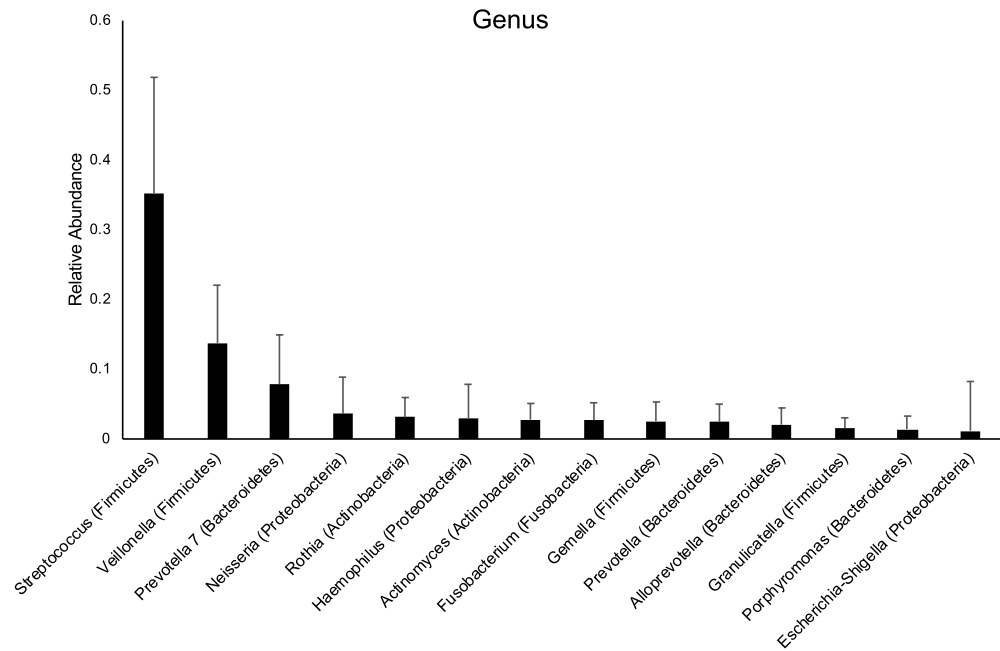
D

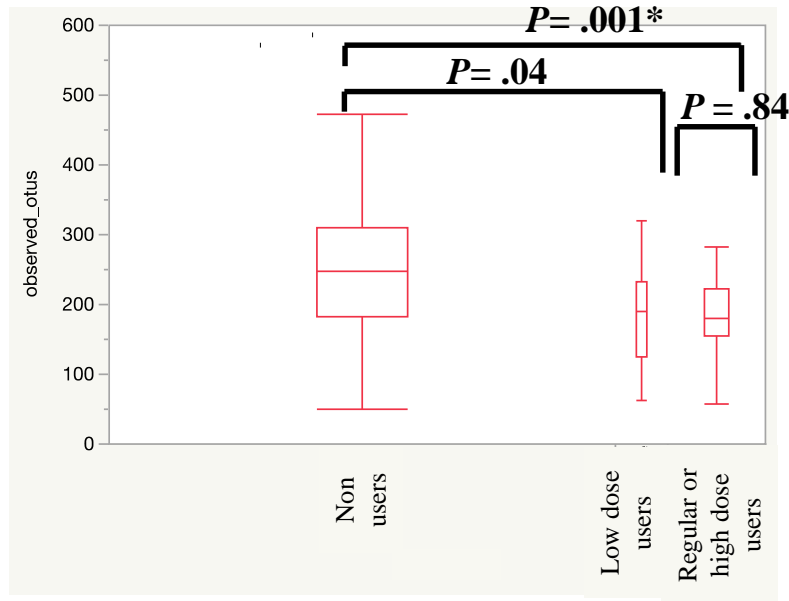
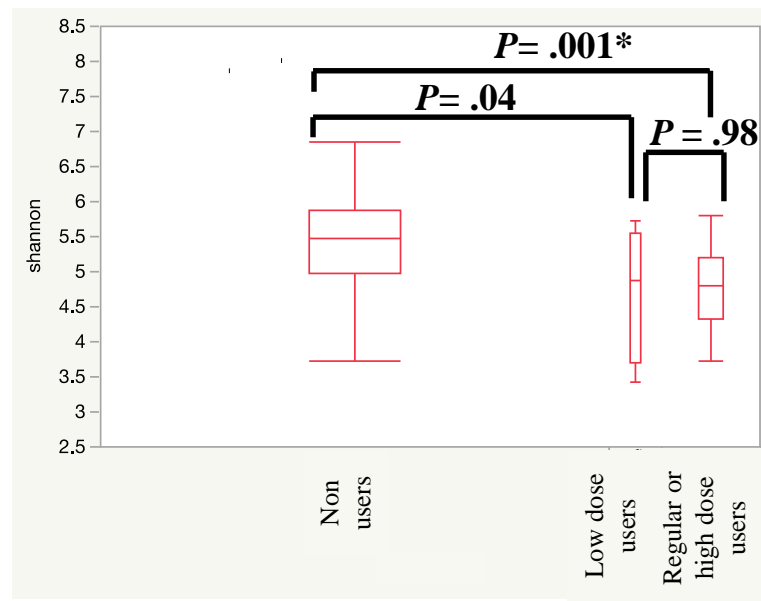
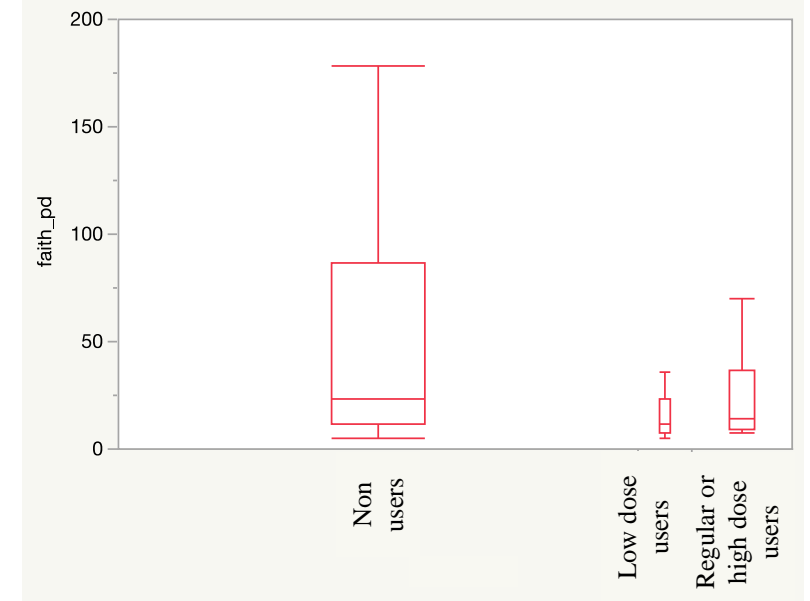
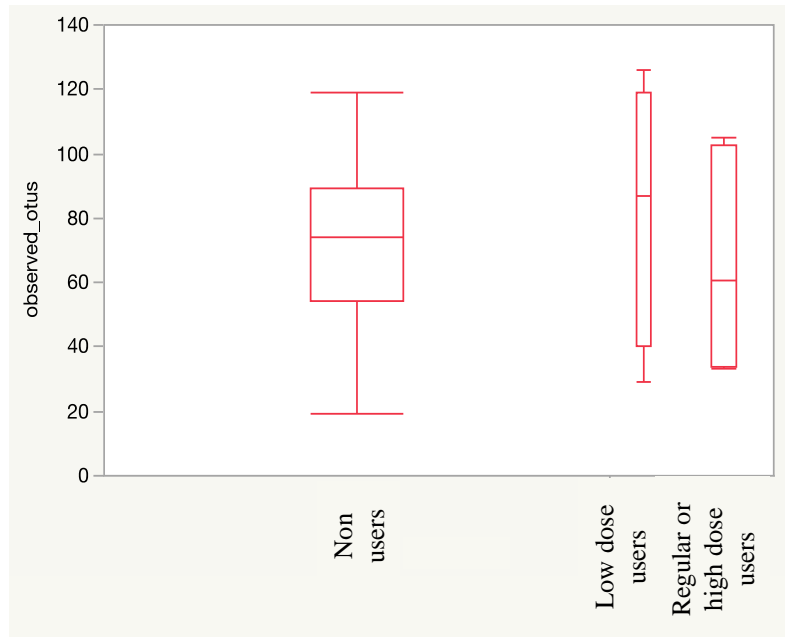
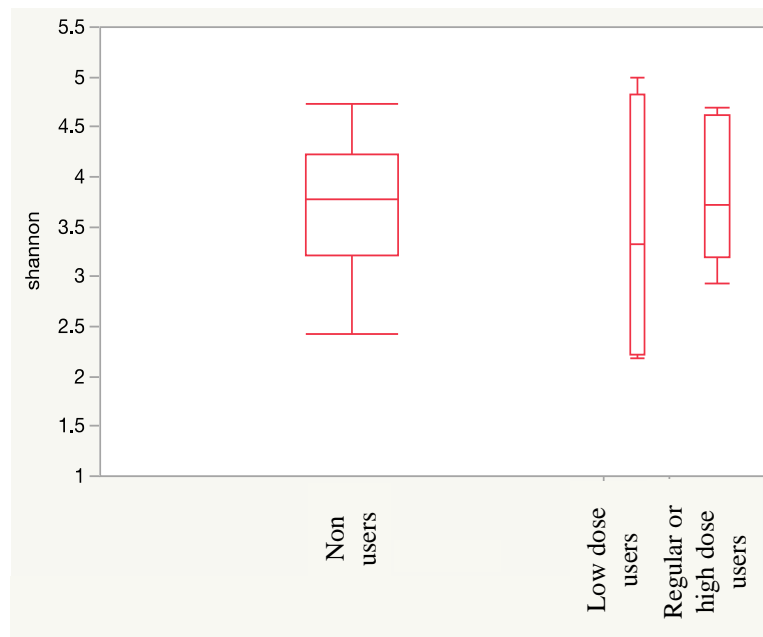
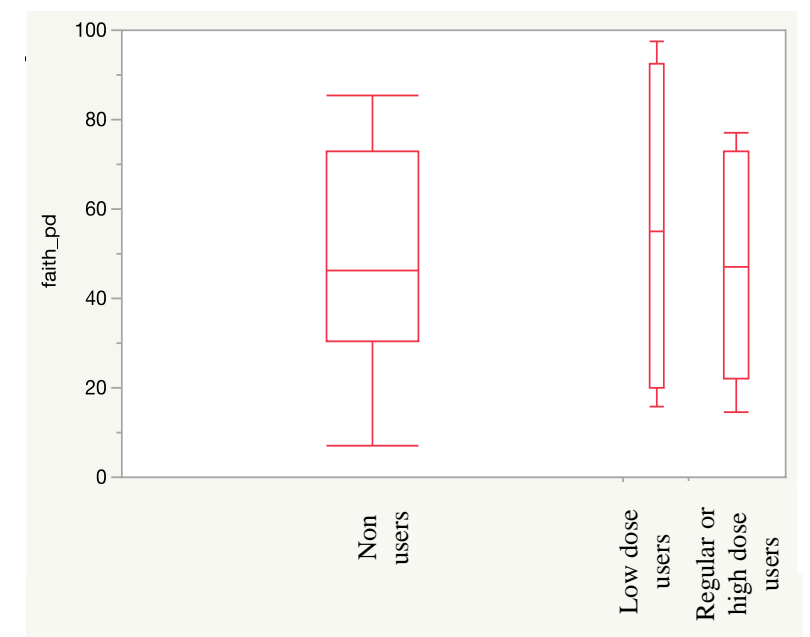
Family



E

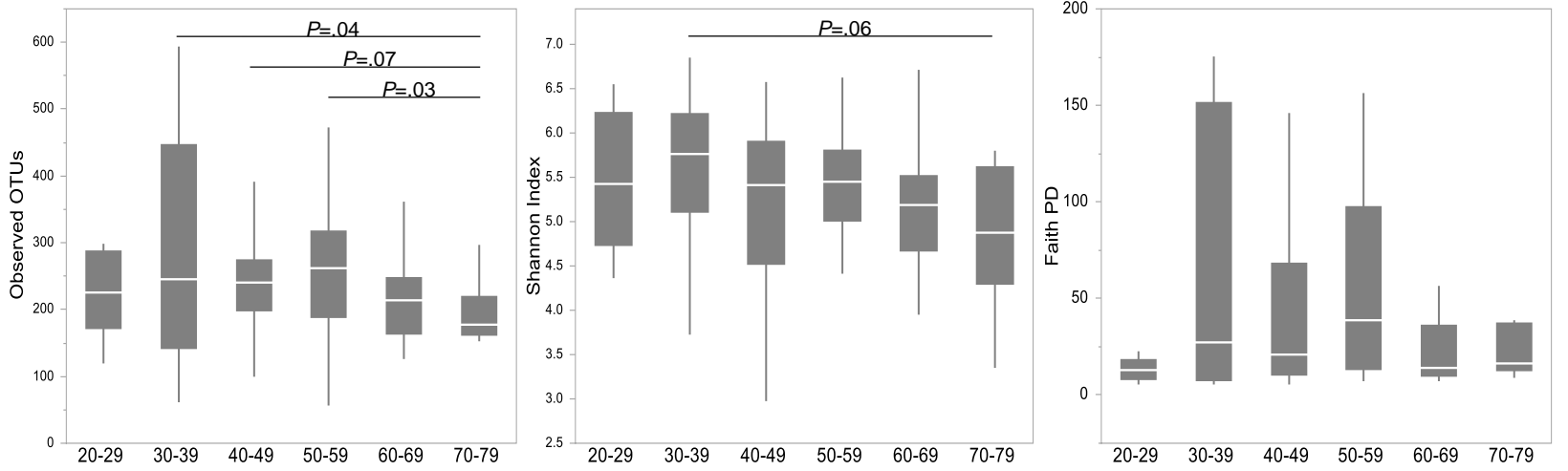
Genus



A **Observed OTUs** $P = .001^*$ **Shannon Index** $P = .001^*$ **Faith PD** $P = .06$ **B** **Observed OTUs** $P = .78$ **Shannon Index** $P = .88$ **Faith PD** $P = .83$ 

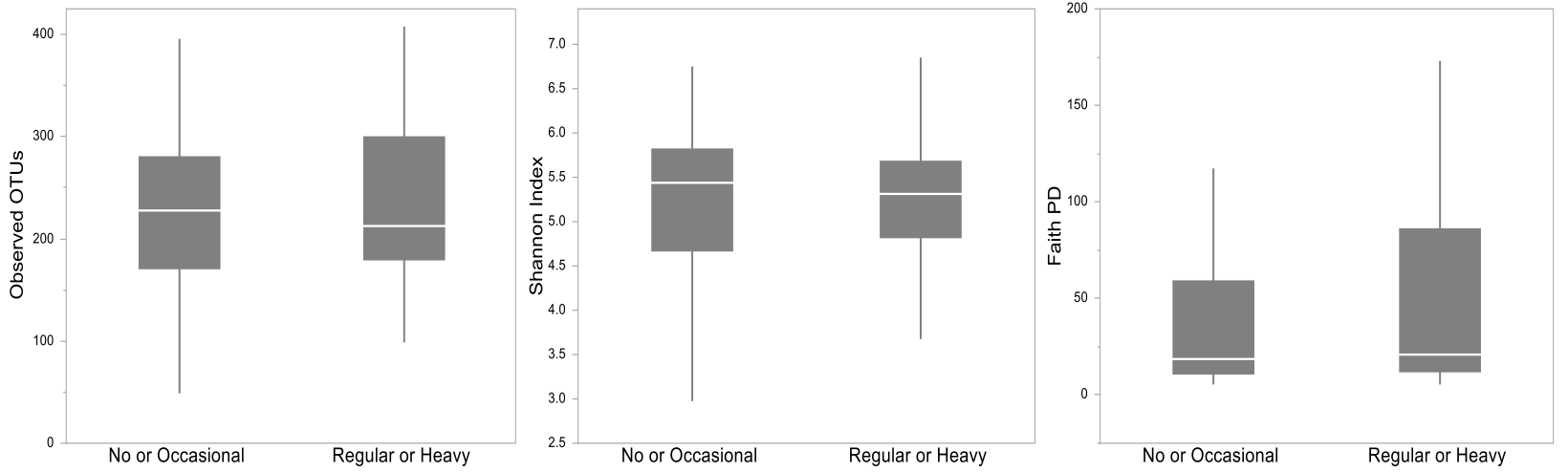
A

Age



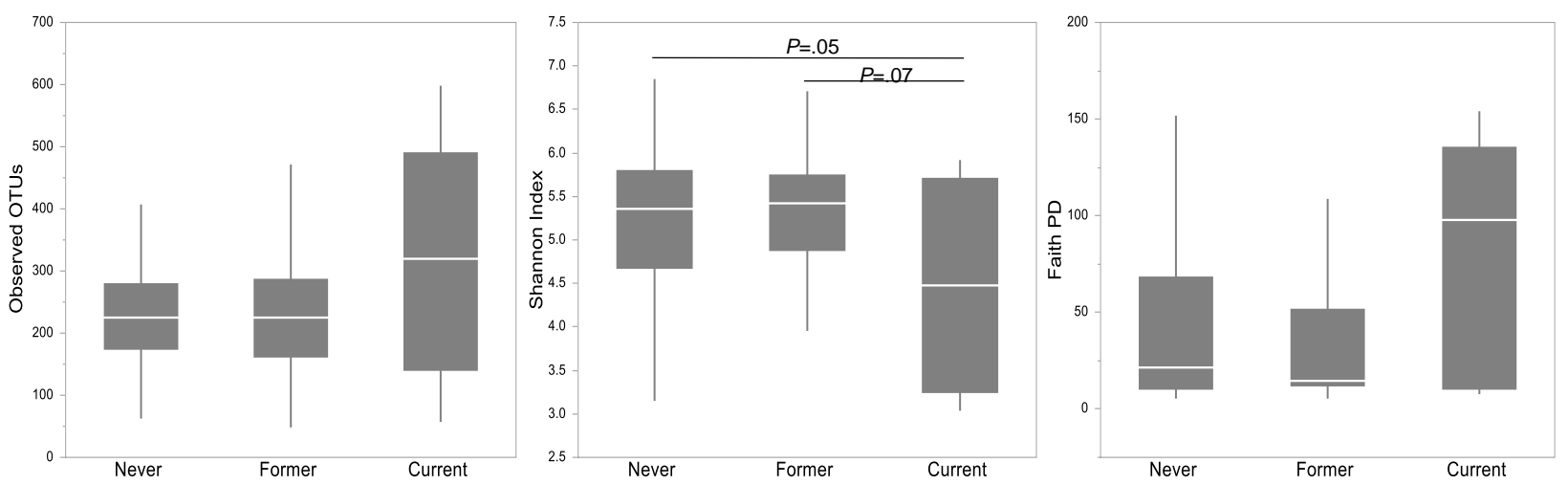
B

Alcohol



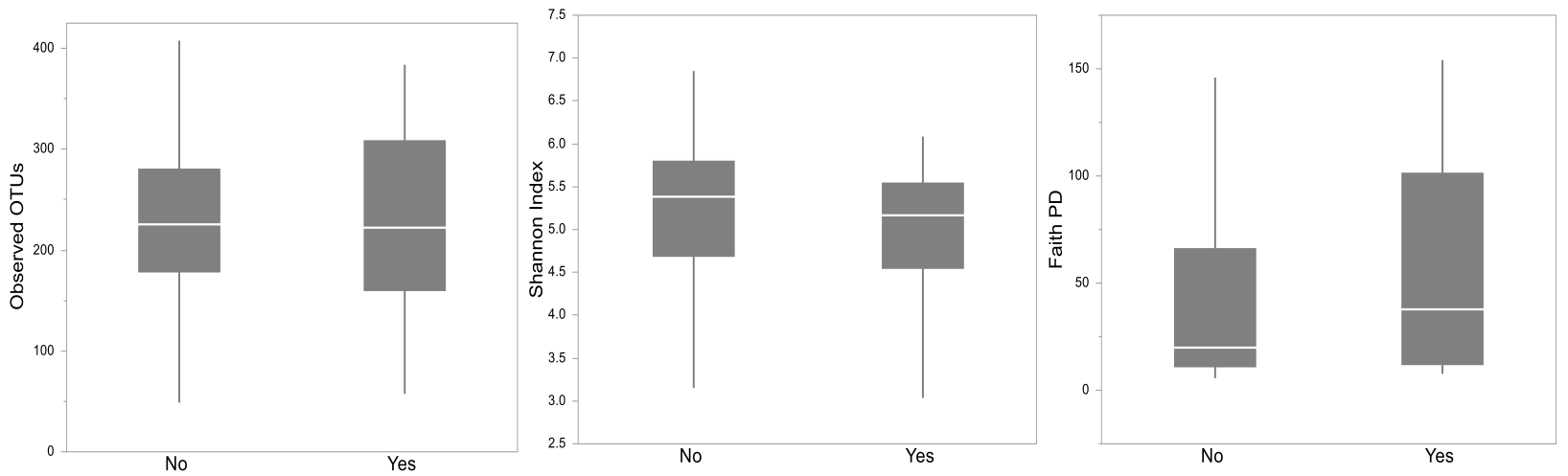
C

Smoking



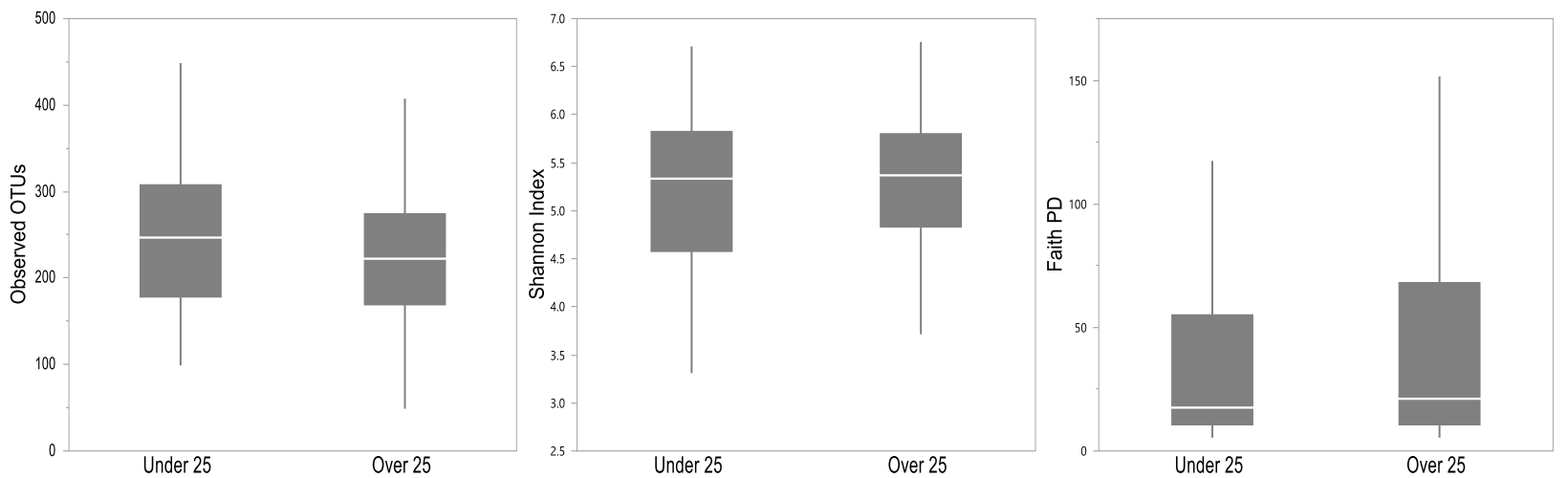
D

DM

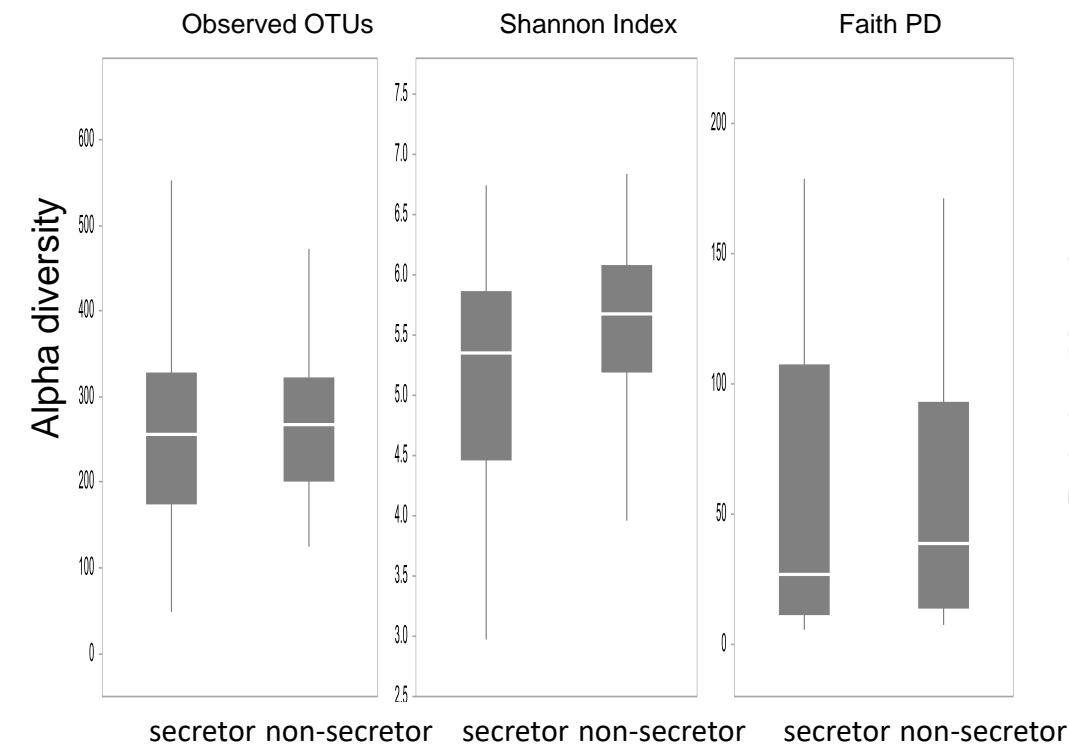


E

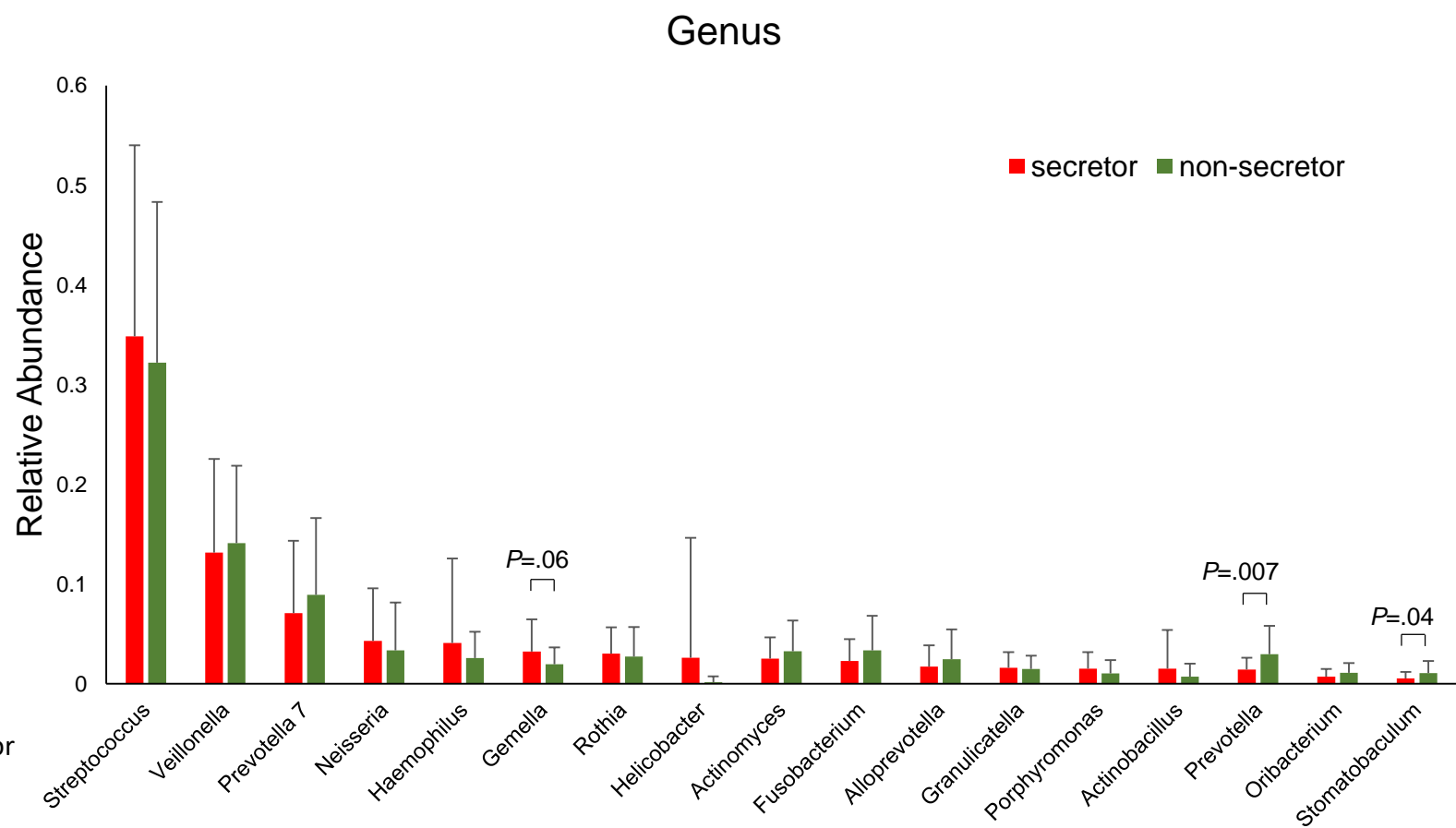
BMI



A

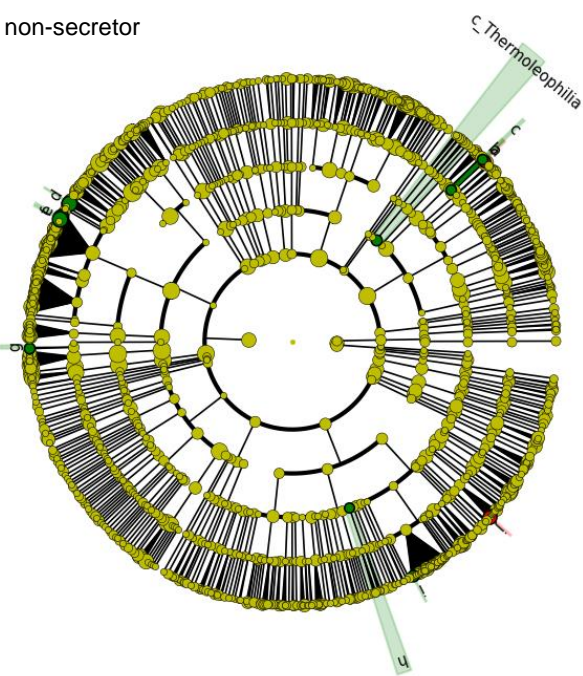


B



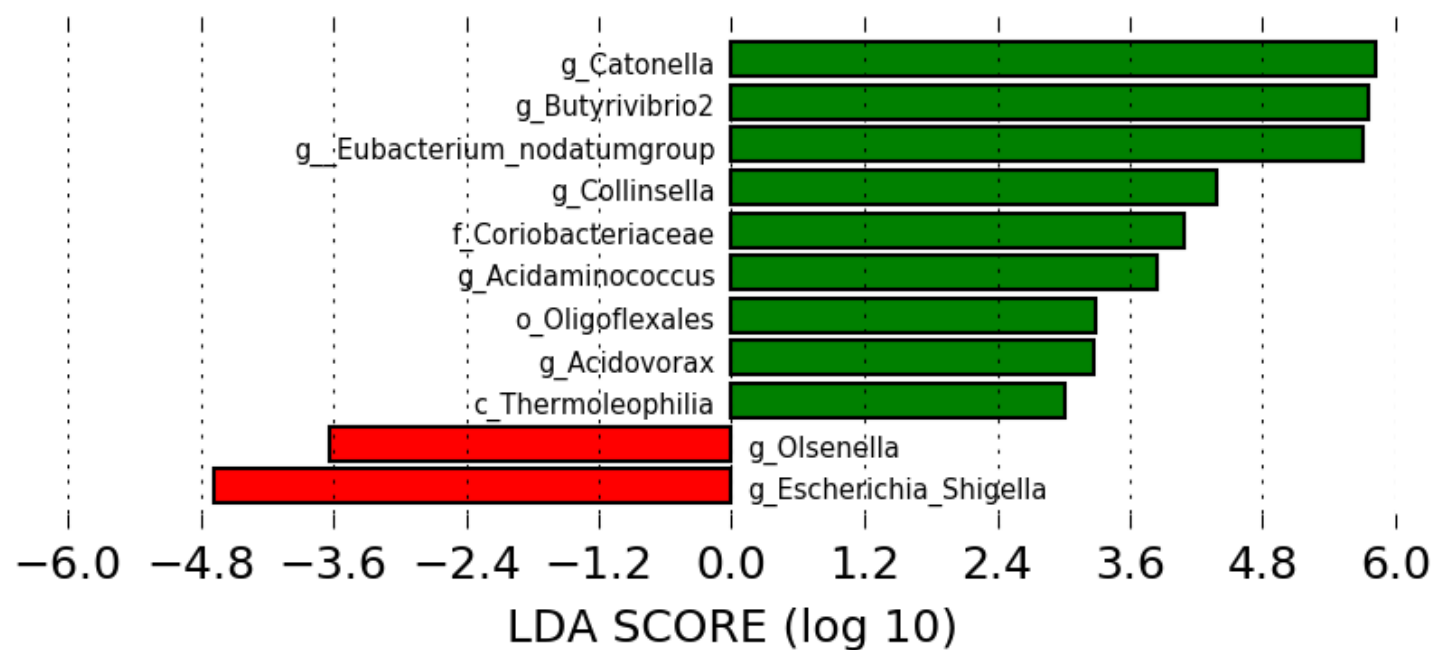
C

secretor
non-secretor

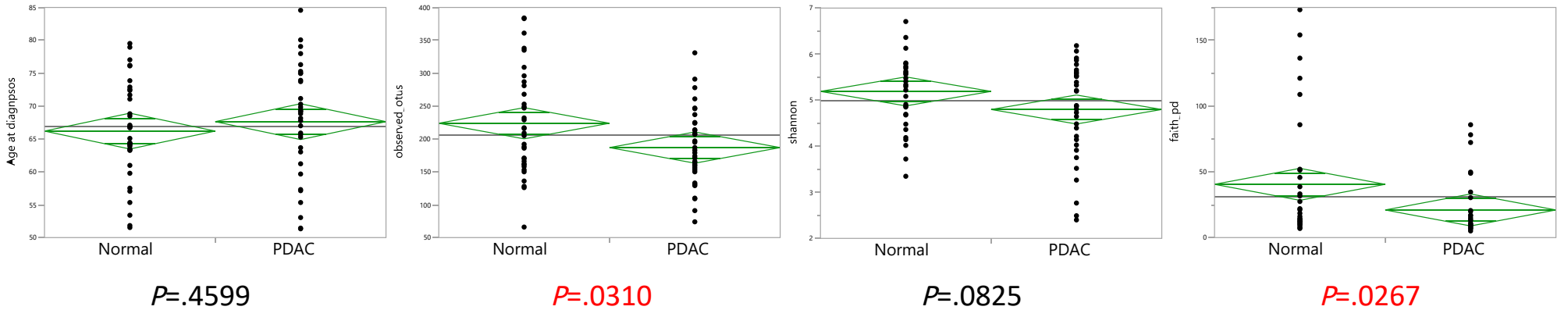


a: g_Olsenella
b: g_Collinsella
c: f_Coriobacteriaceae
d: g_Eubacterium_nodatum
e: g_Butyrvibrio2
f: g_Catonella
g: g_Acidaminococcus
h: o_Oligoflexales
i: g_Acidovorax
j: g_Escherichia_Shigella

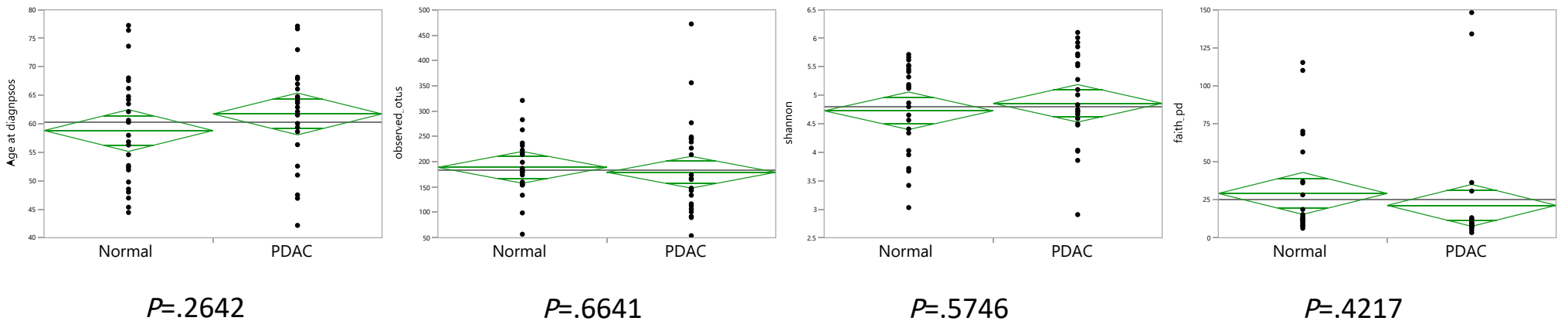
secretor non-secretor



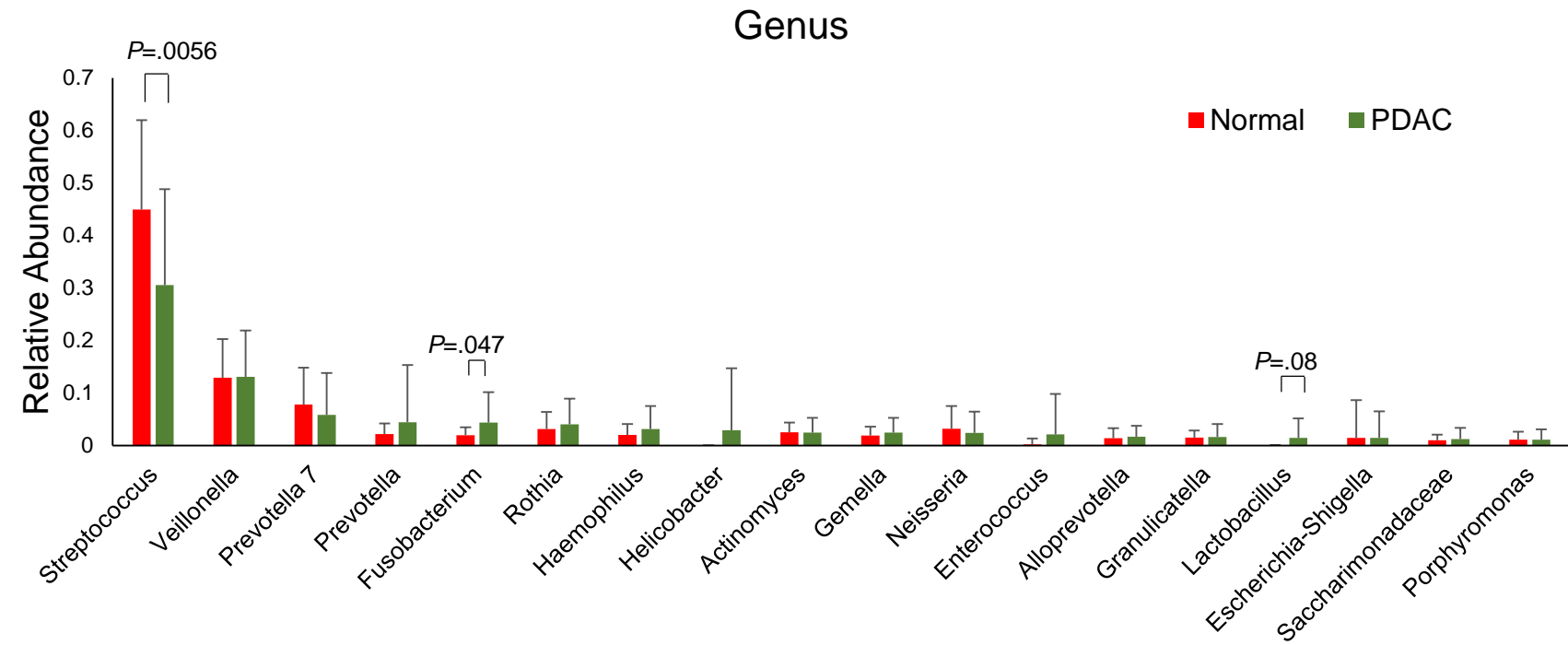
PPI Non-users: PDAC vs age-matched normal pancreas (n=34 per group)



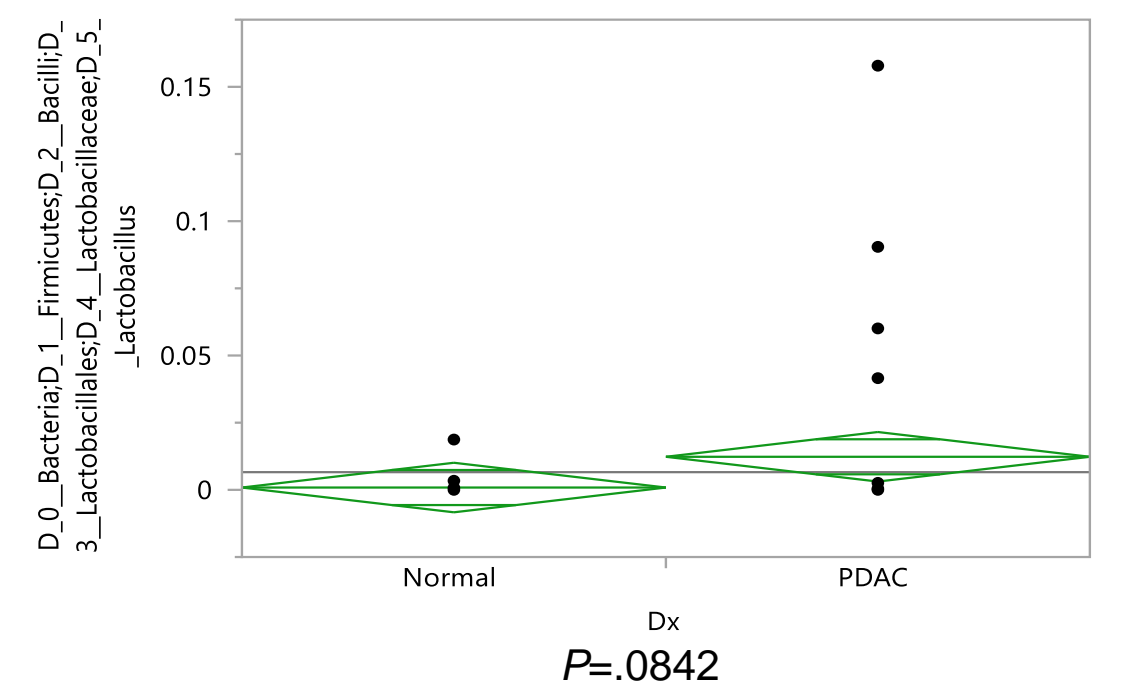
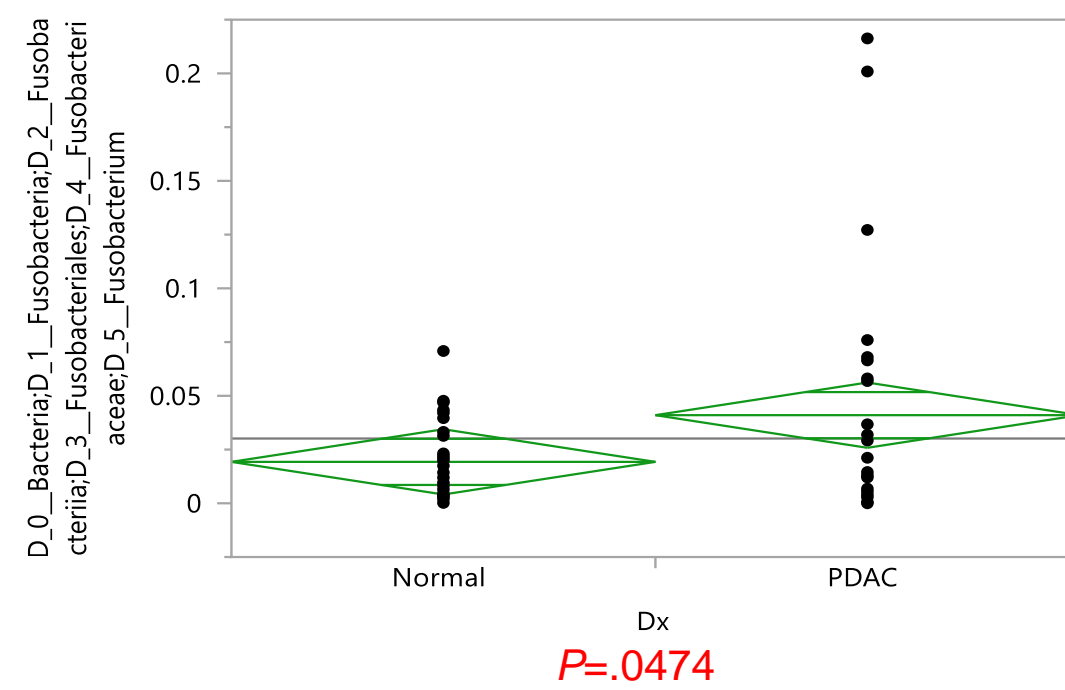
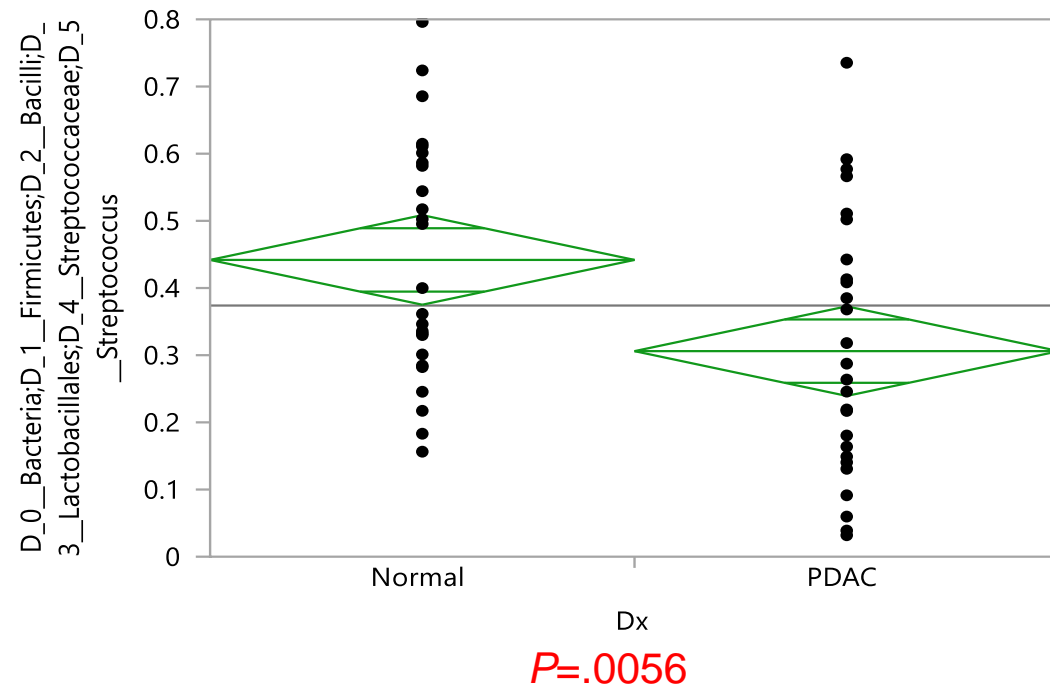
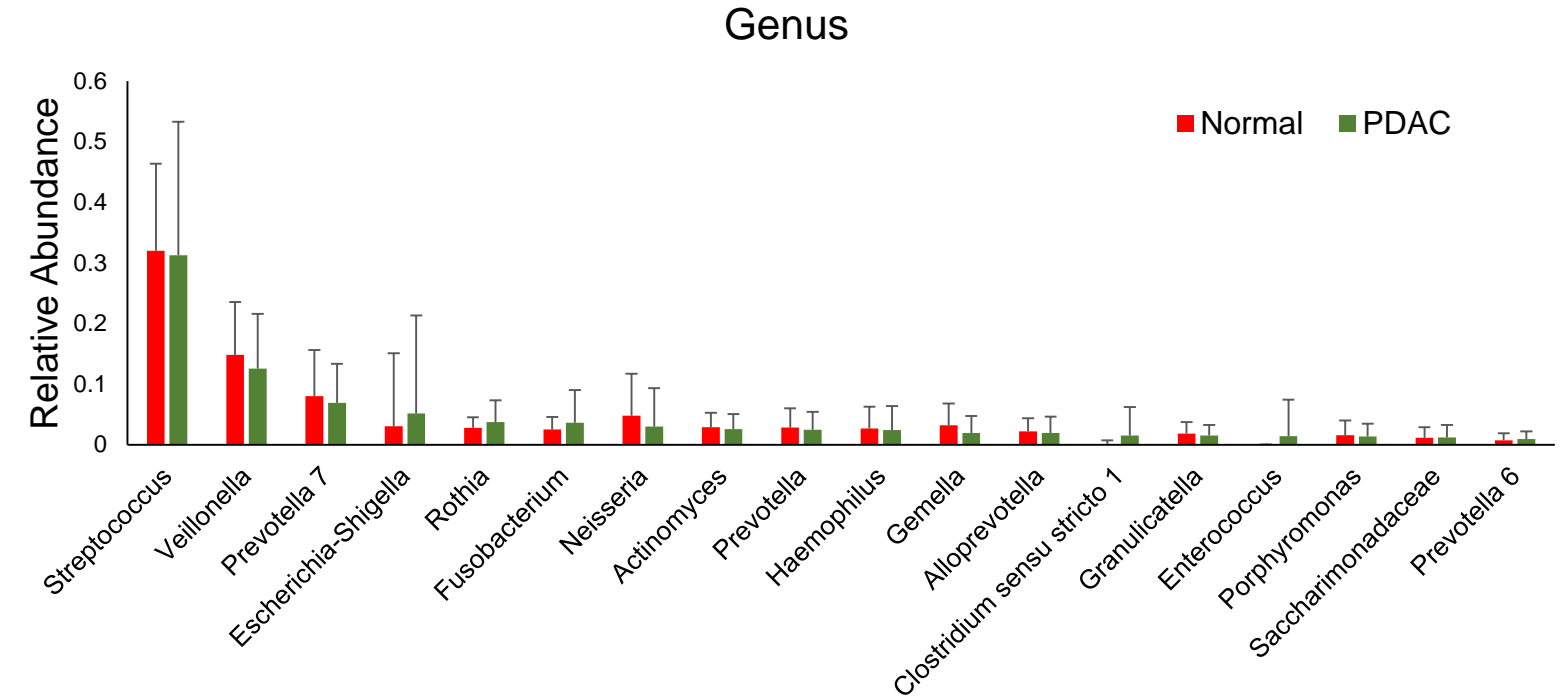
PPI users: PDAC vs age-matched normal pancreas (n=25 per group)

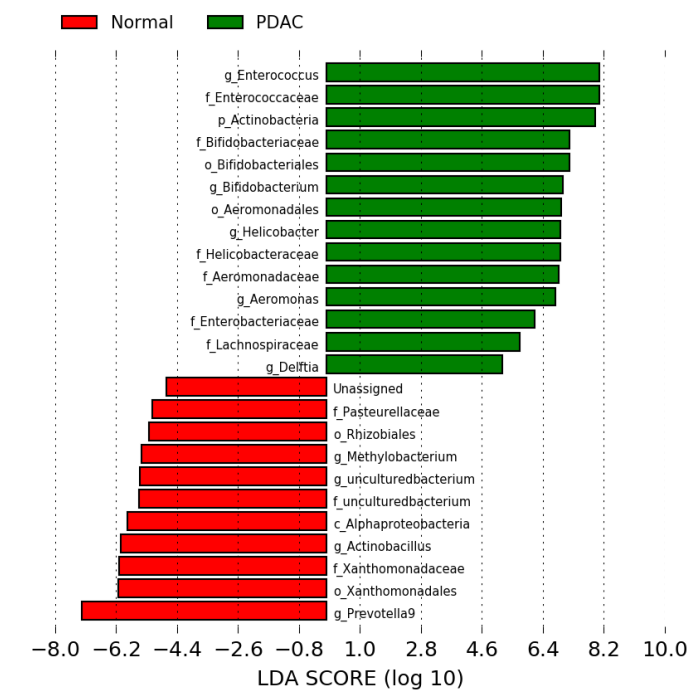
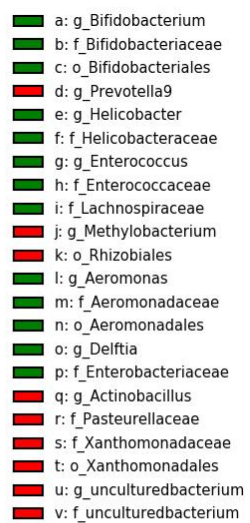
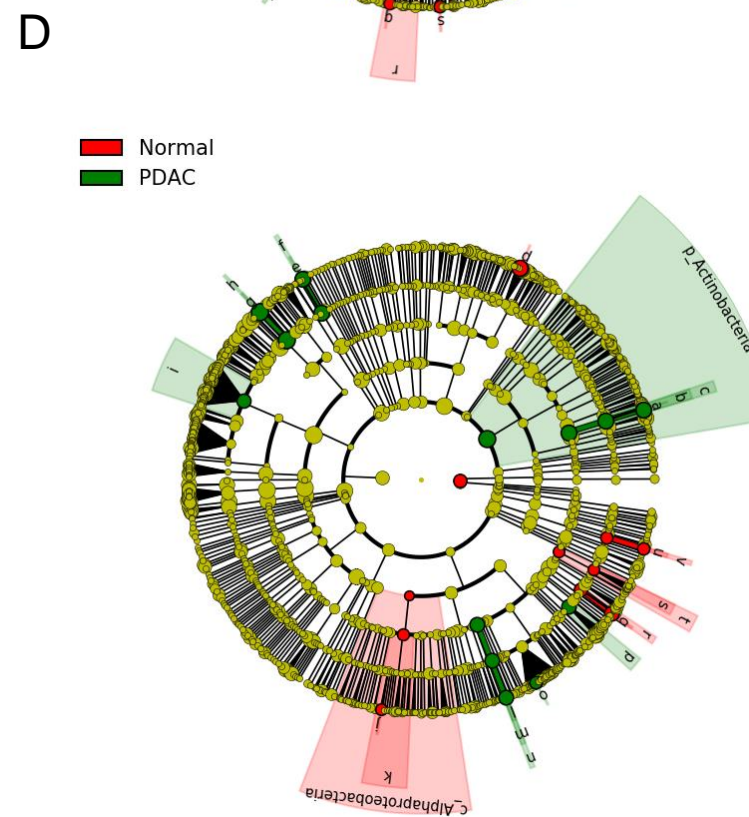
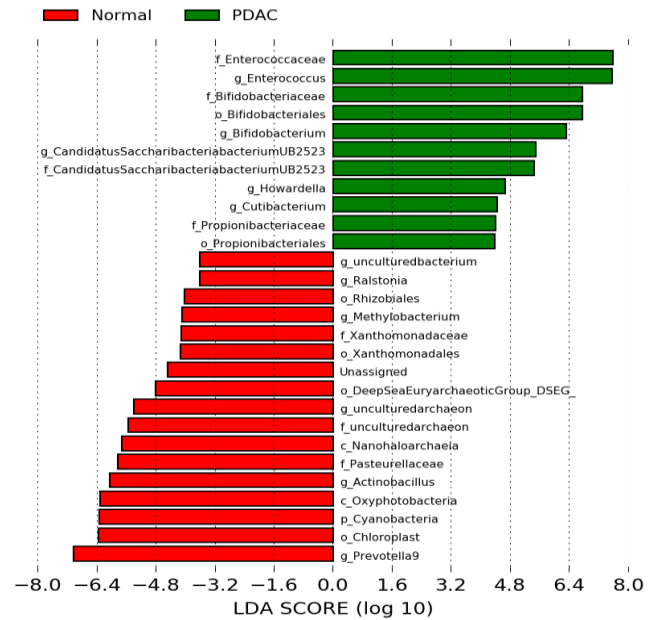
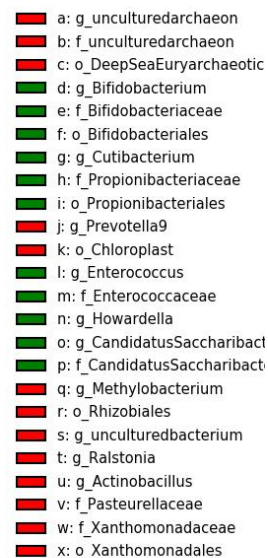
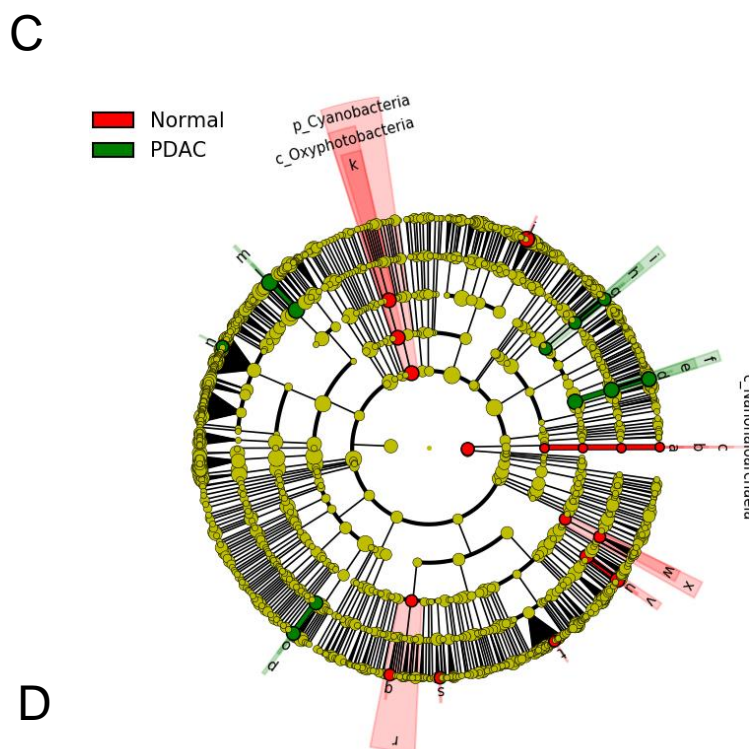
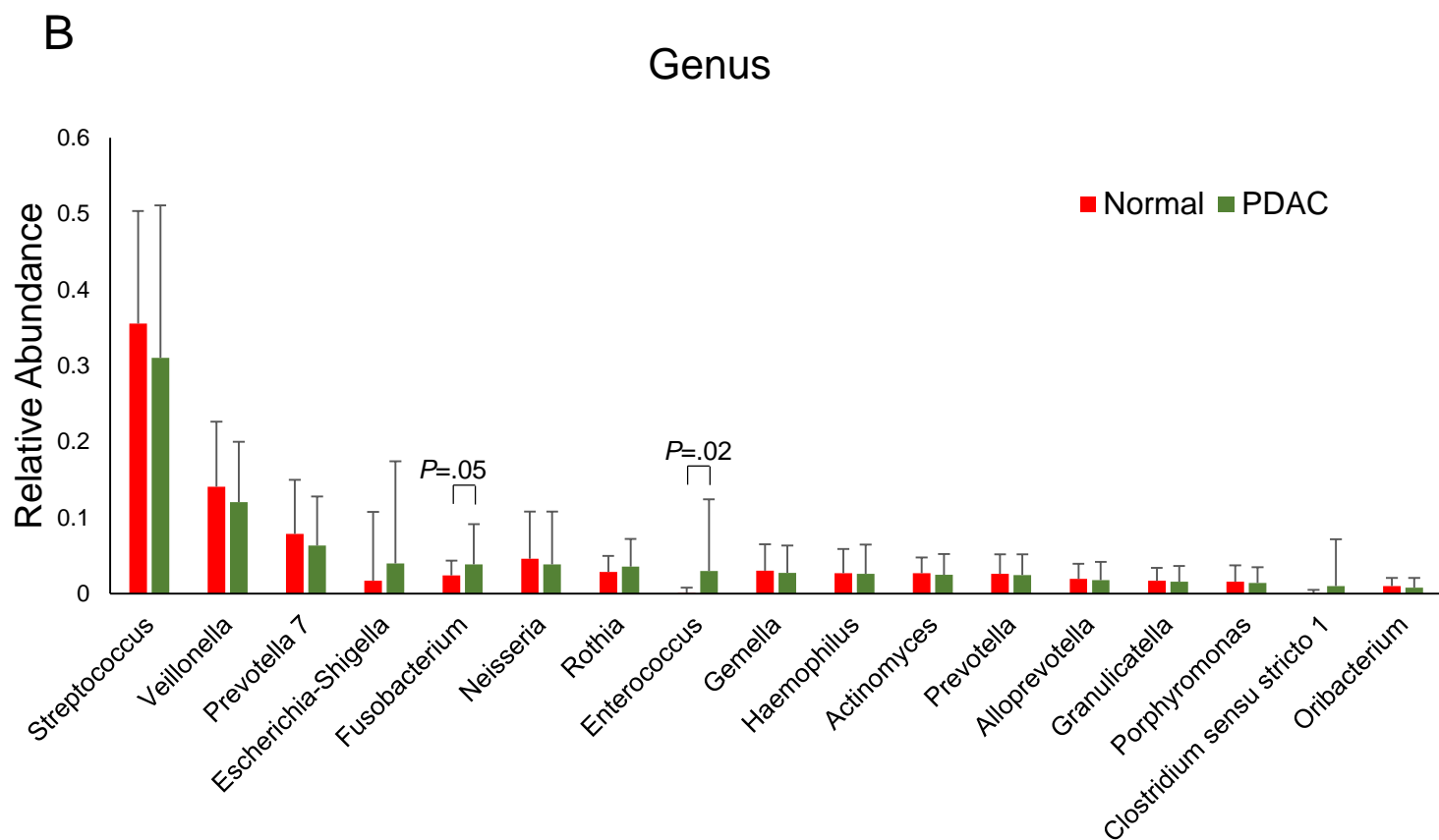
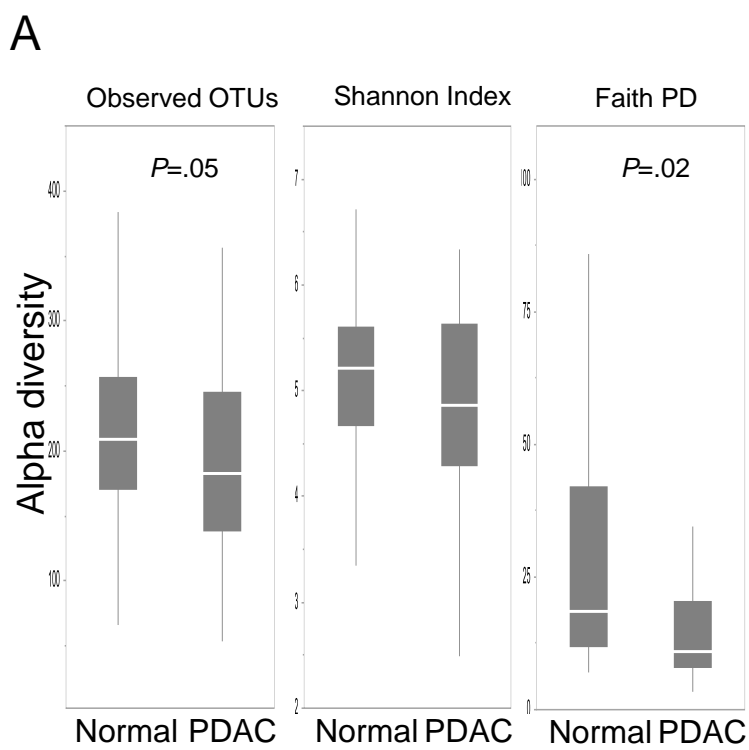


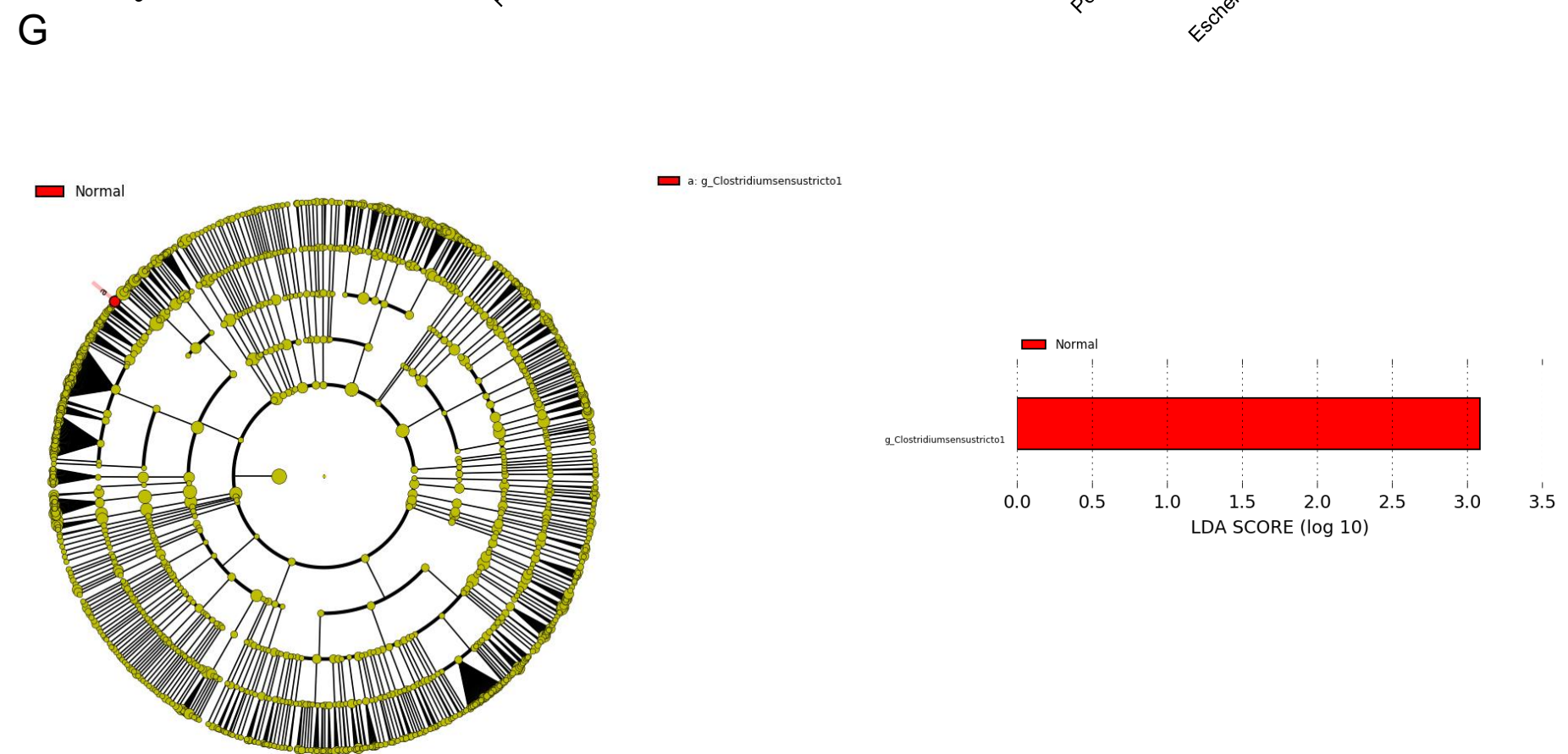
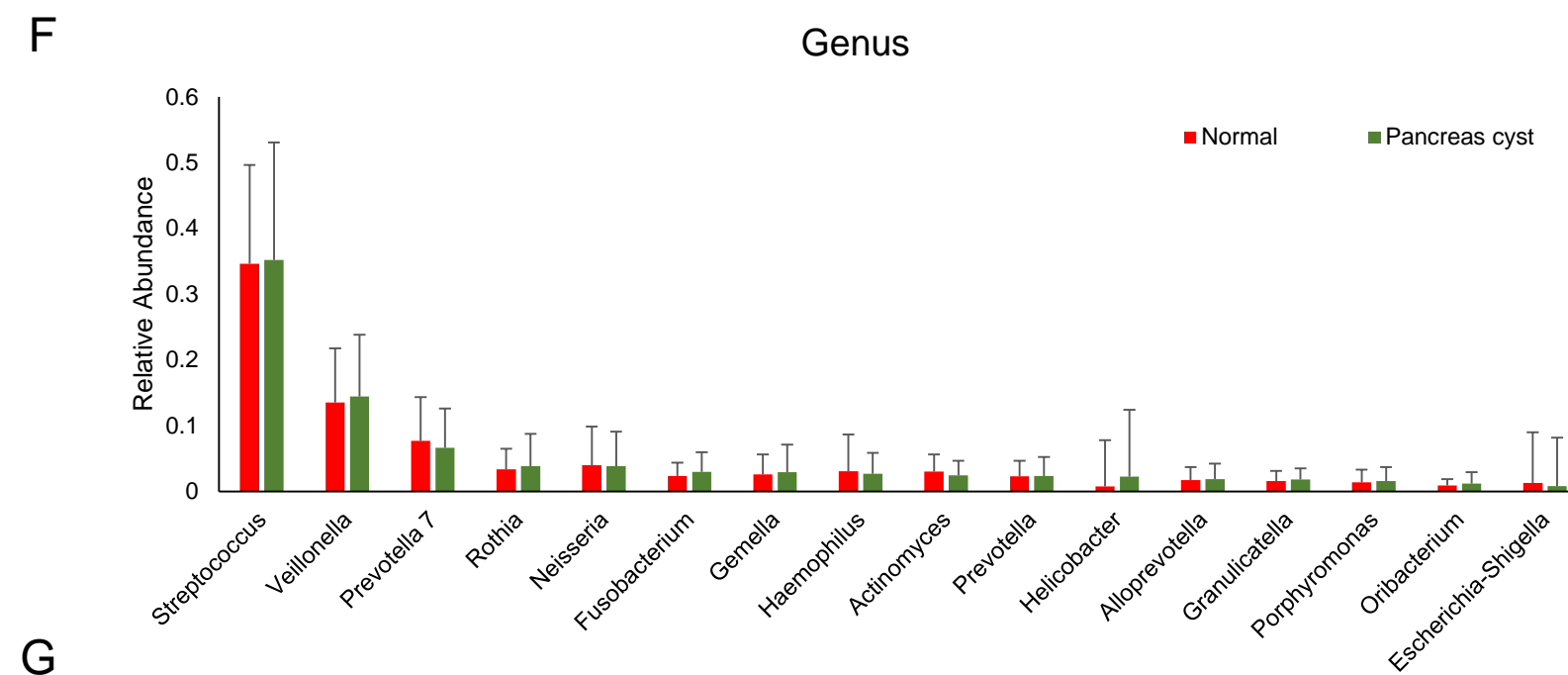
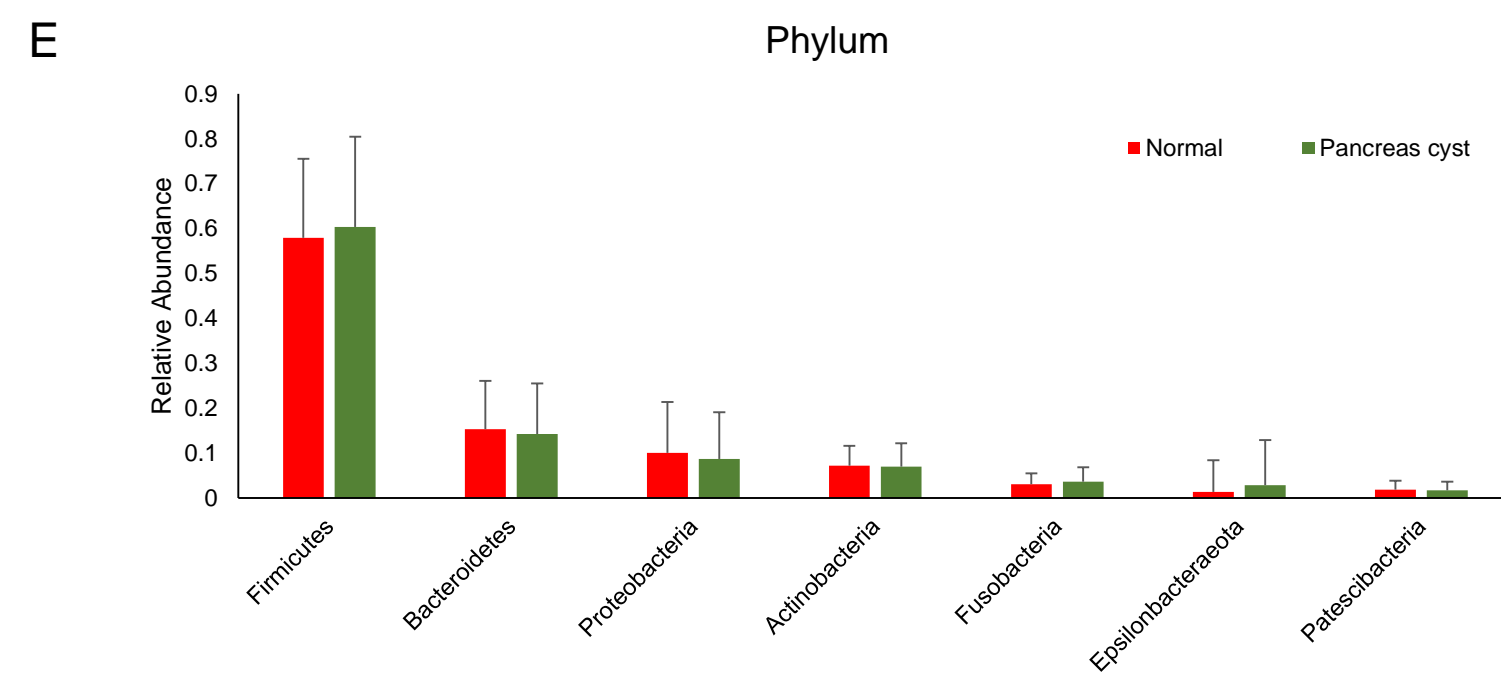
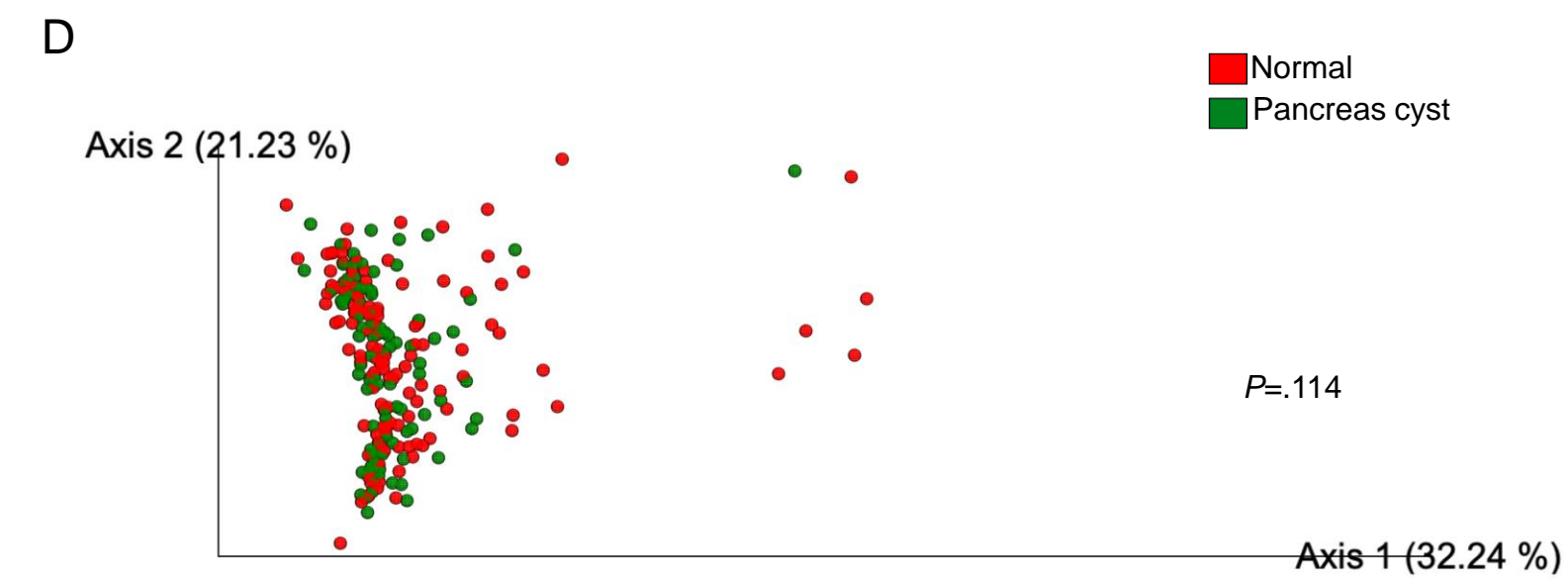
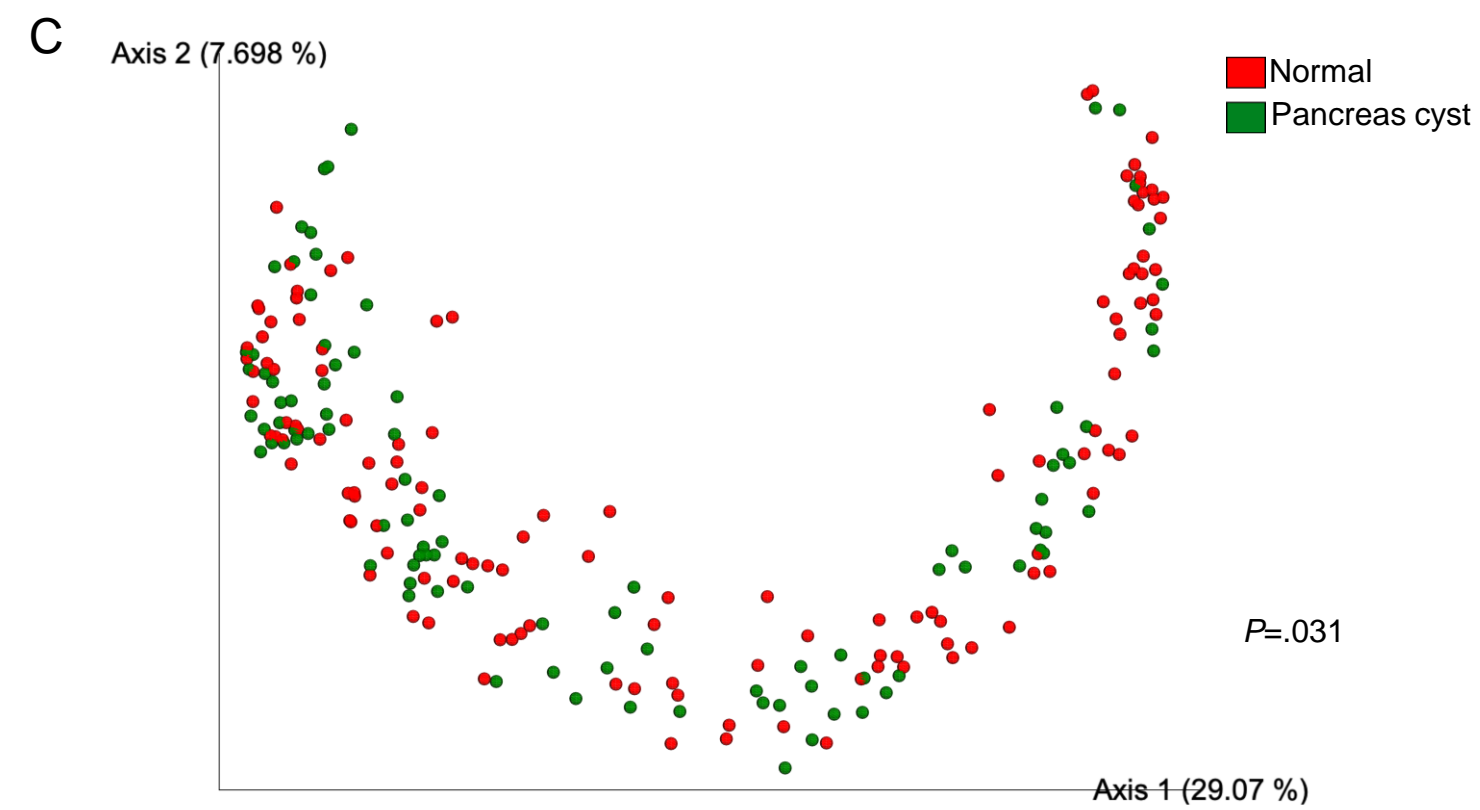
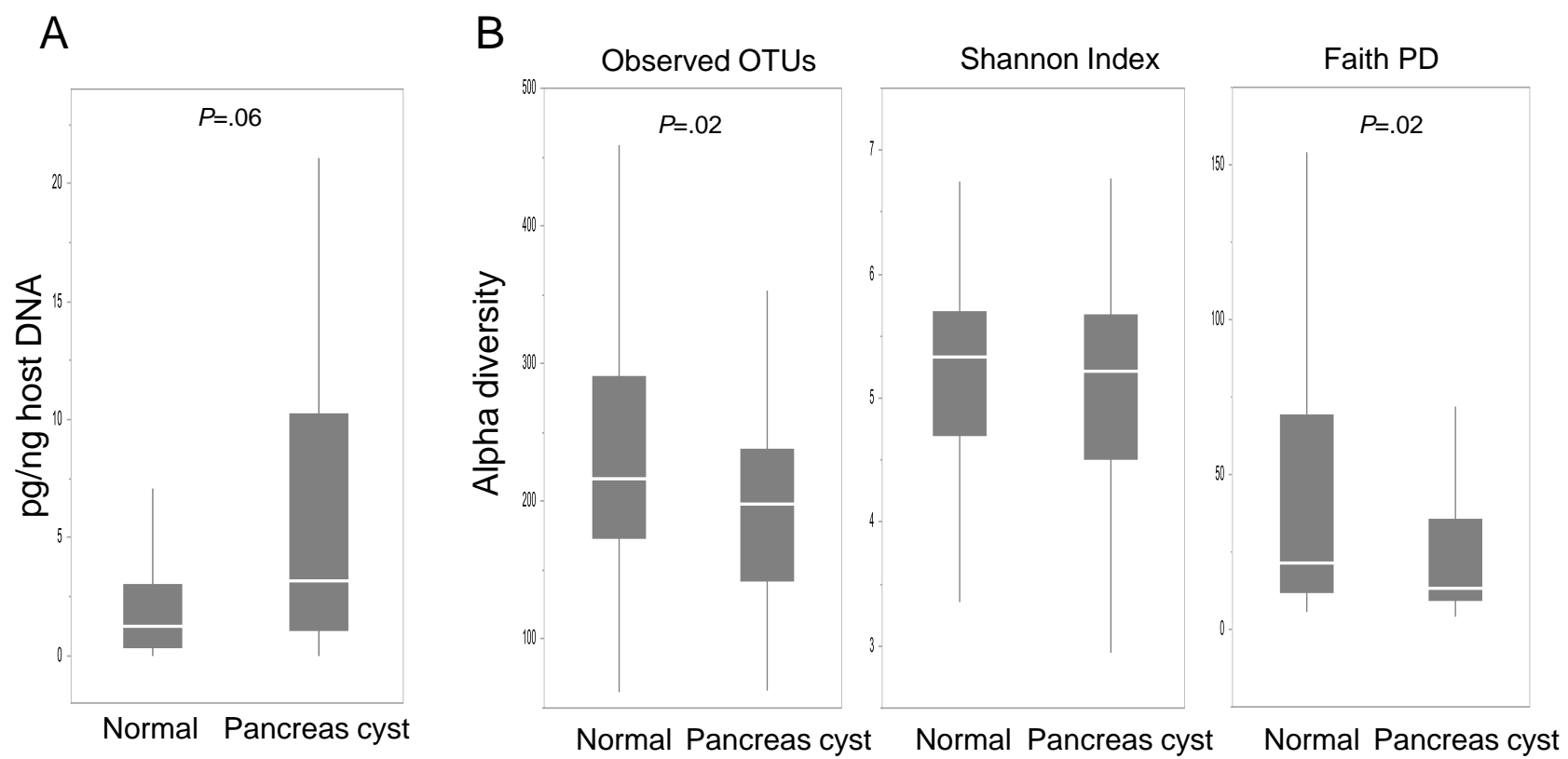
PPI users



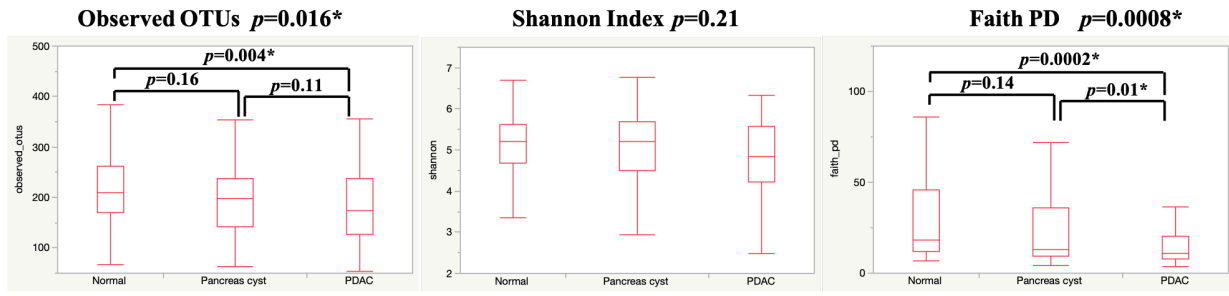
PPI non users



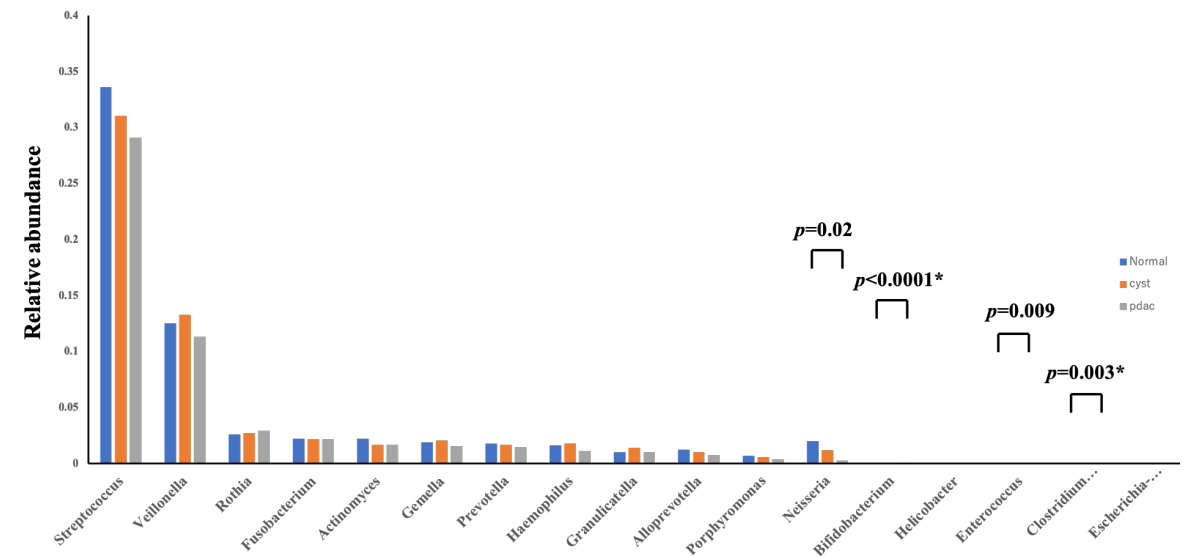




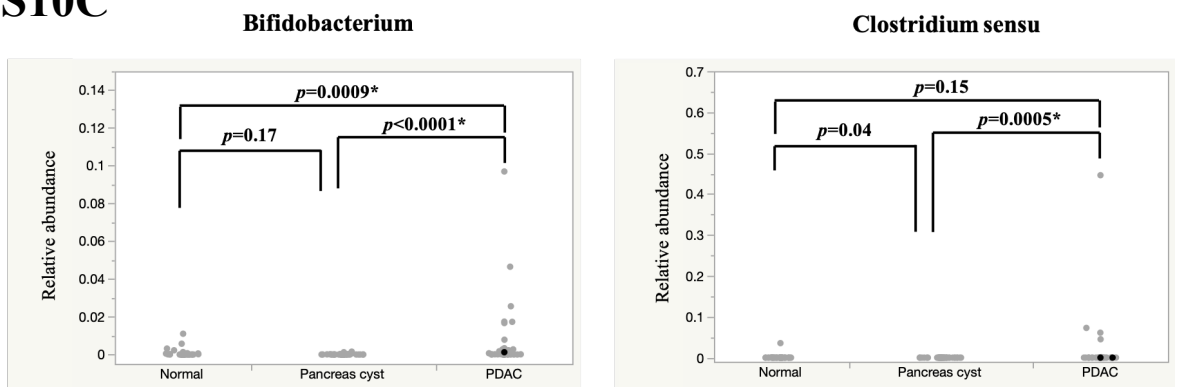
S10A



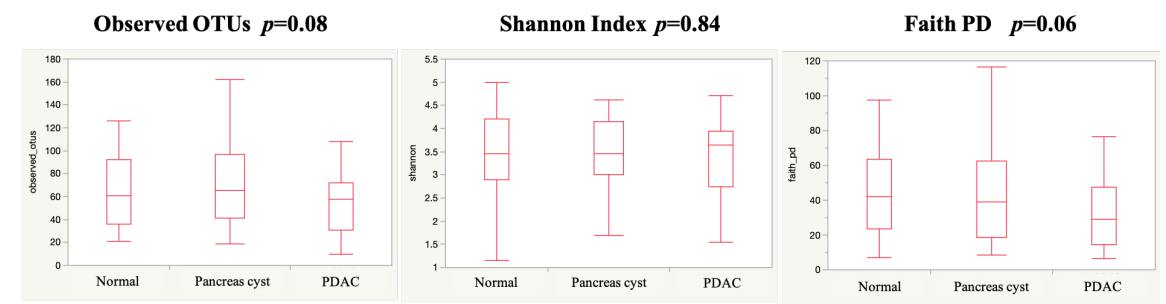
S10B



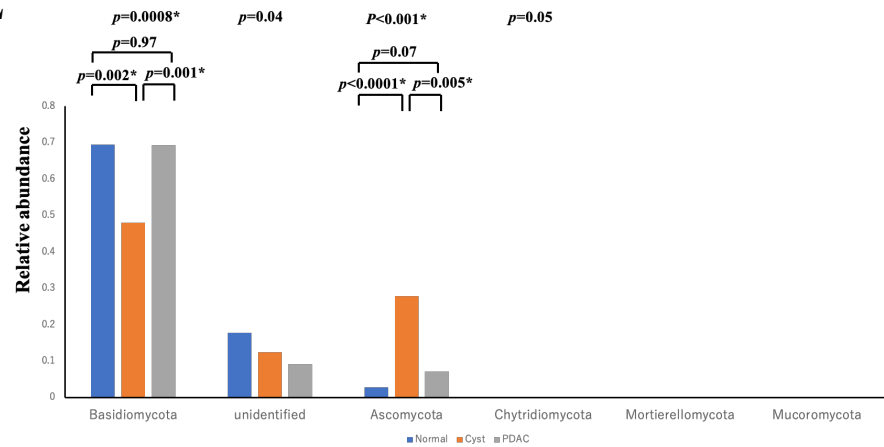
S10C



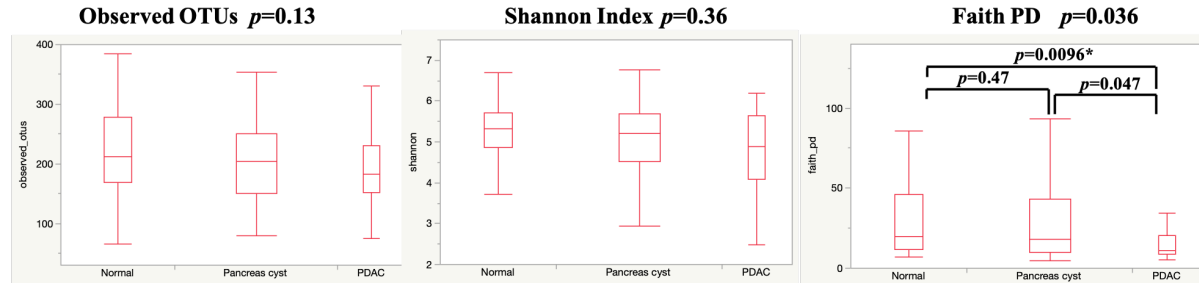
S10D



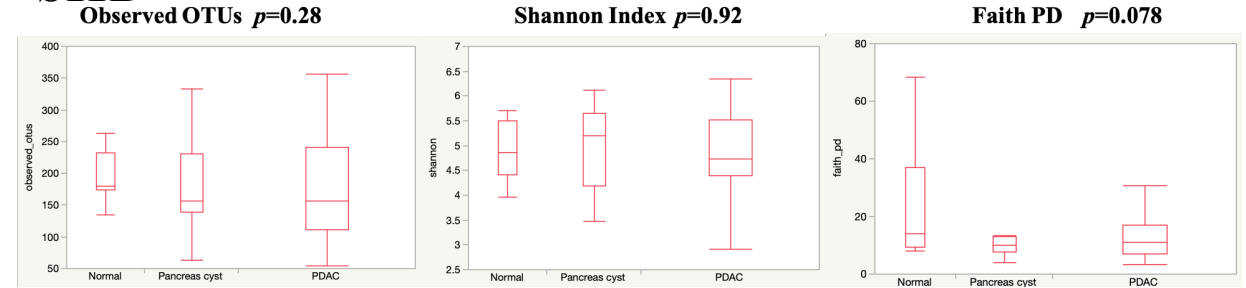
S10E



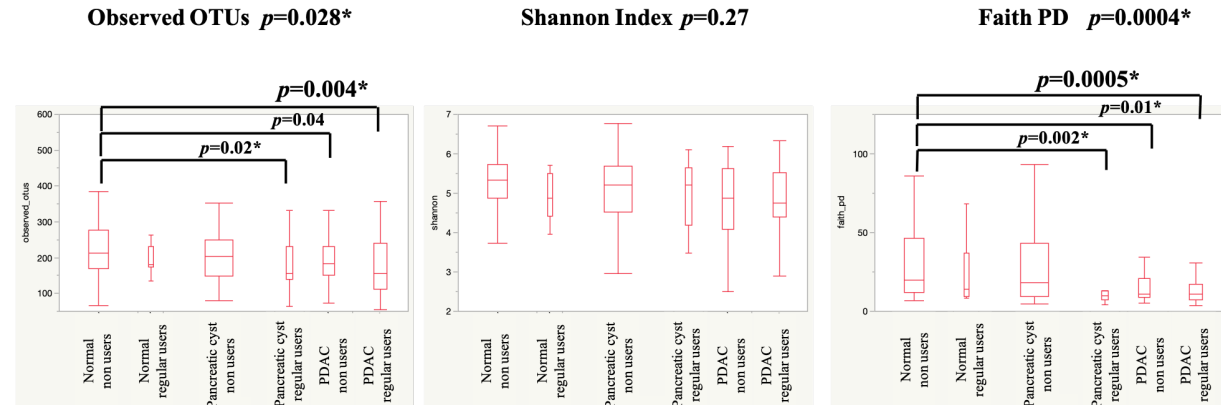
S11A



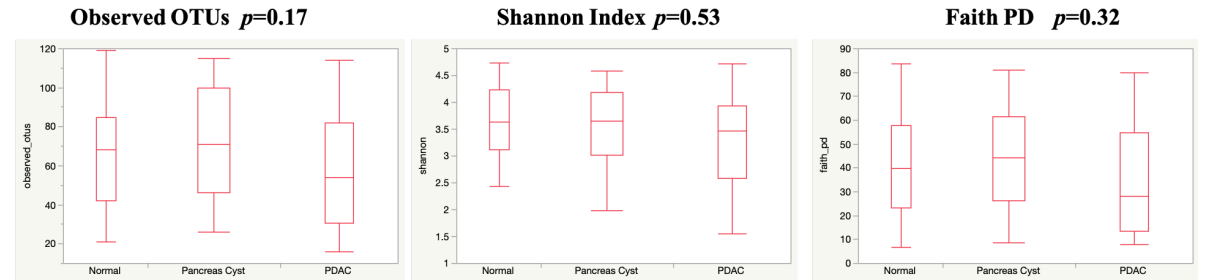
S11B



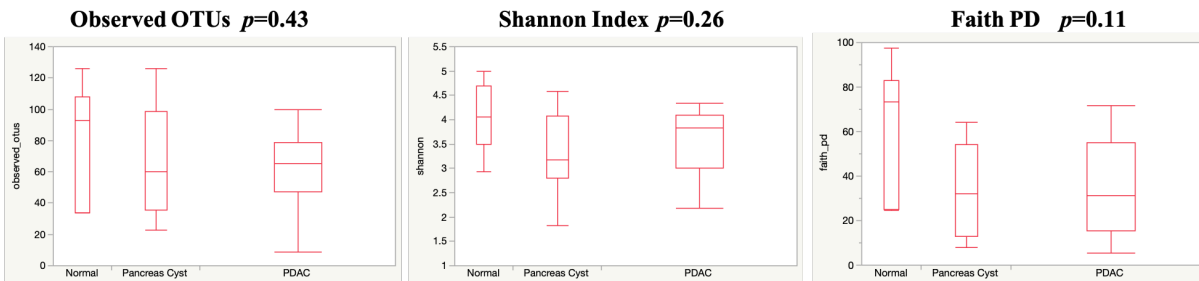
S11C



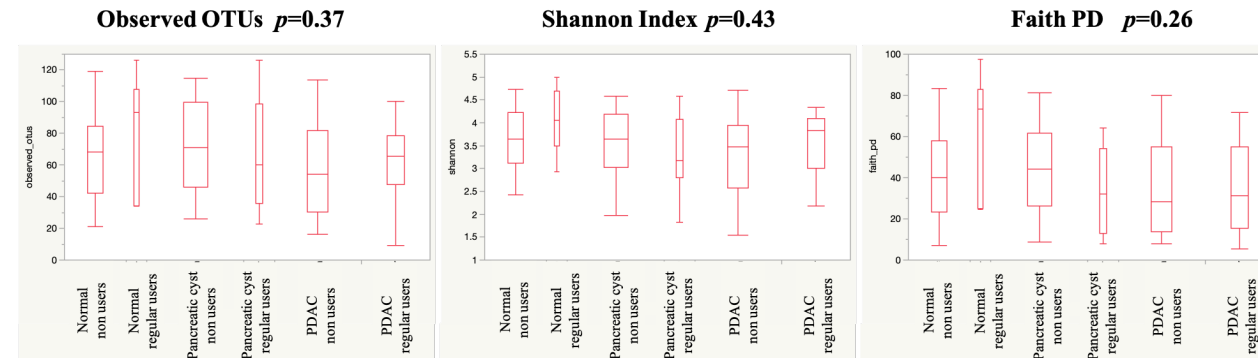
S11D



S11E

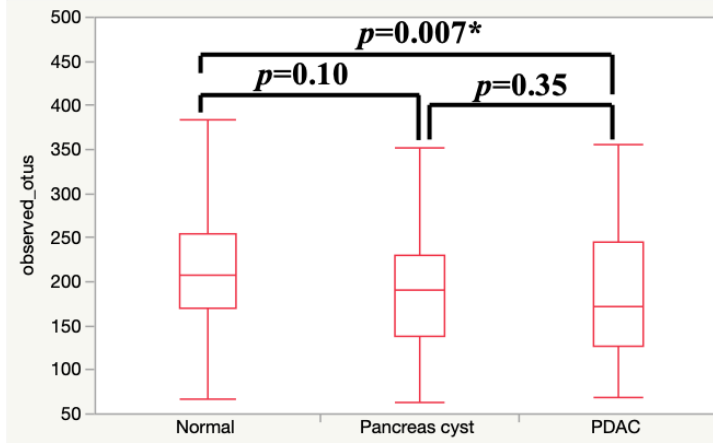


S11F

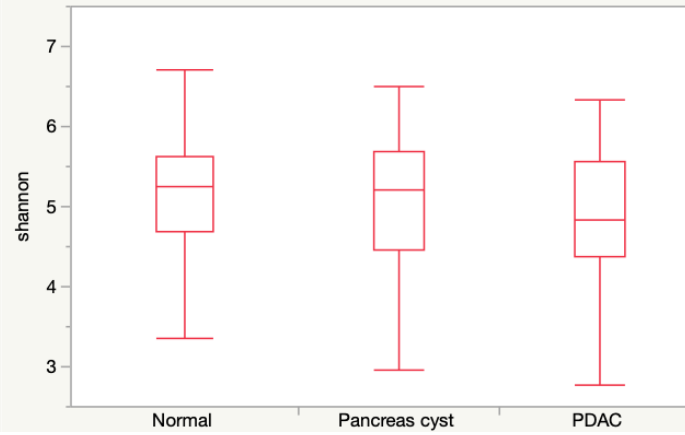


S12A

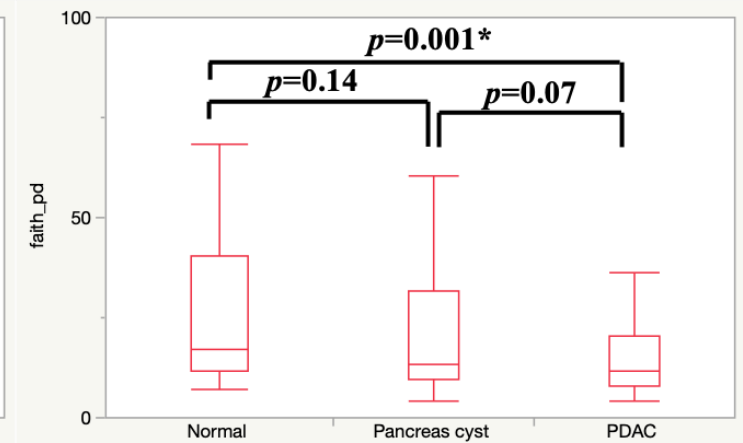
Observed OTUs $p=0.025^*$



Shannon Index $p=0.23$

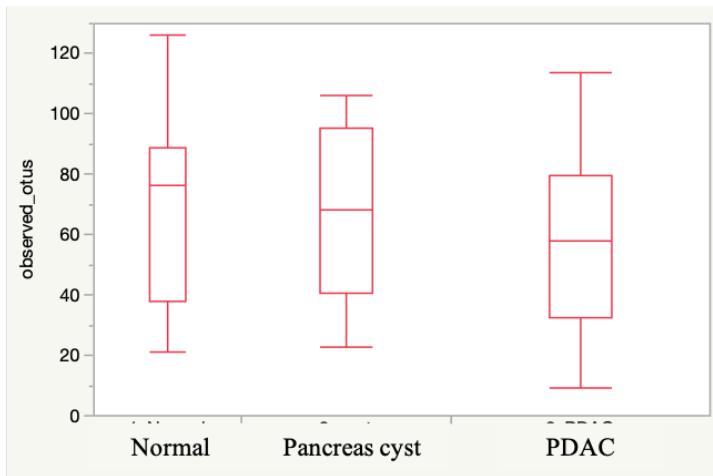


Faith PD $p=0.004^*$

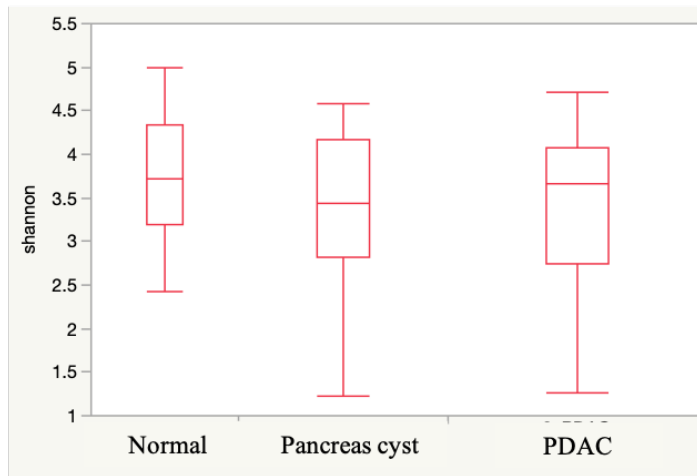


S12B

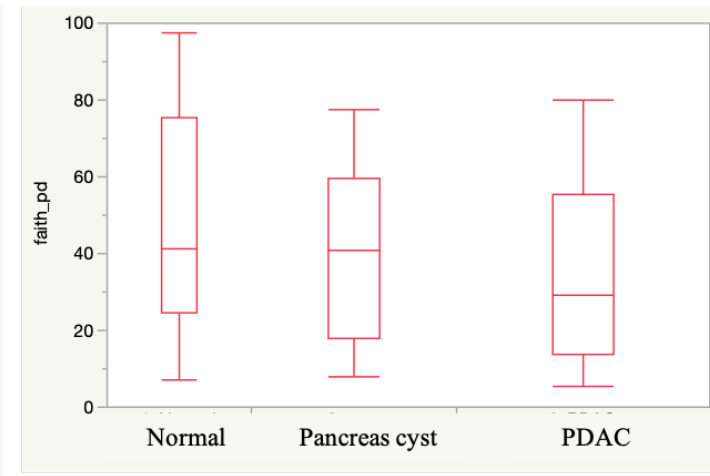
Observed OTUs $p=0.21$

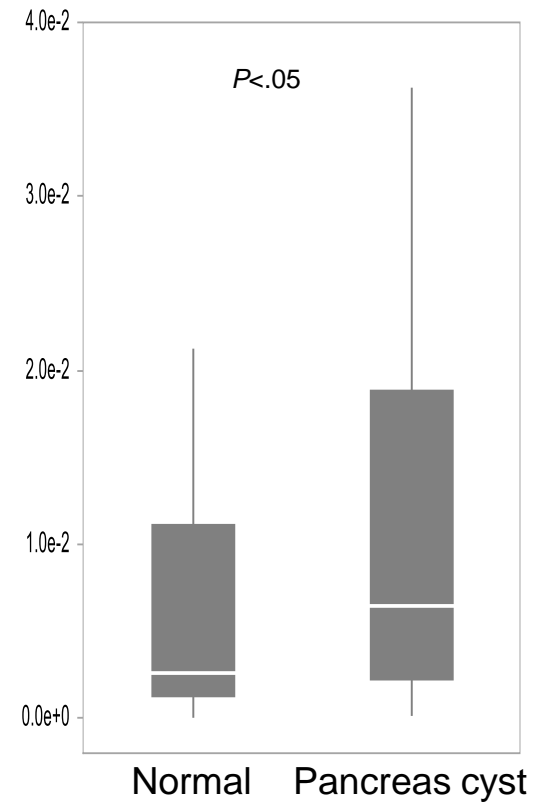
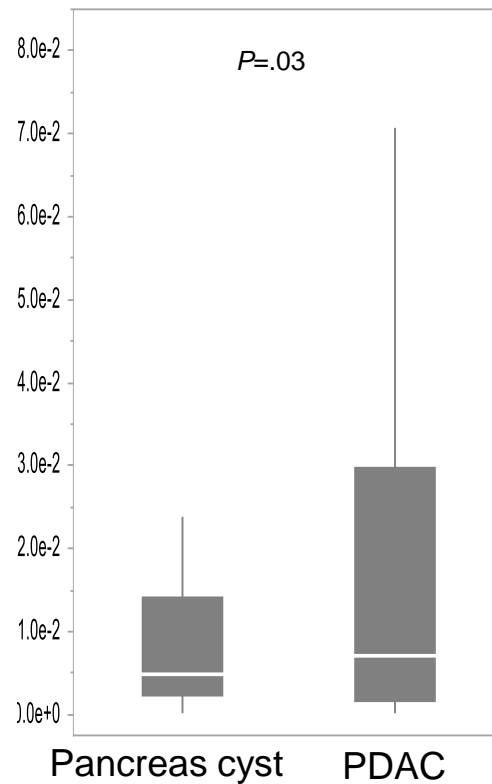
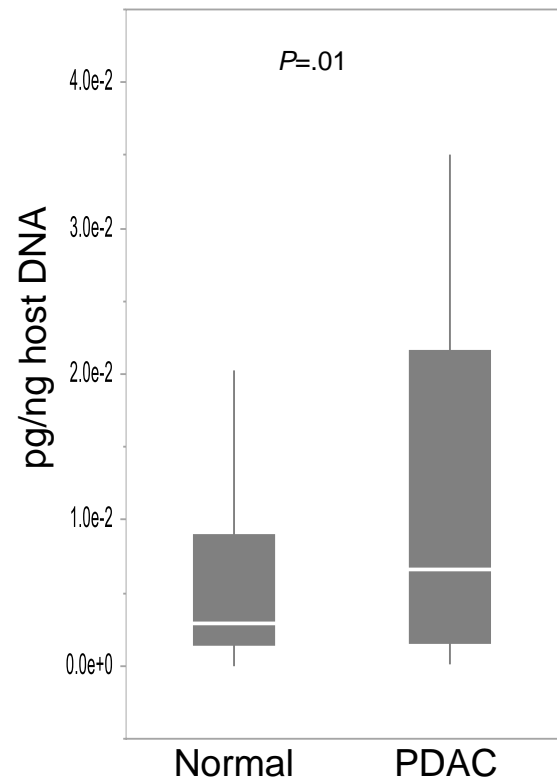


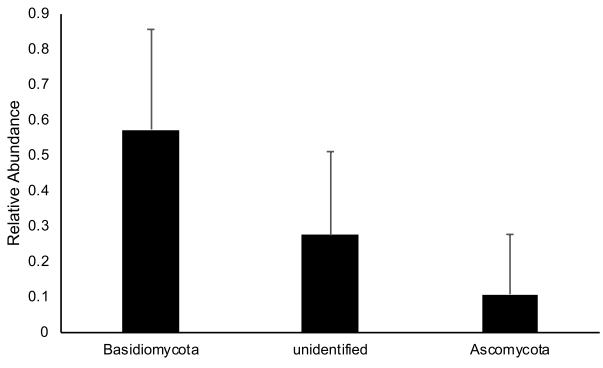
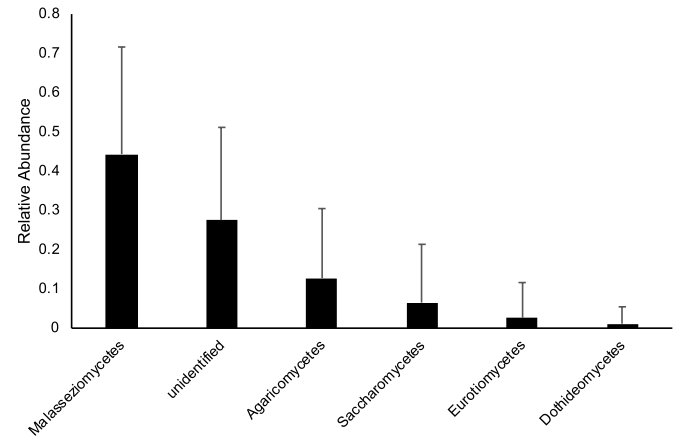
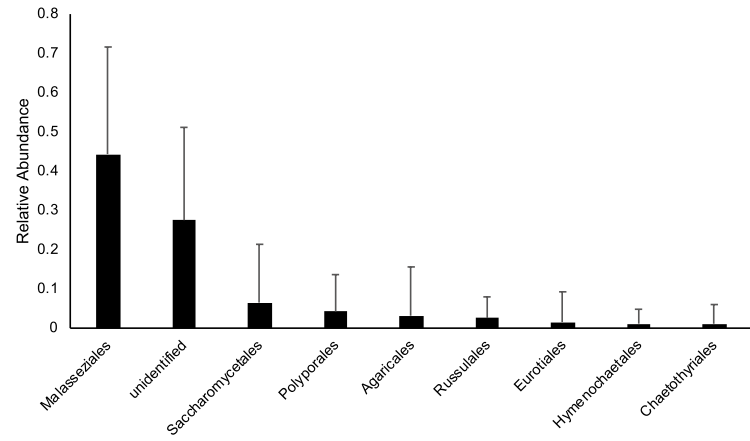
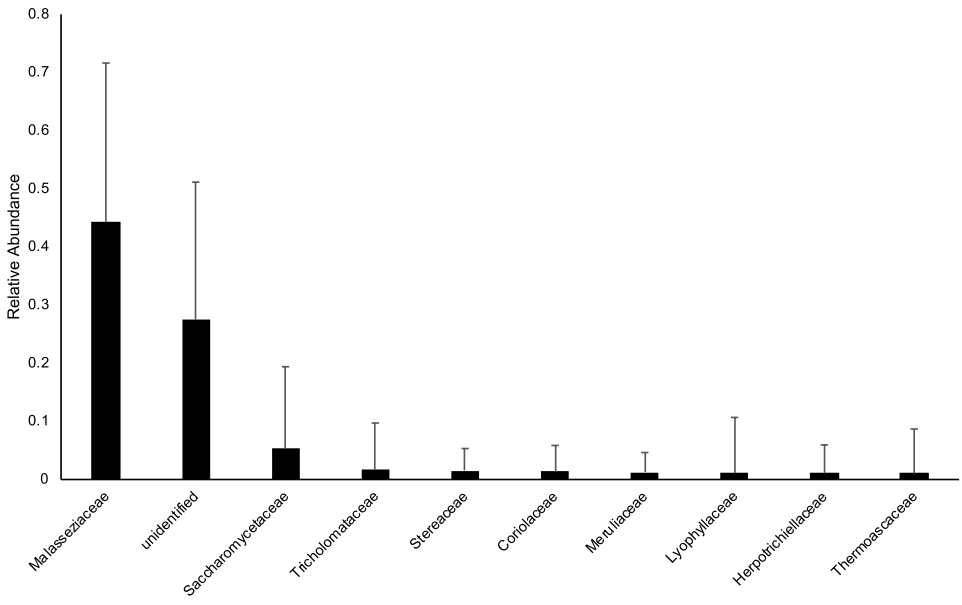
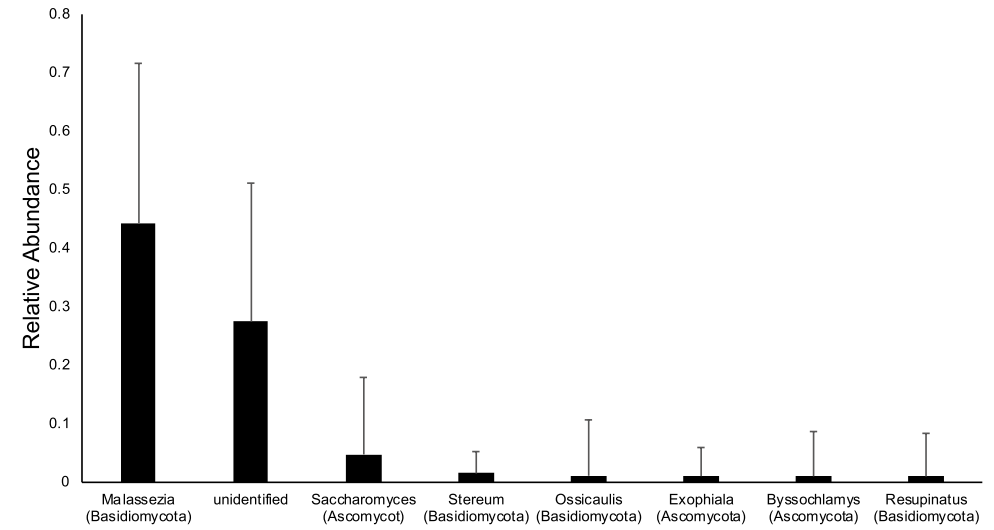
Shannon Index $p=0.41$



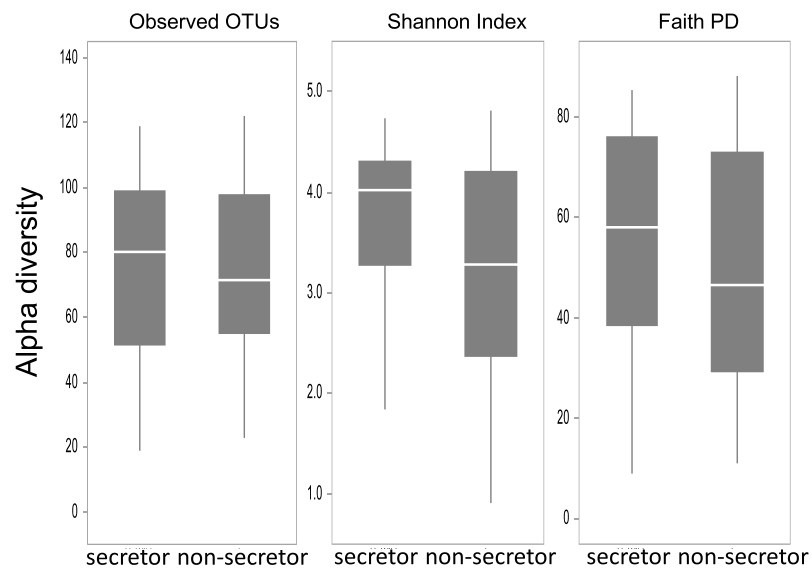
Faith PD $p=0.21$



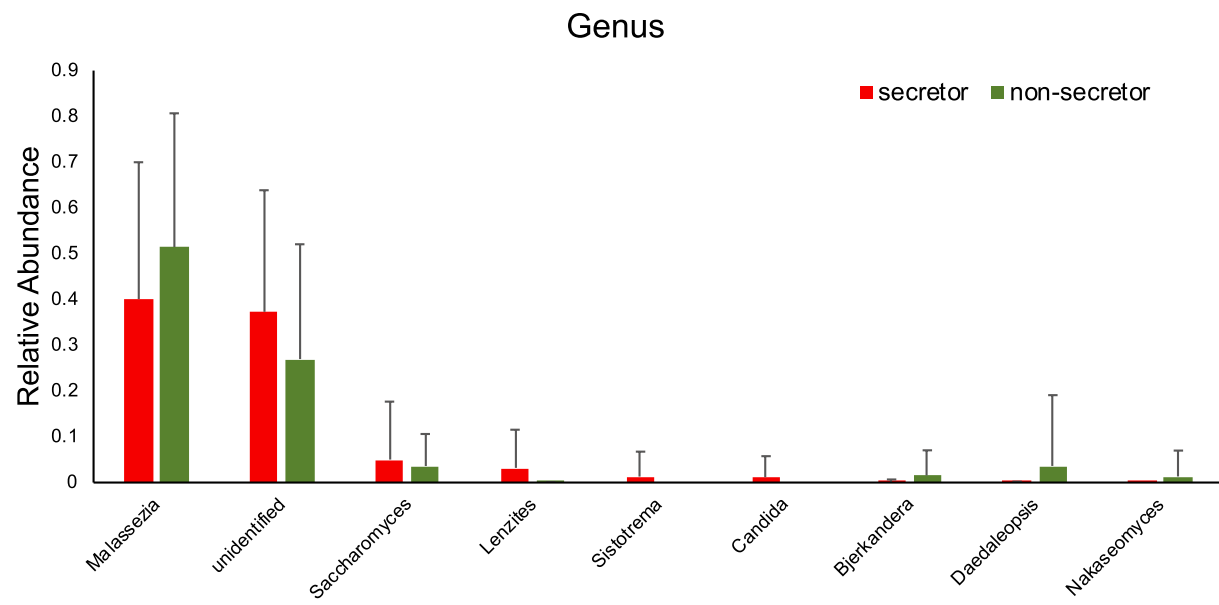


A**Phylum****B****Class****C****Order****D****Family****E****Genus**

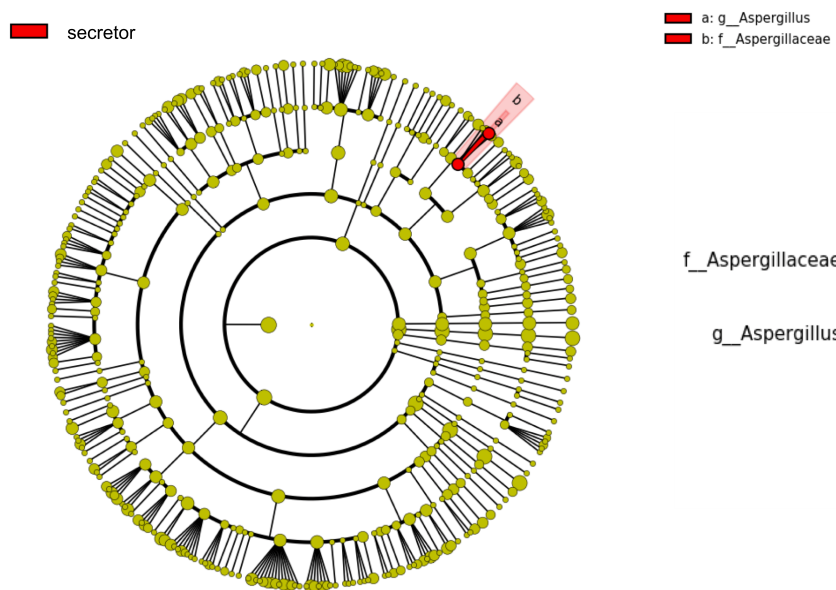
A

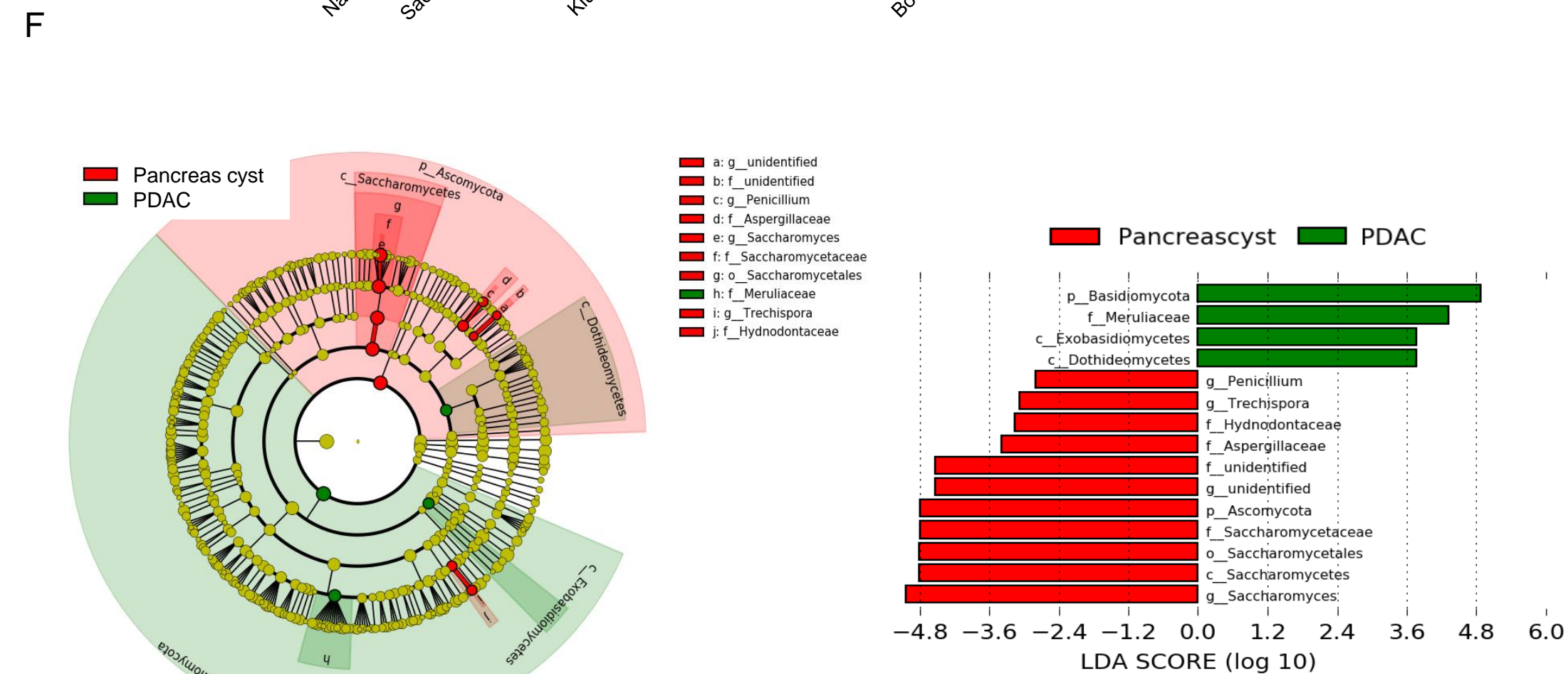
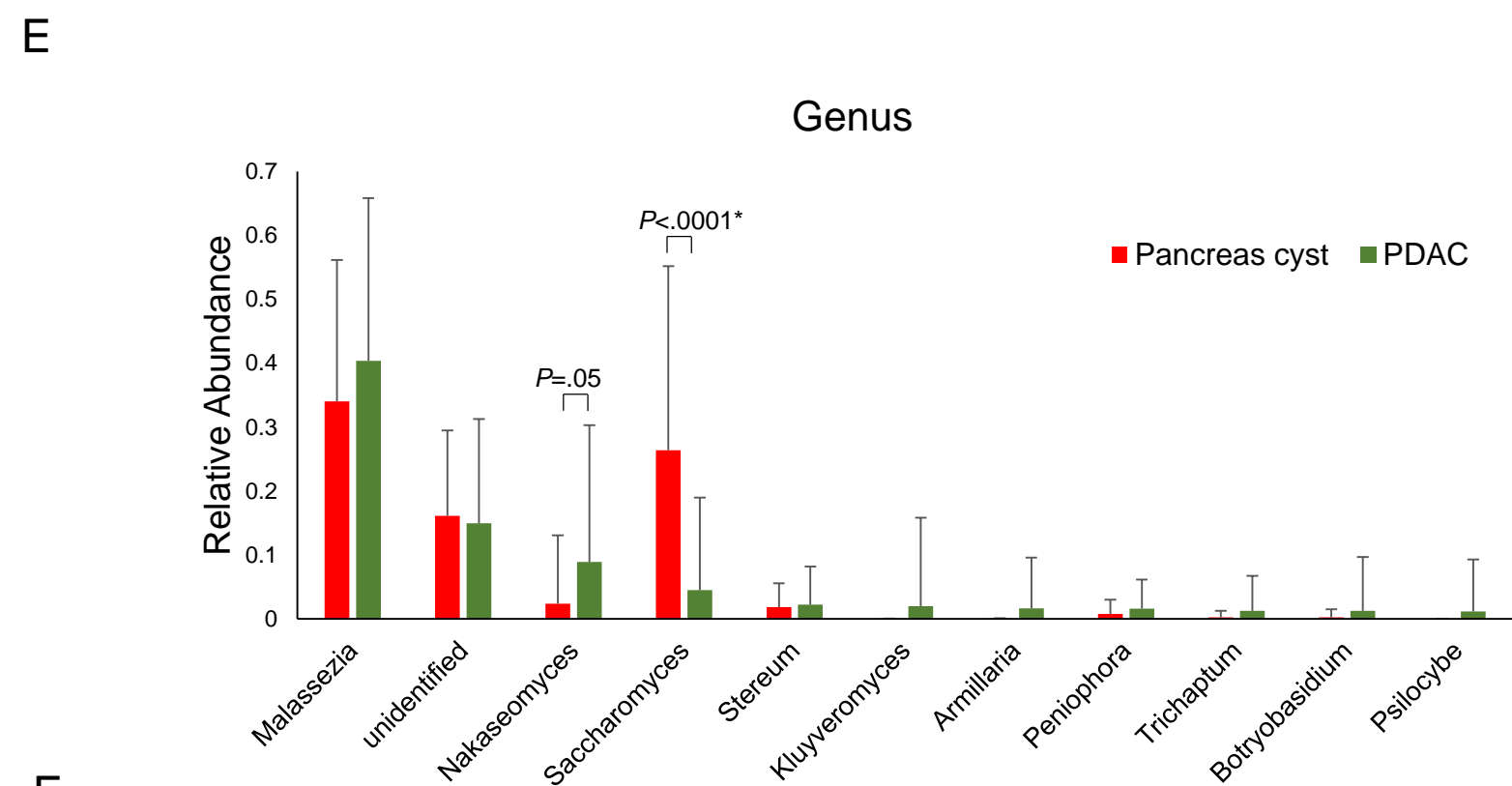
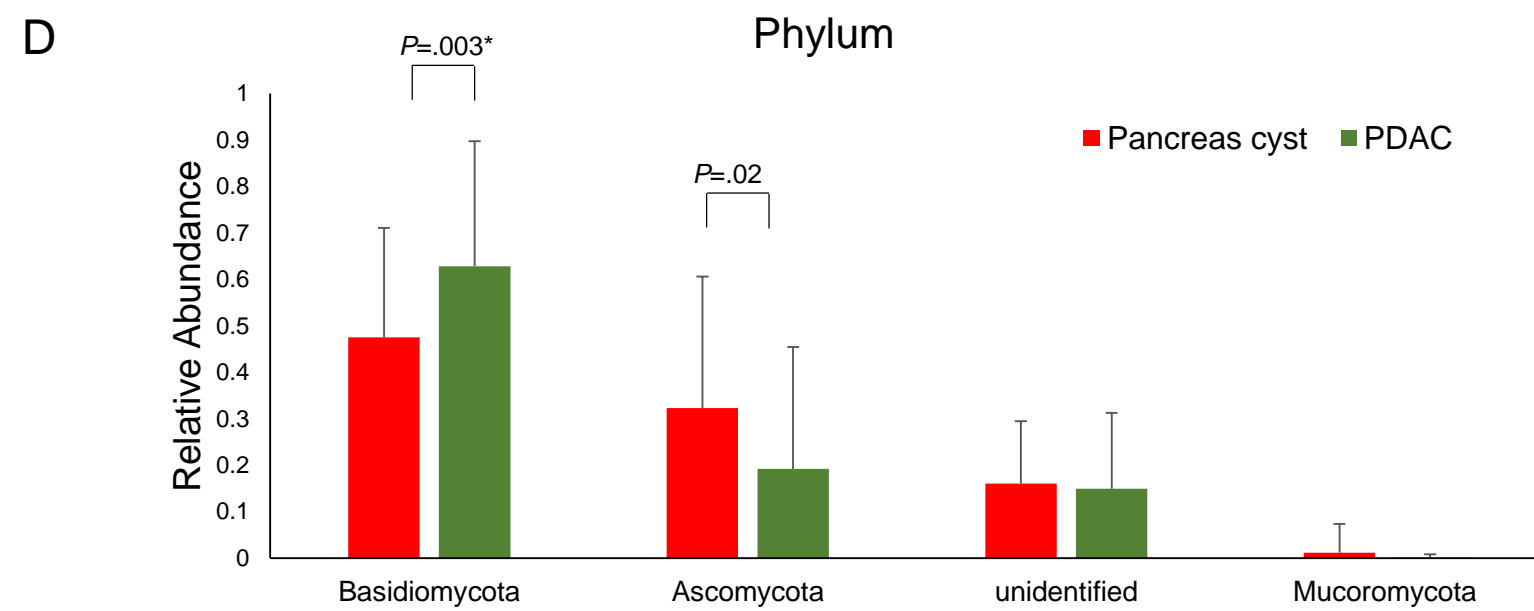
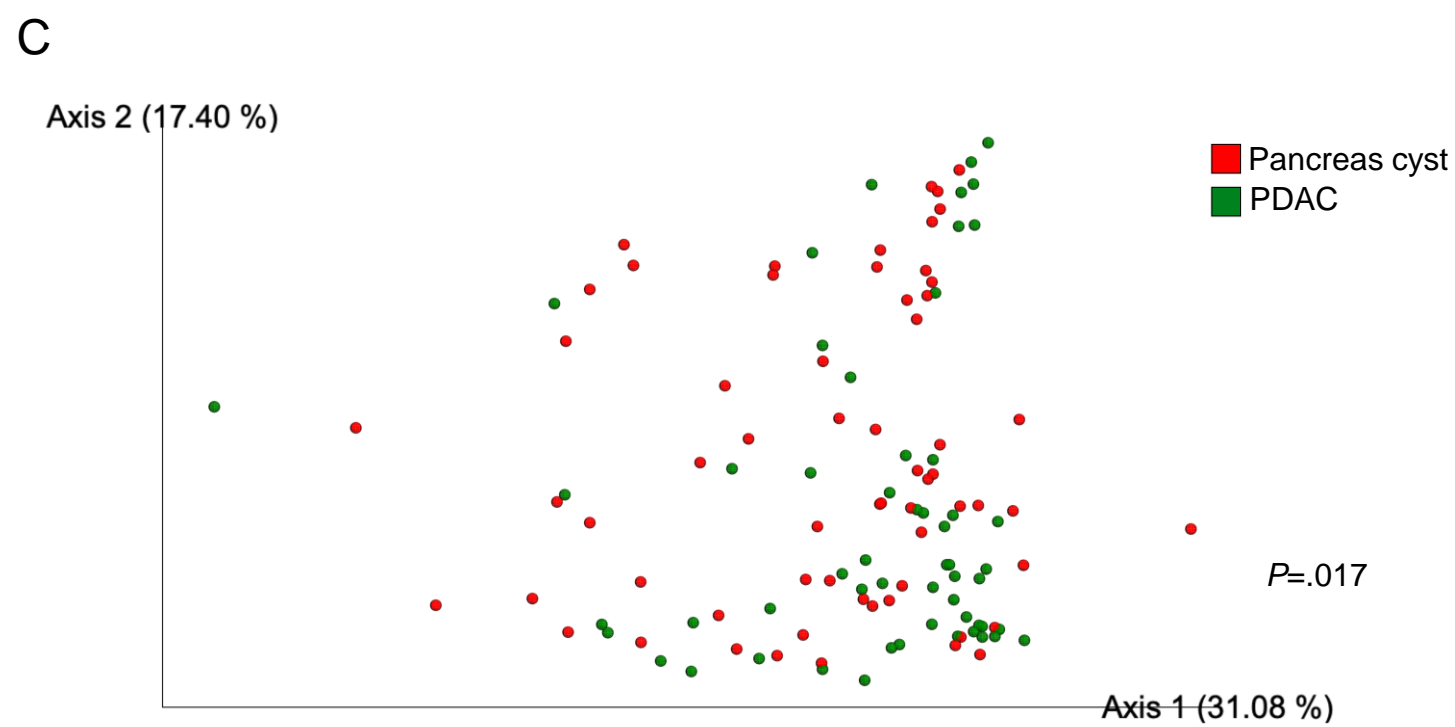
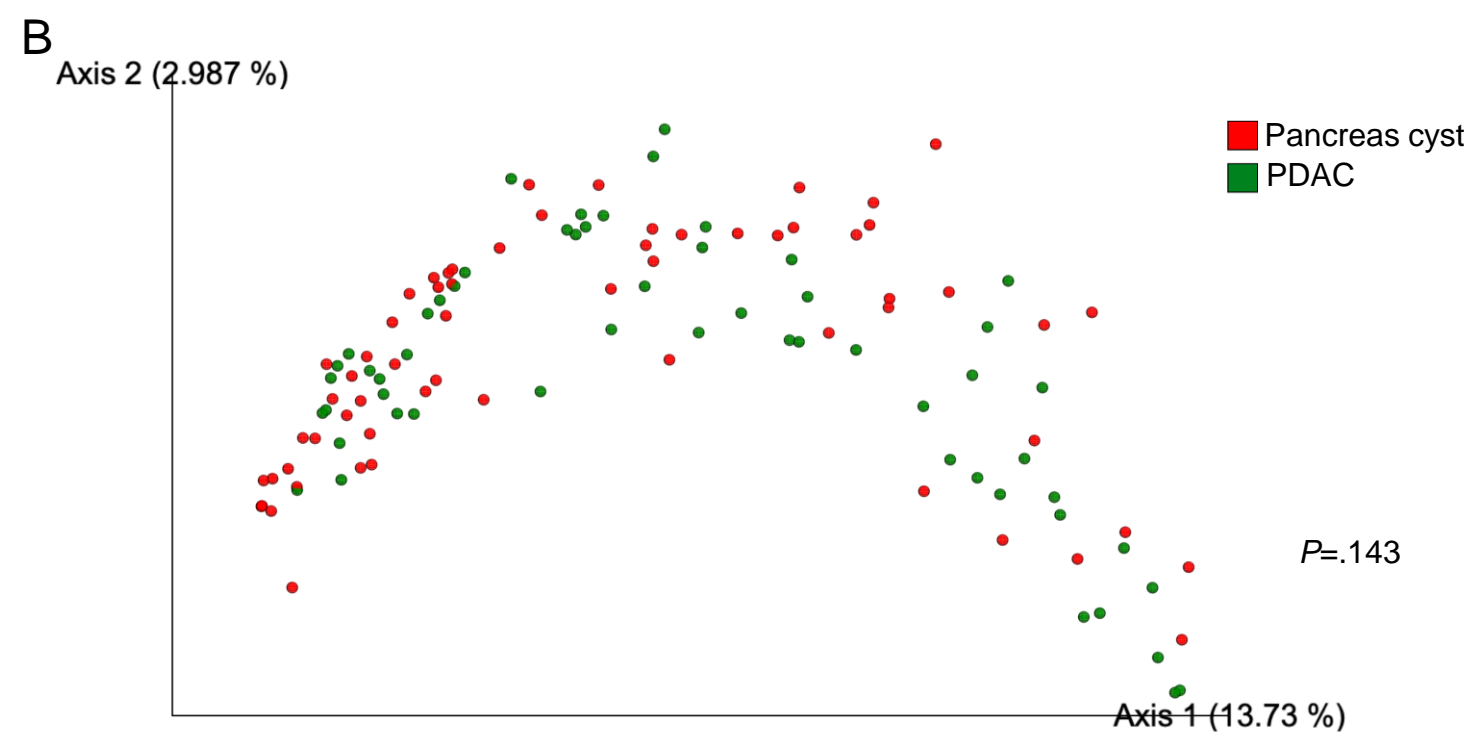
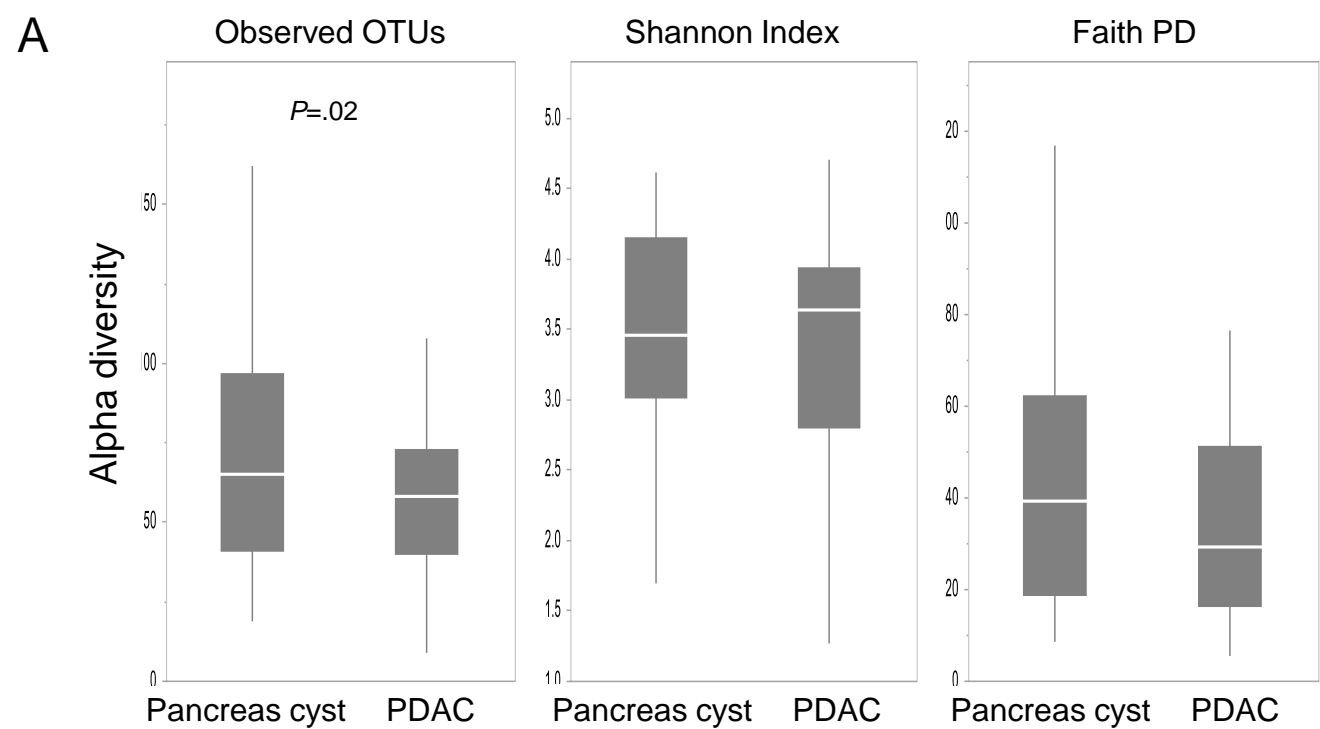


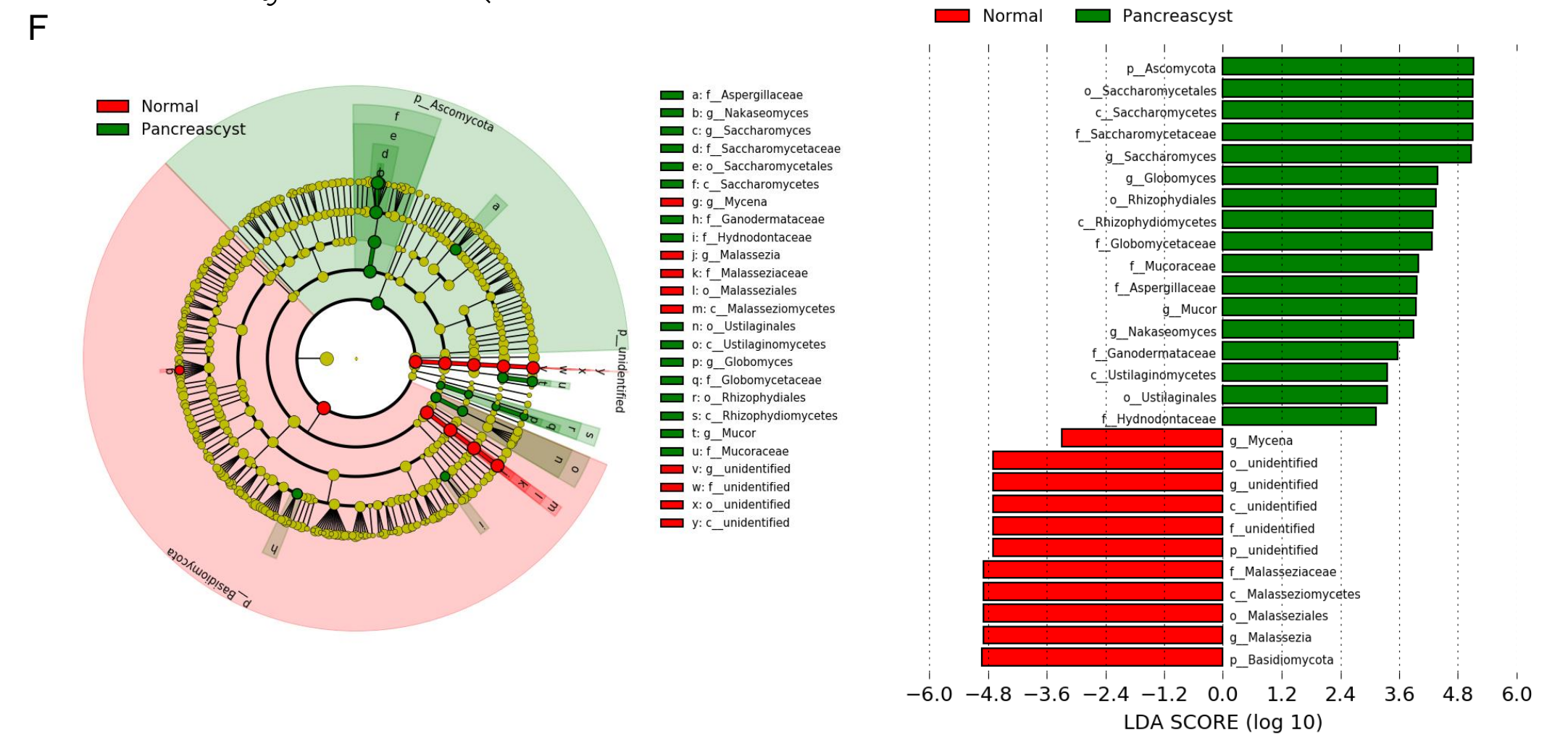
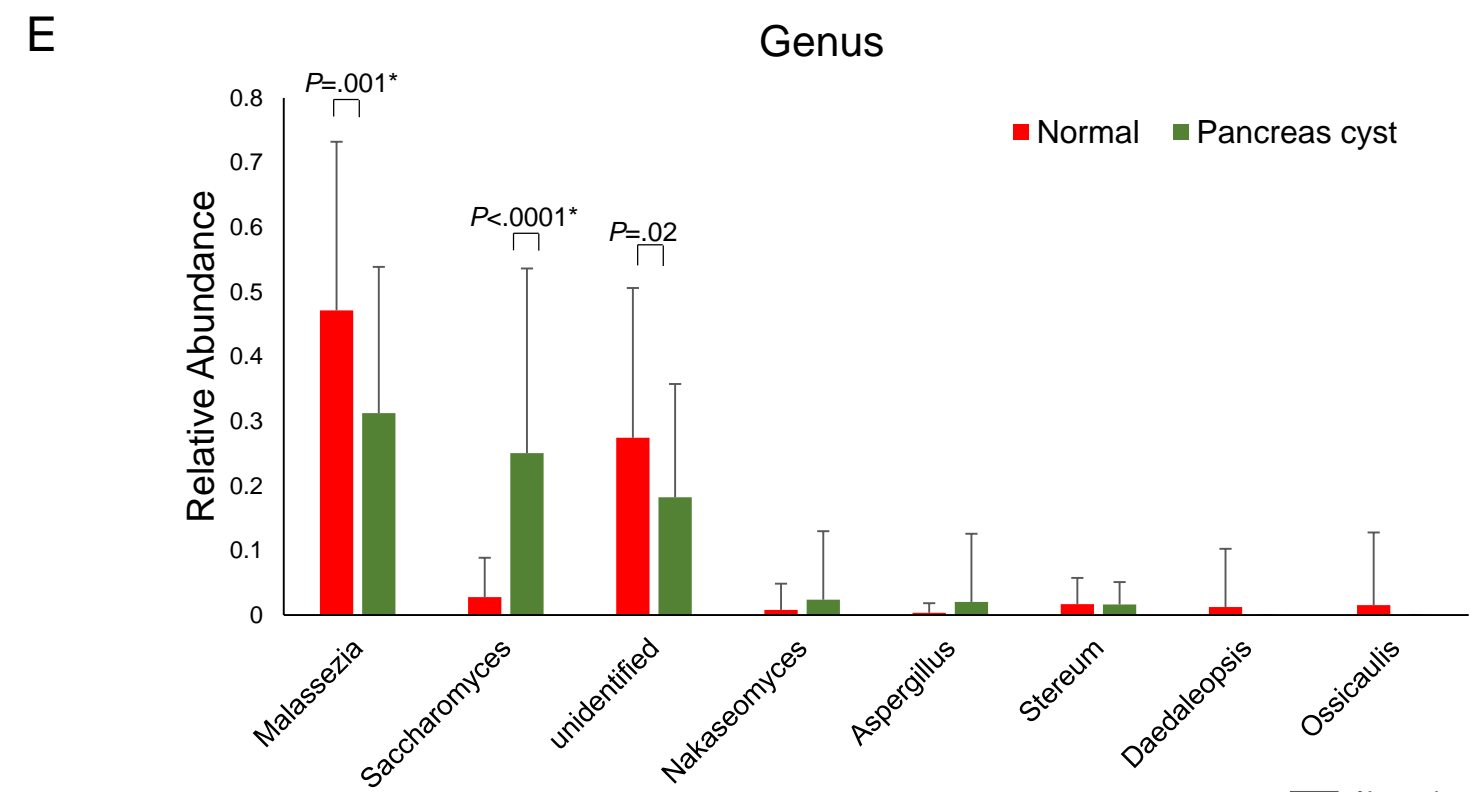
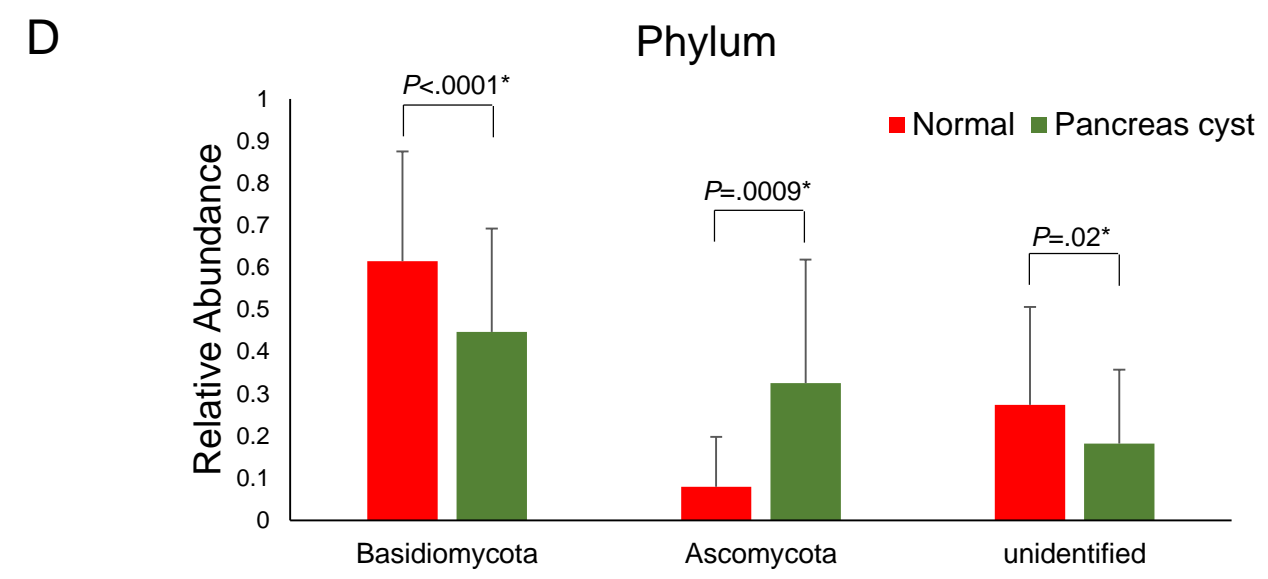
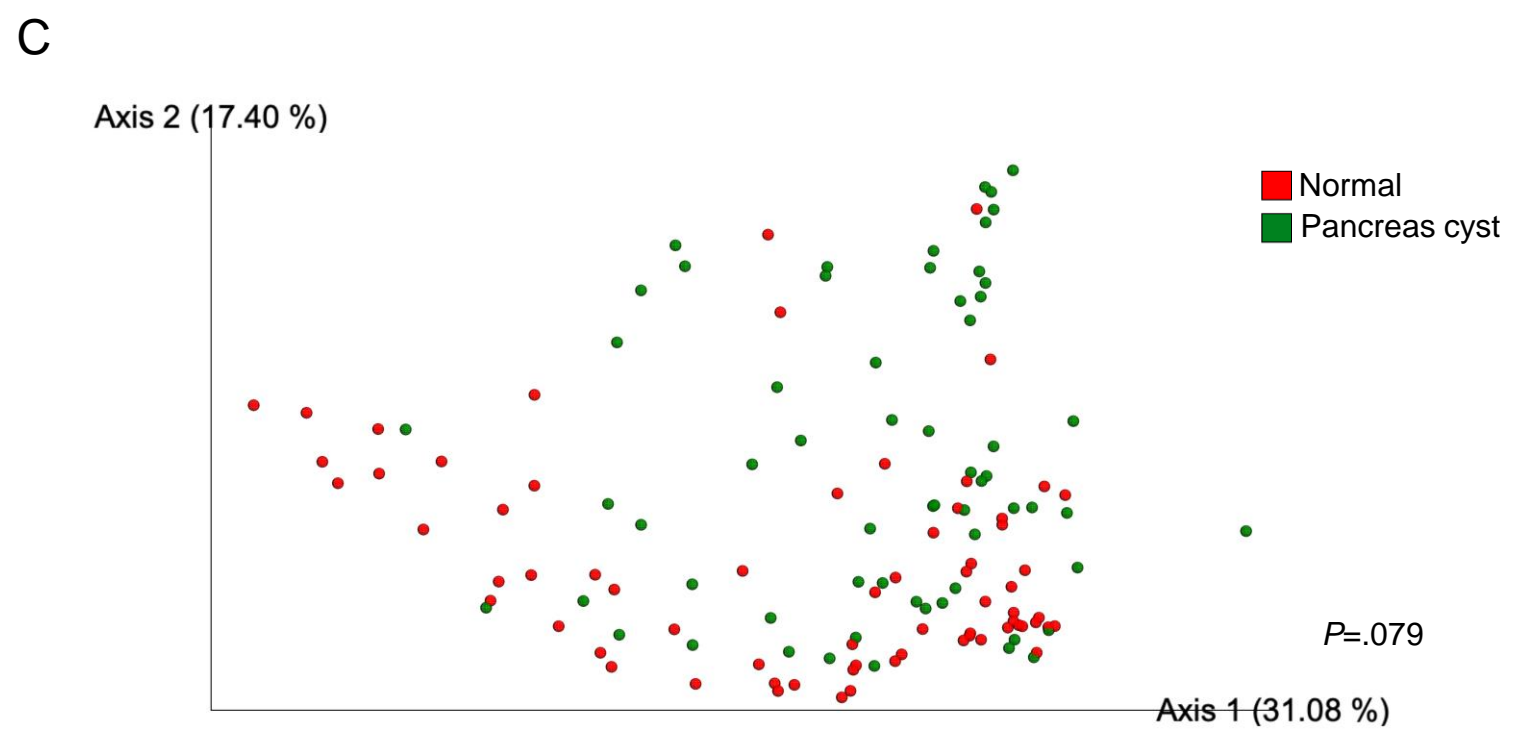
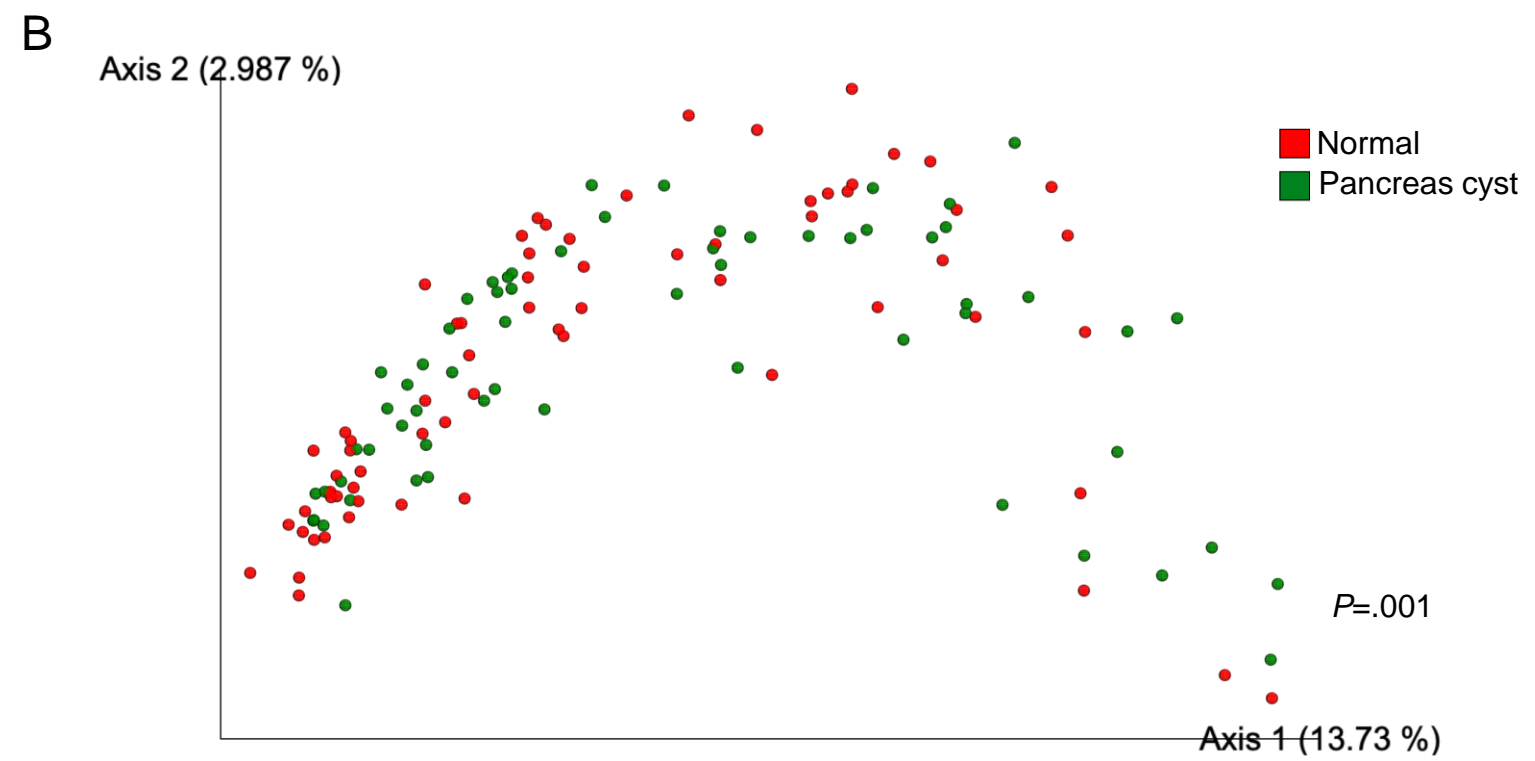
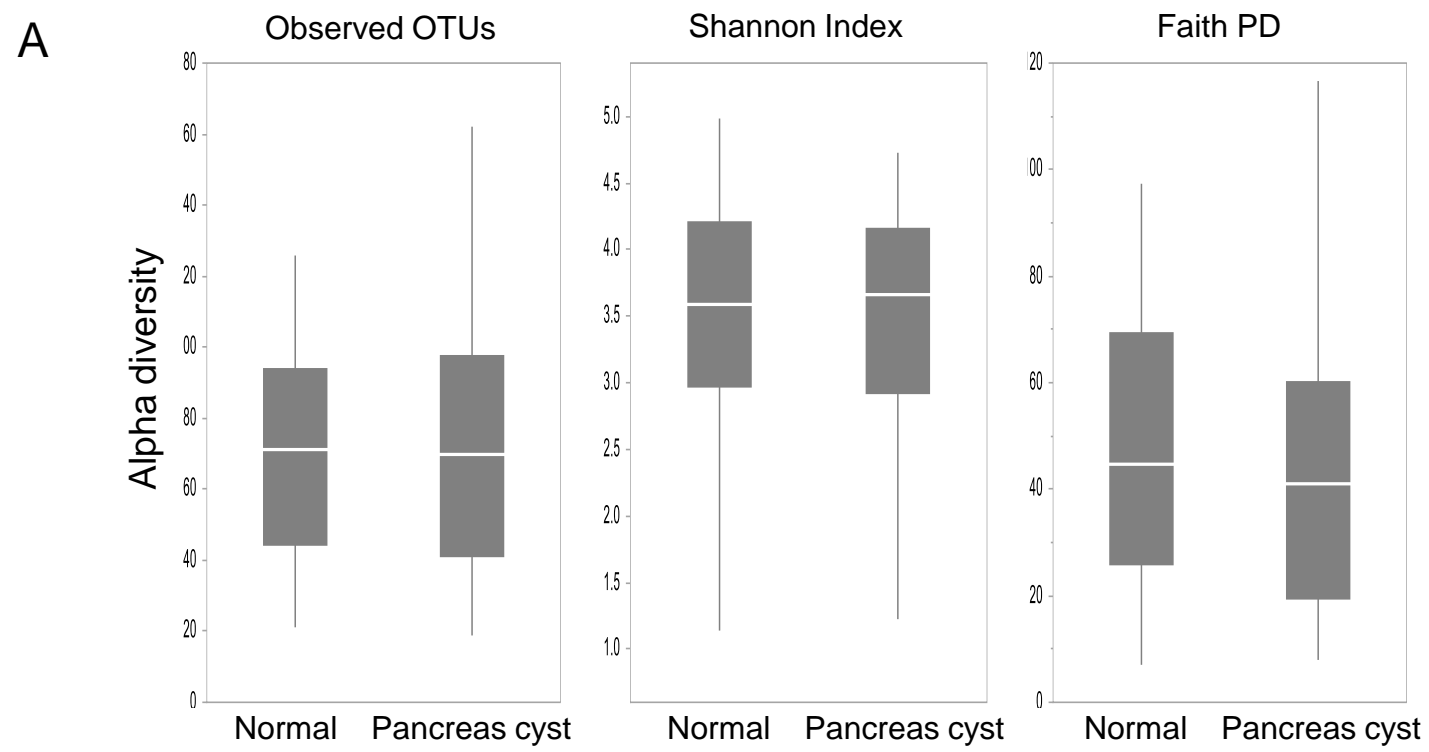
B



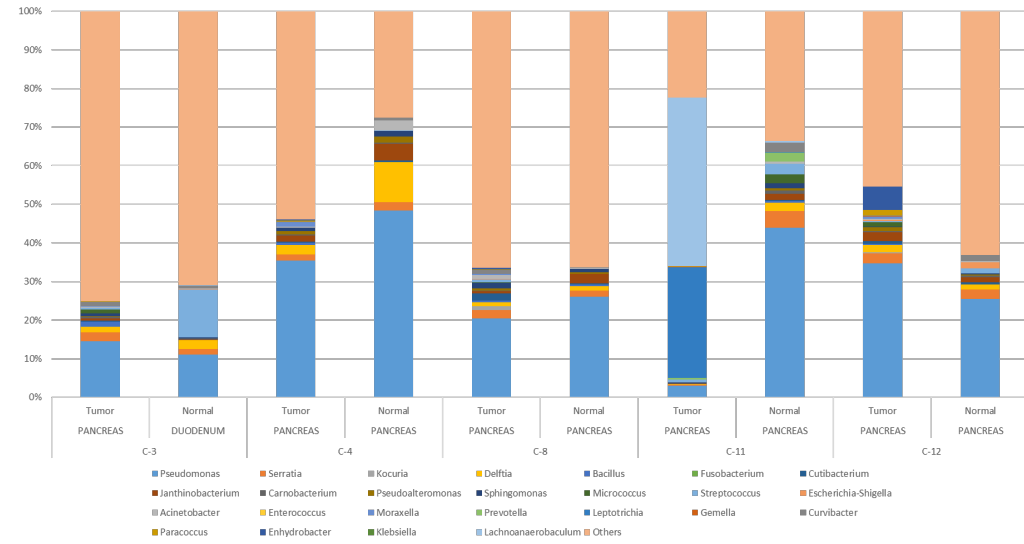
C



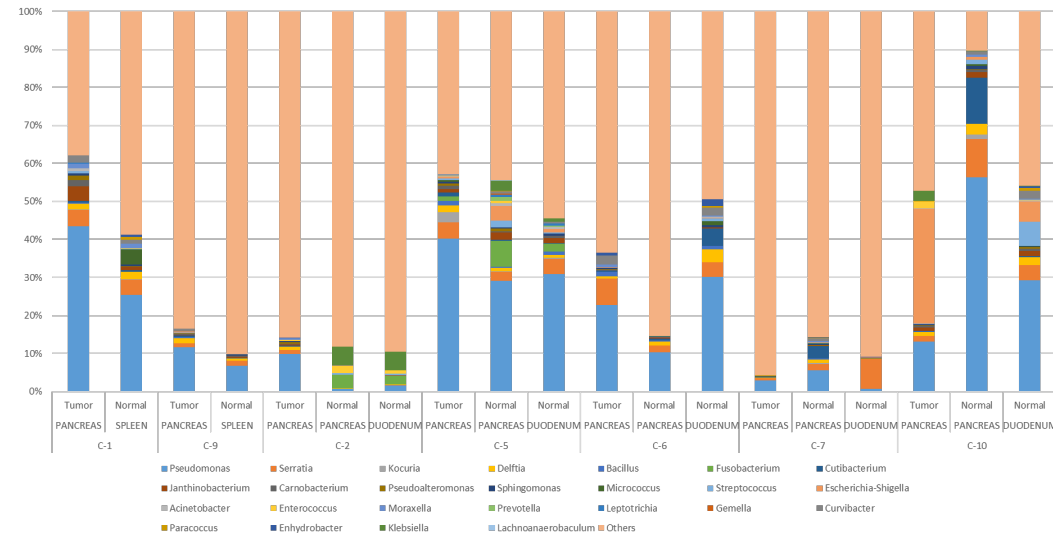


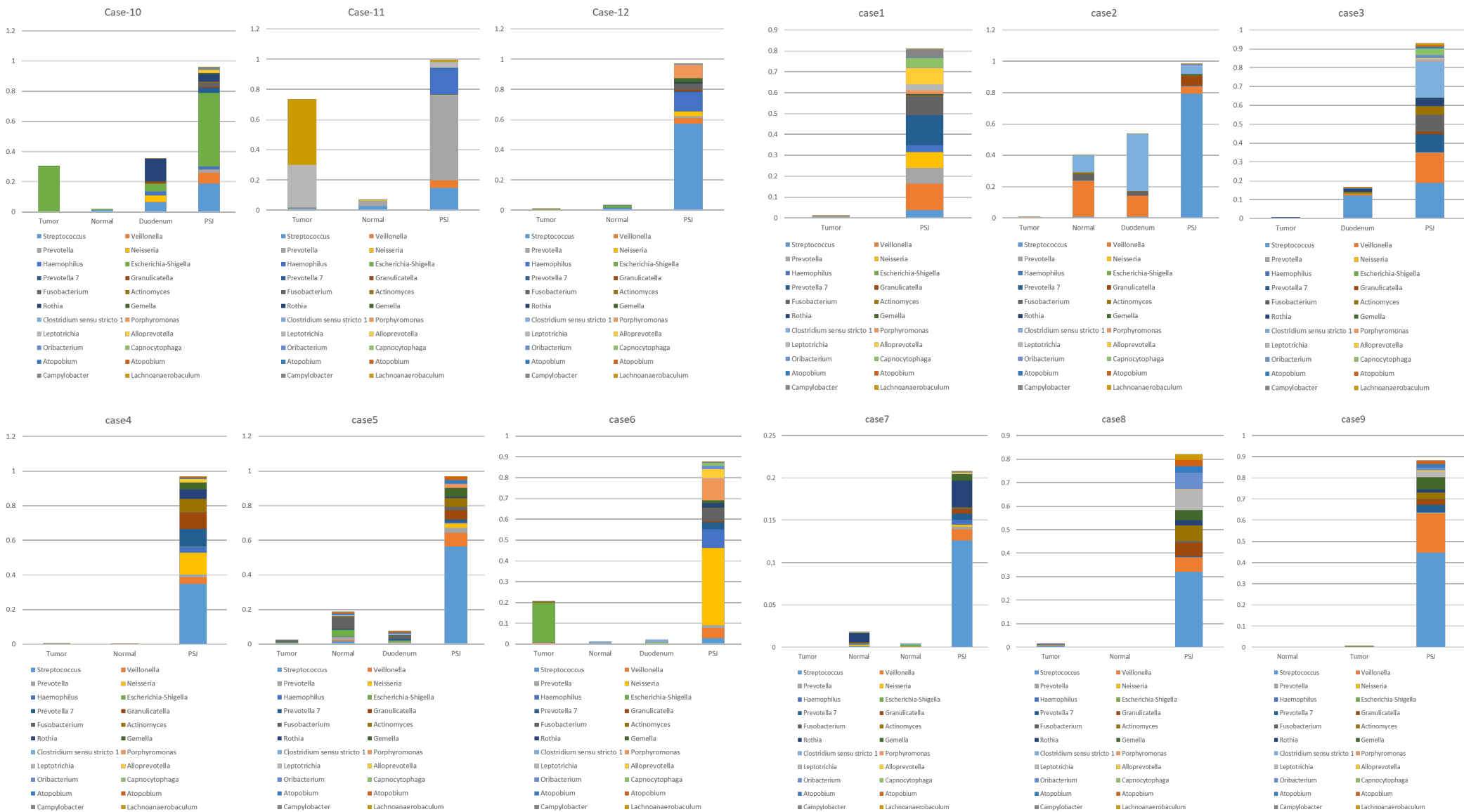


Genus

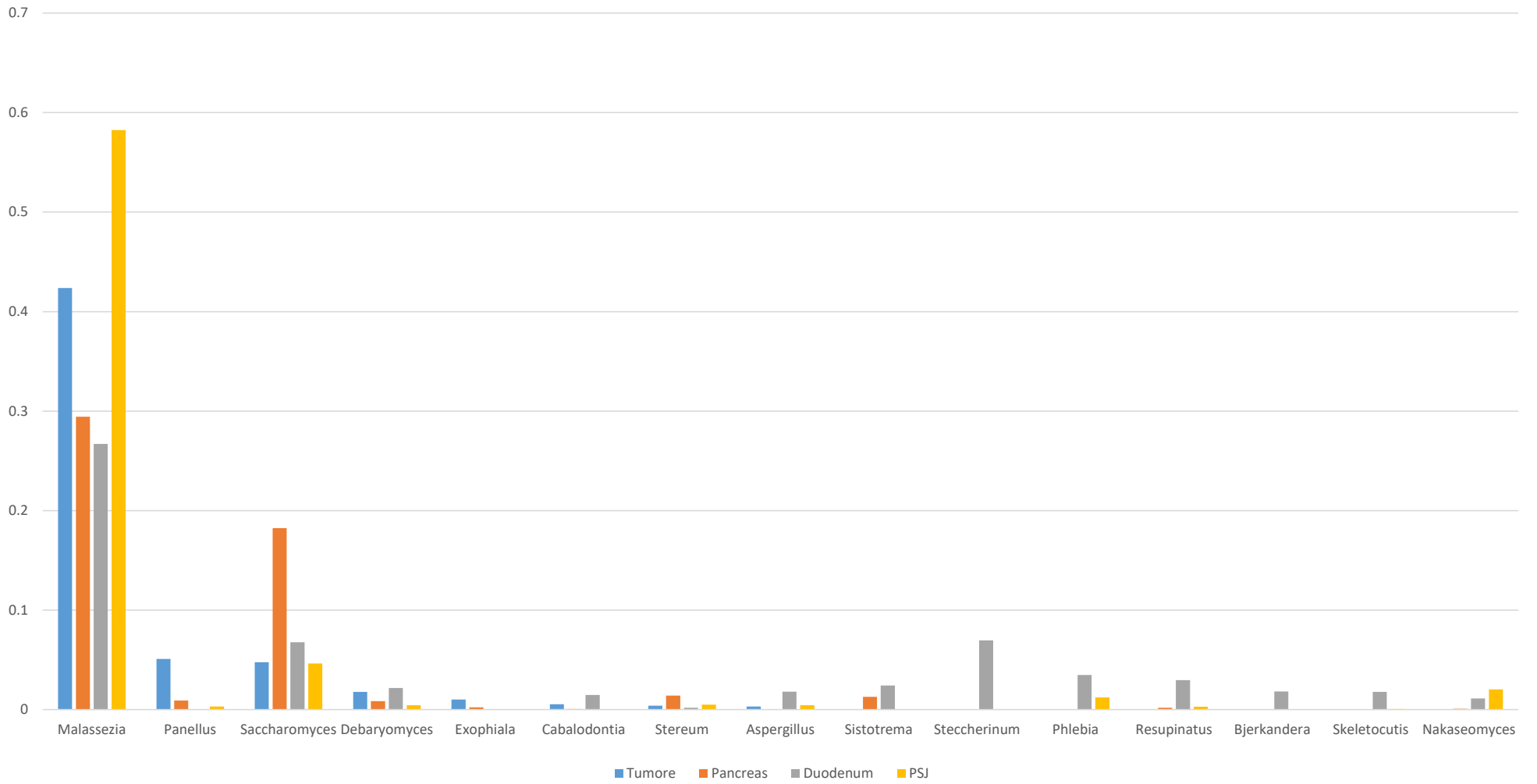


Genus

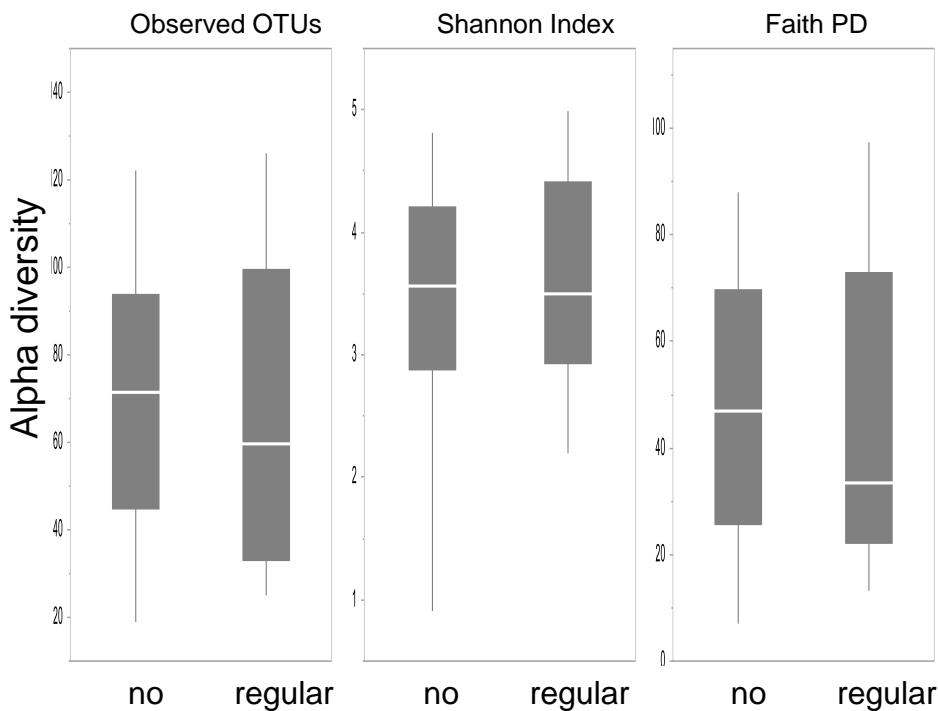




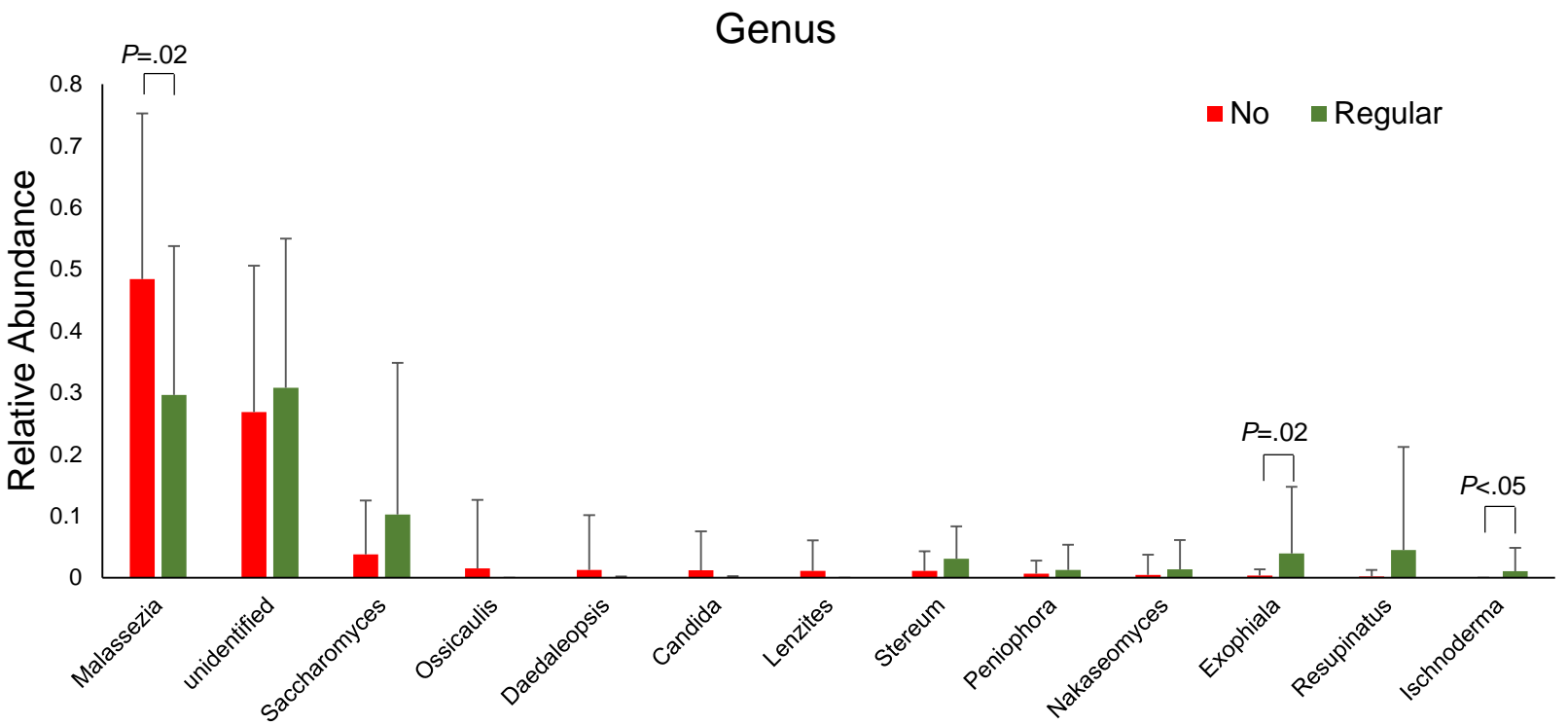
Genus



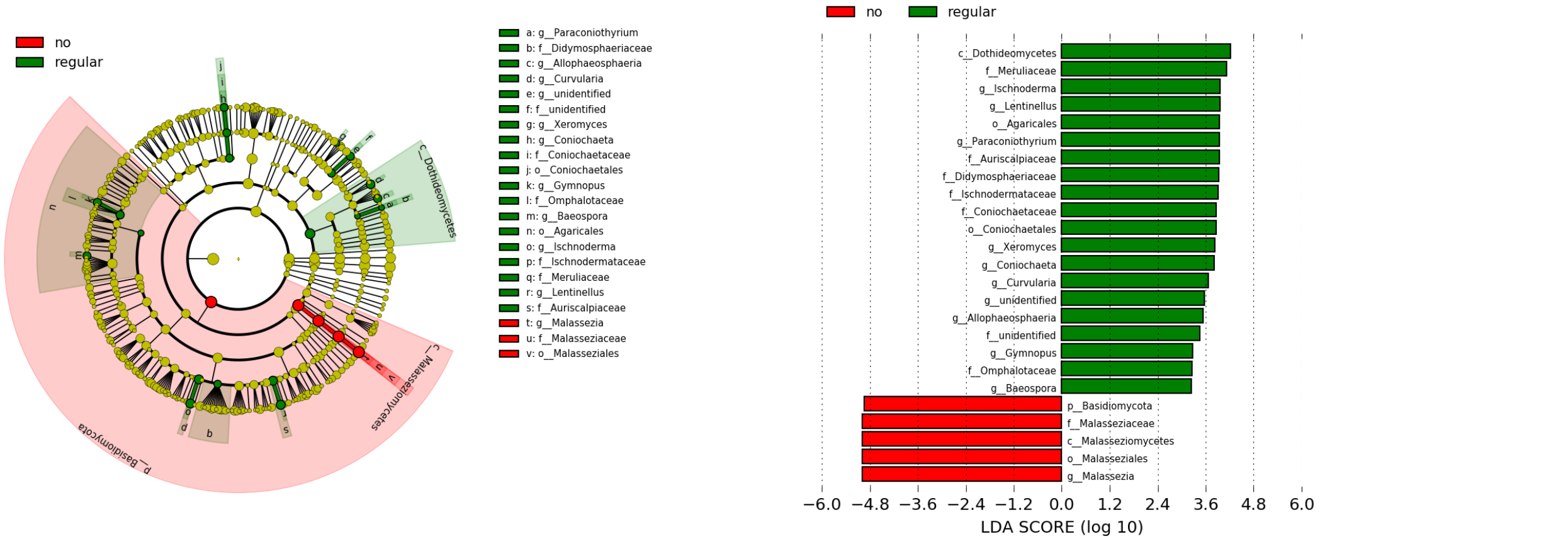
A

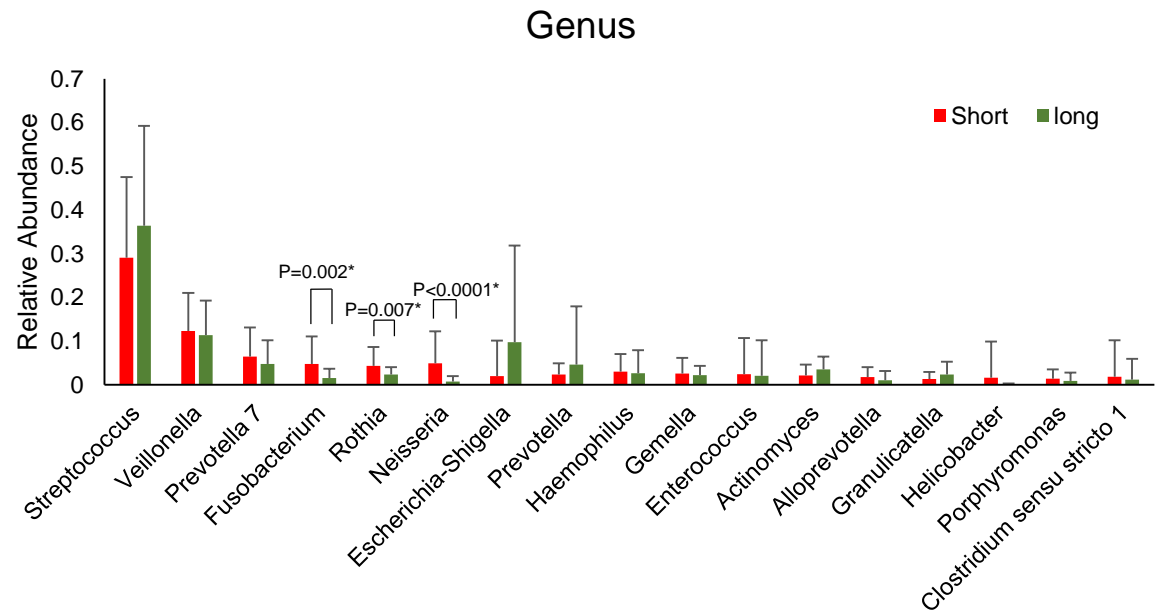
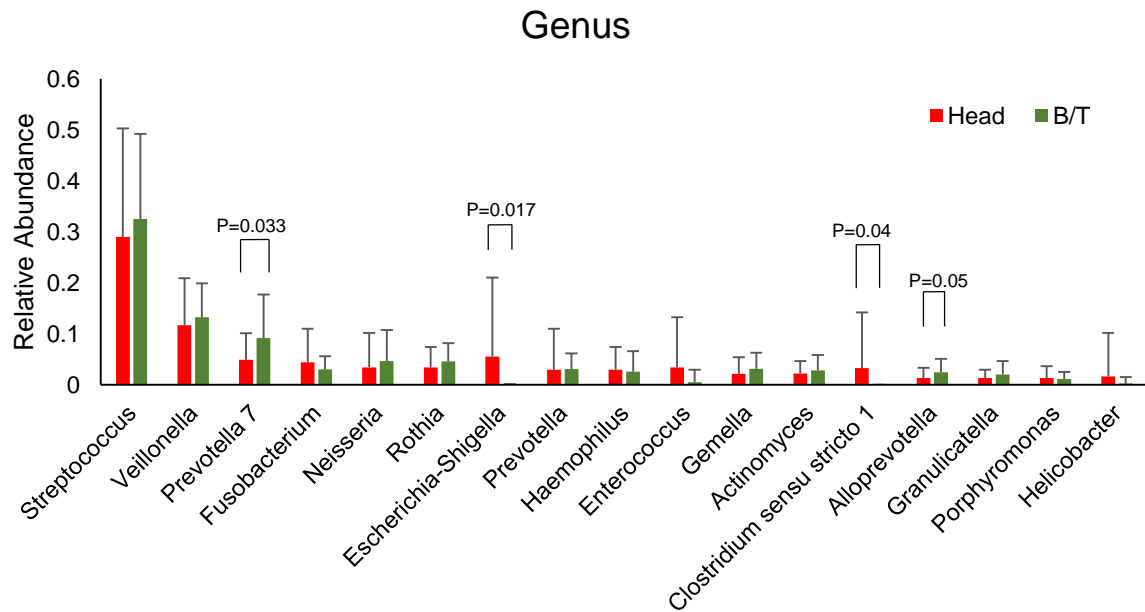
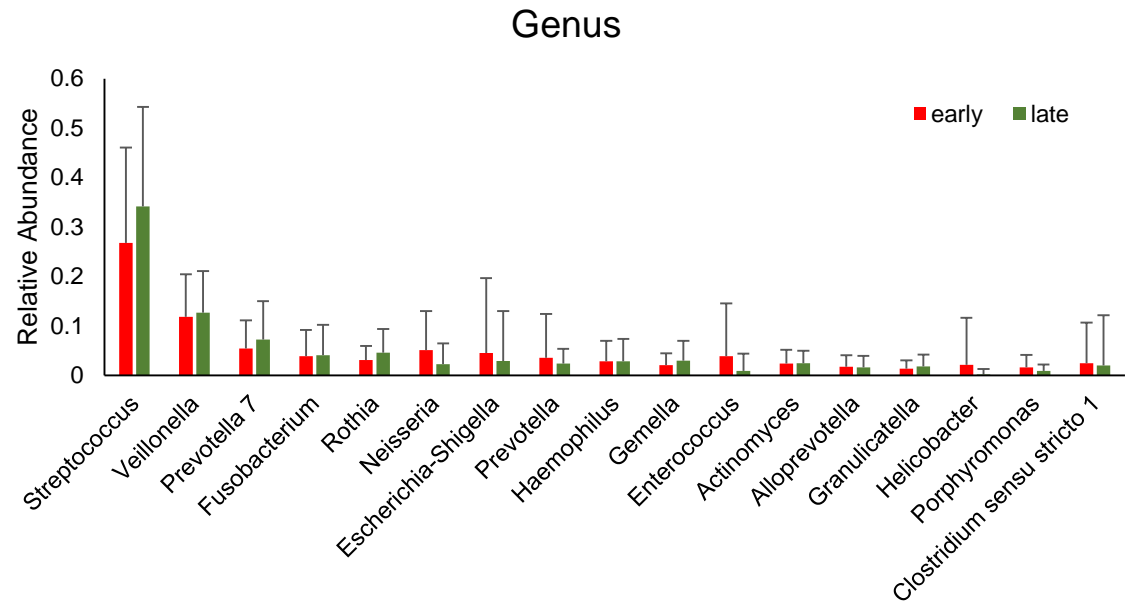
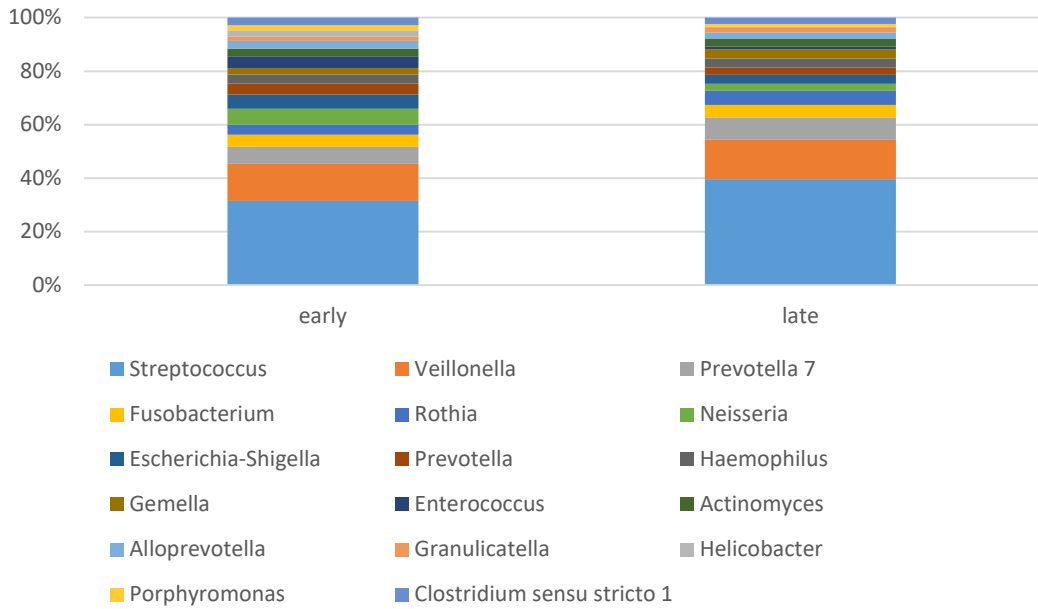


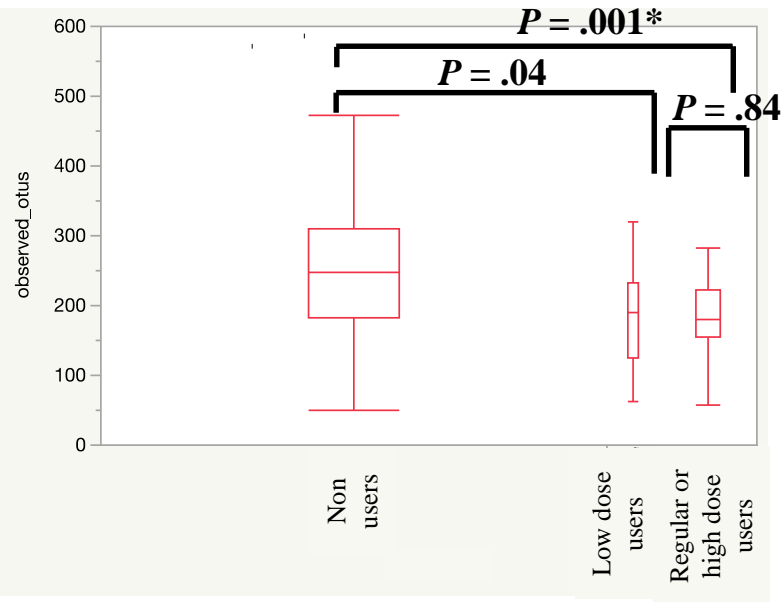
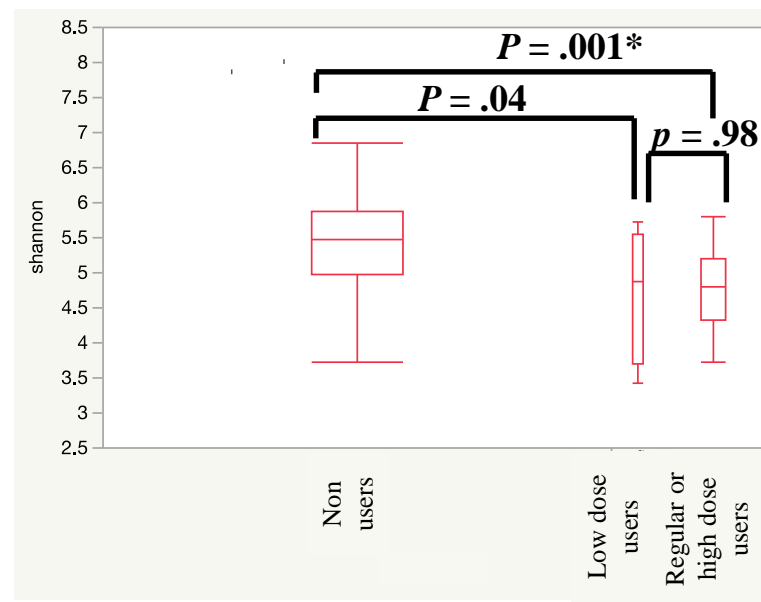
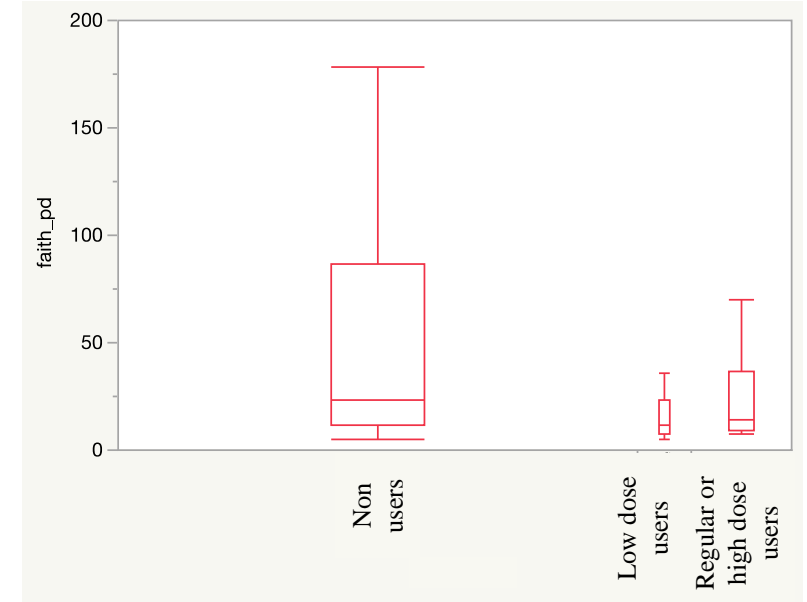
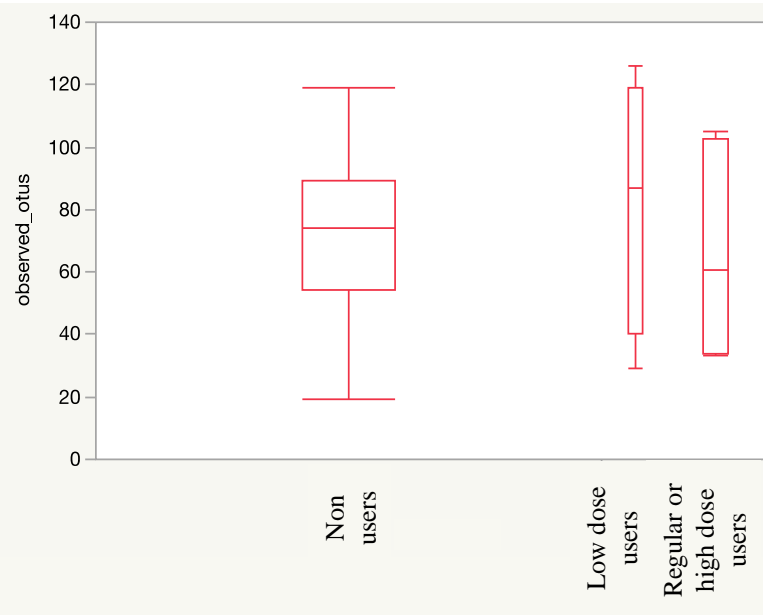
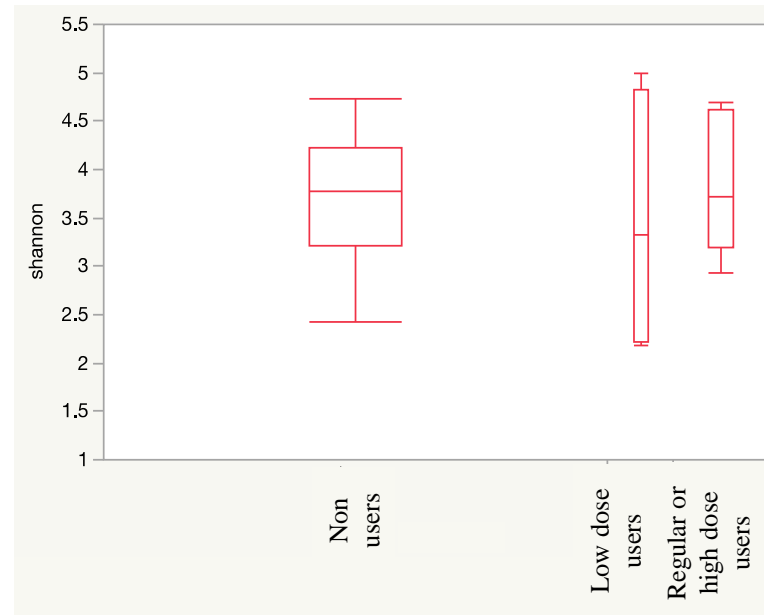
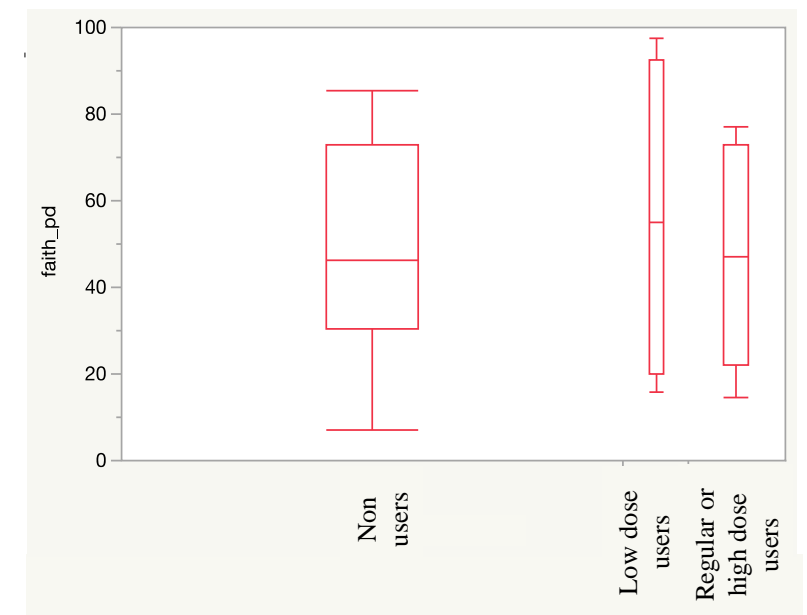
B

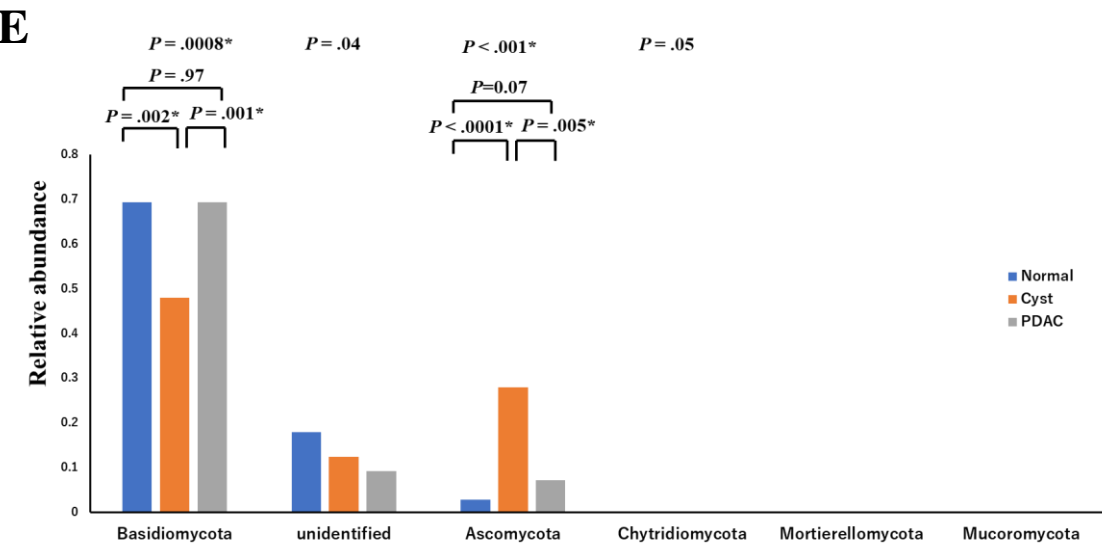
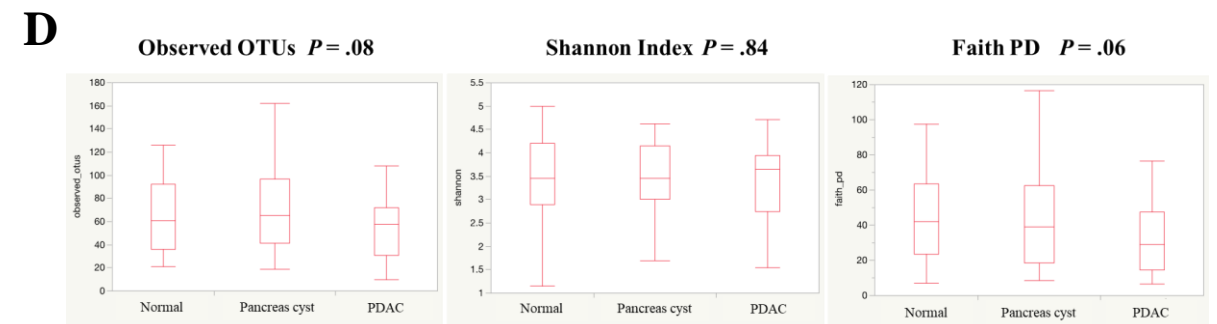
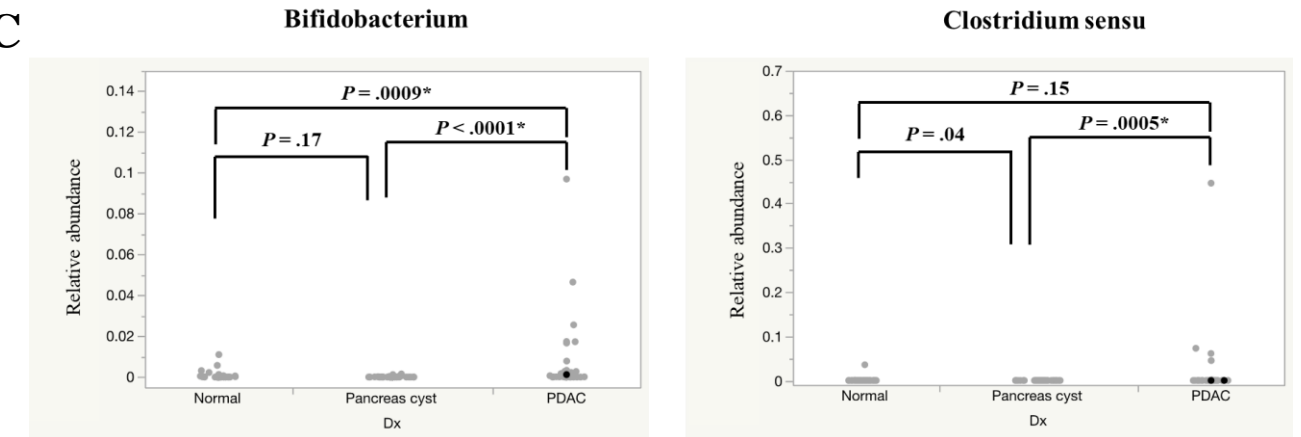
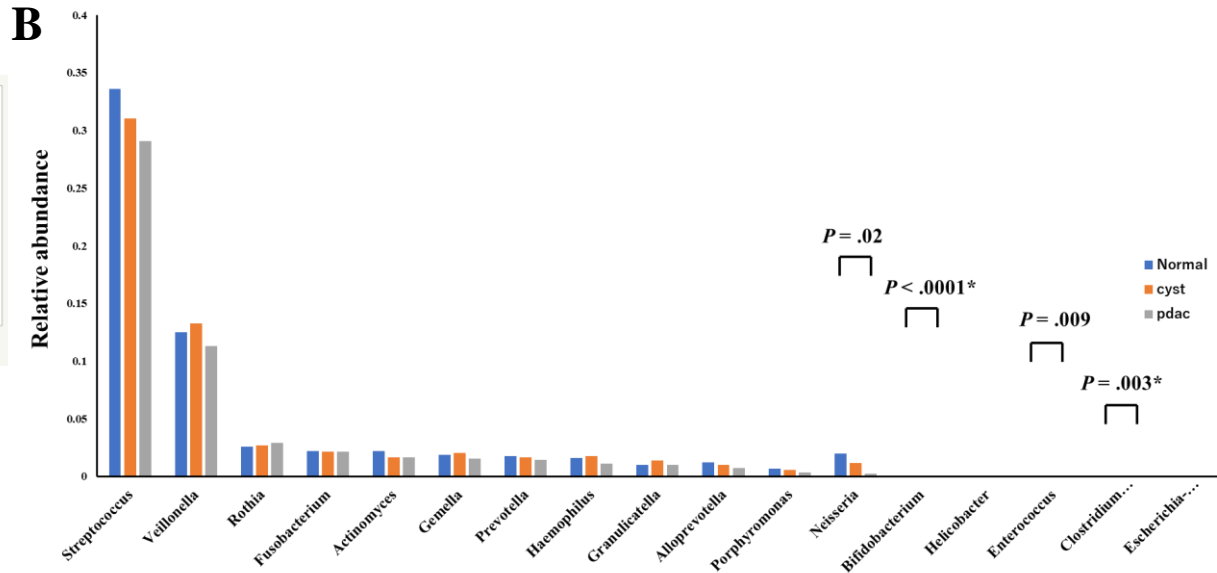
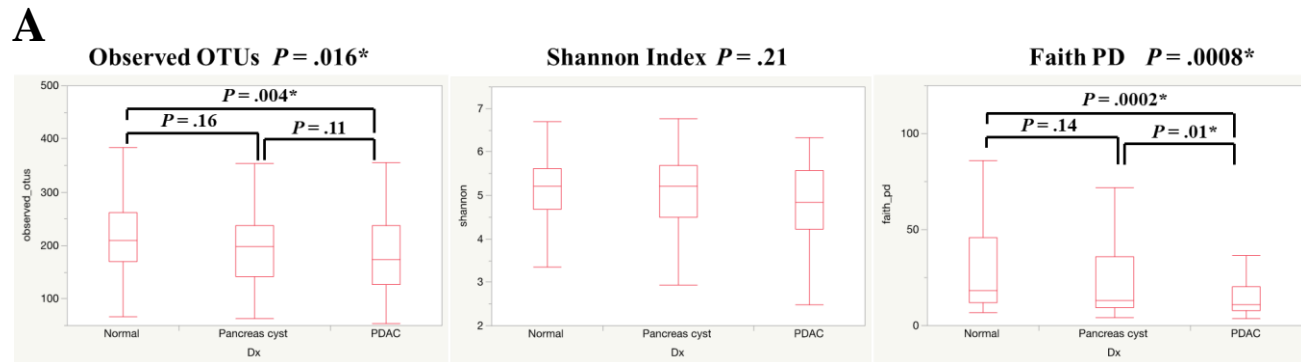


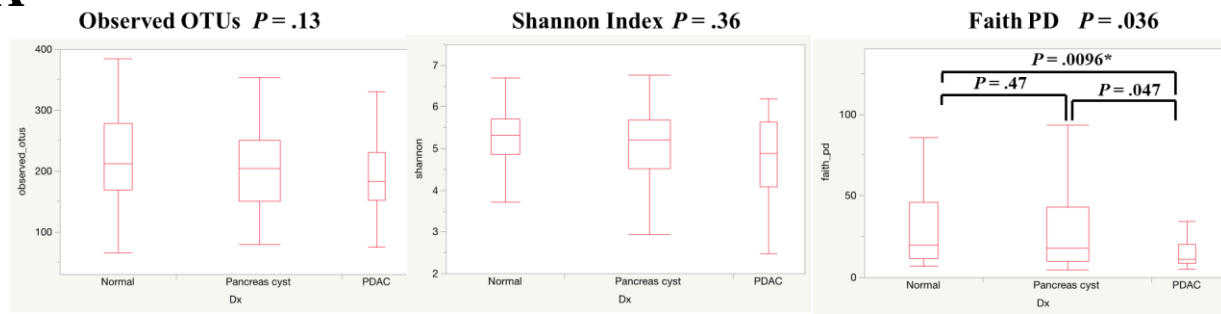
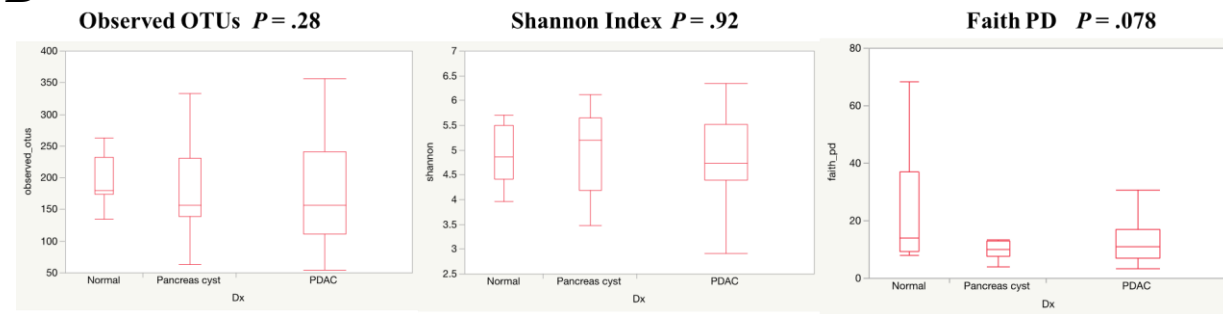
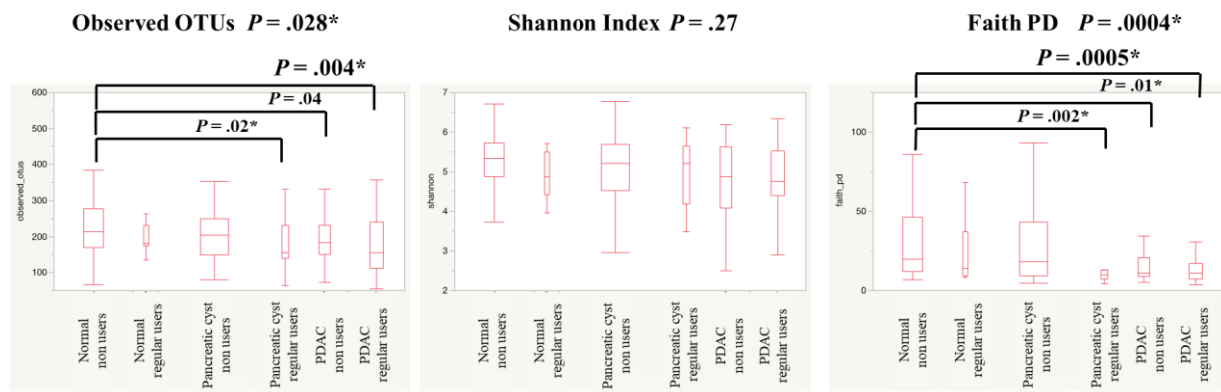
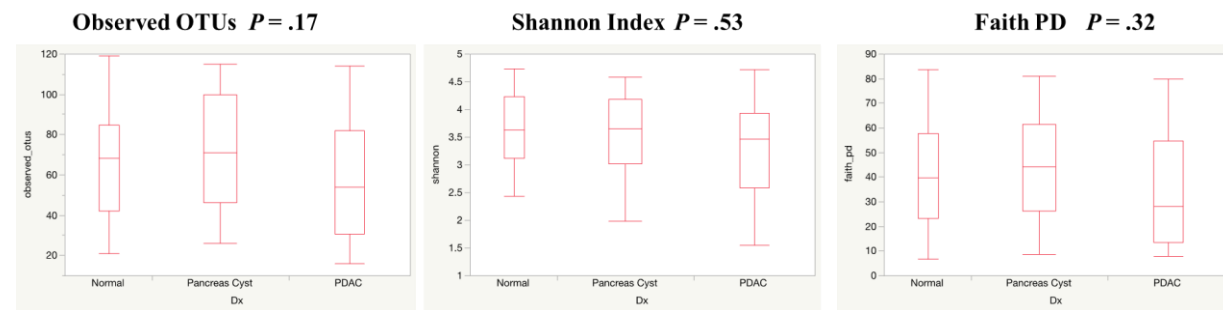
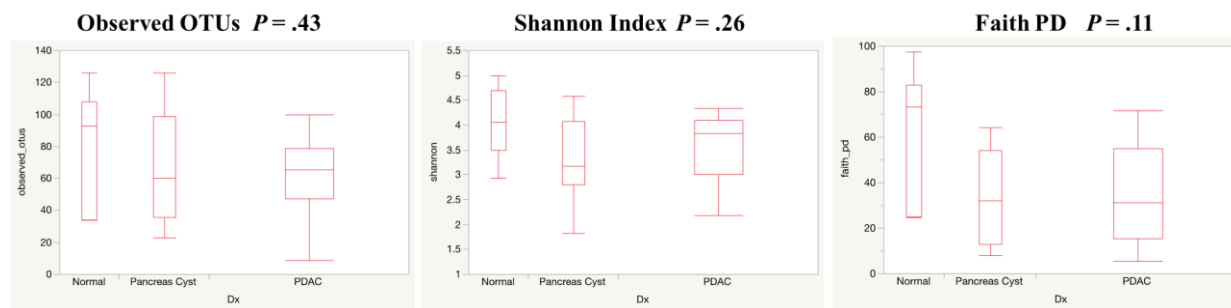
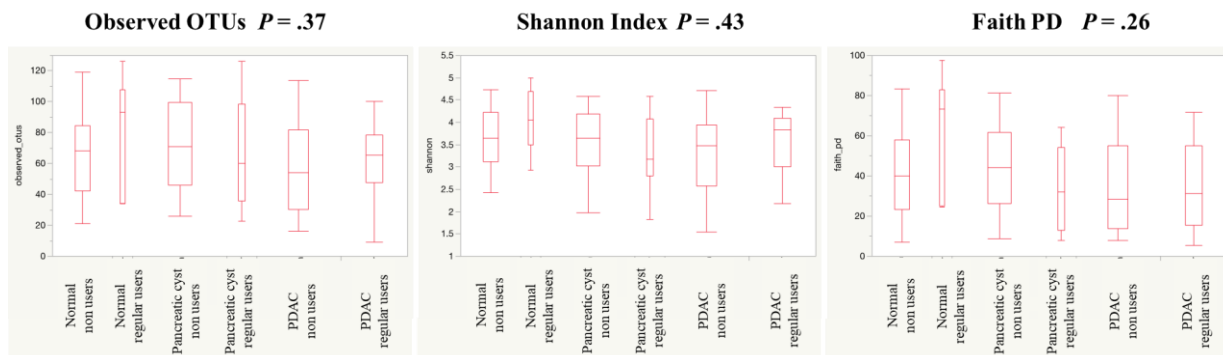
C

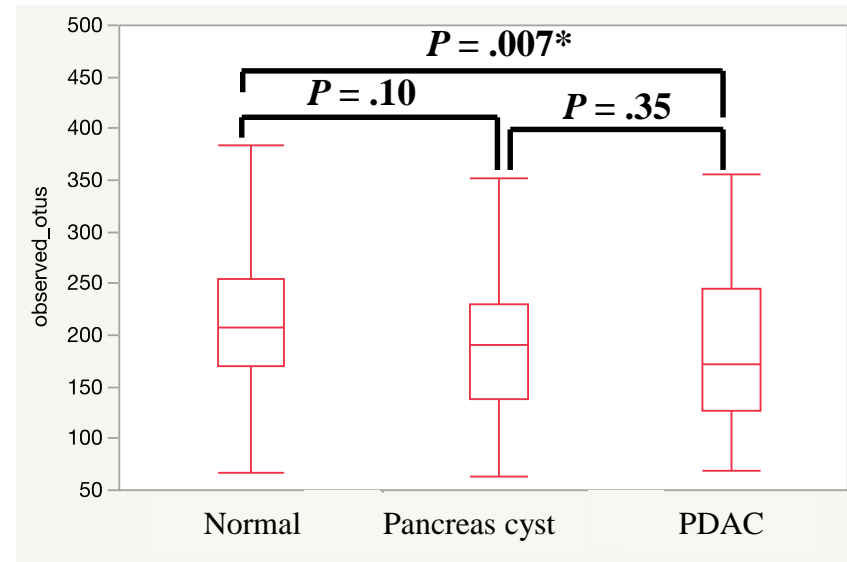
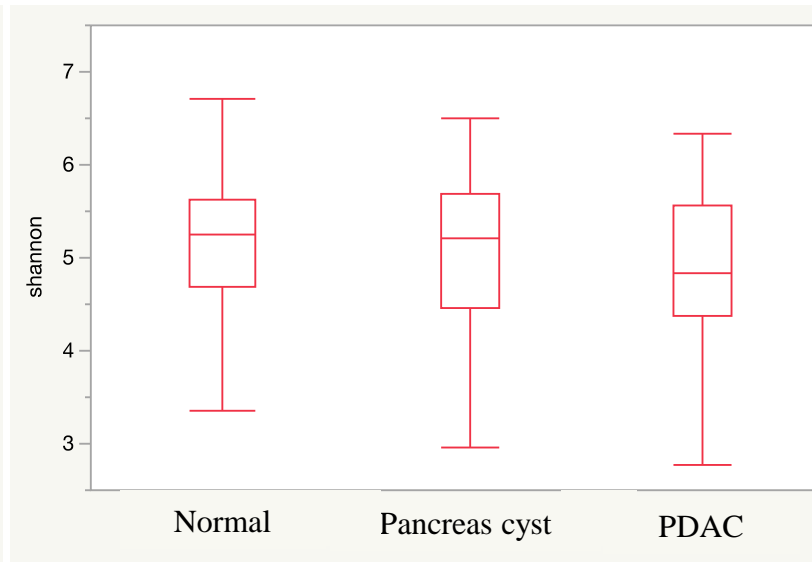
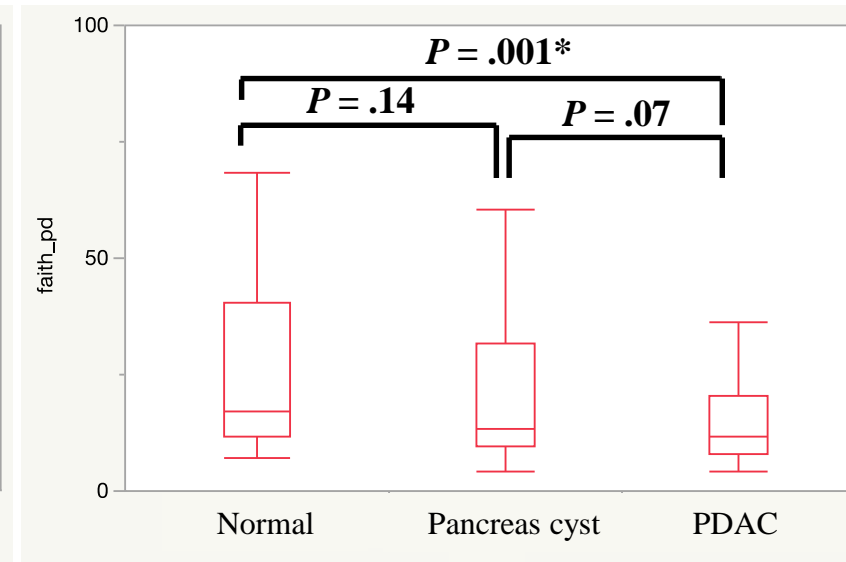
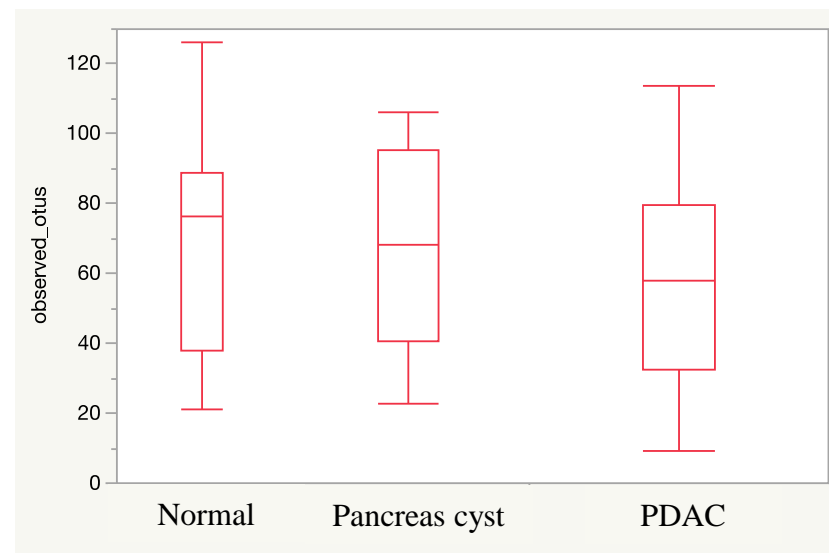
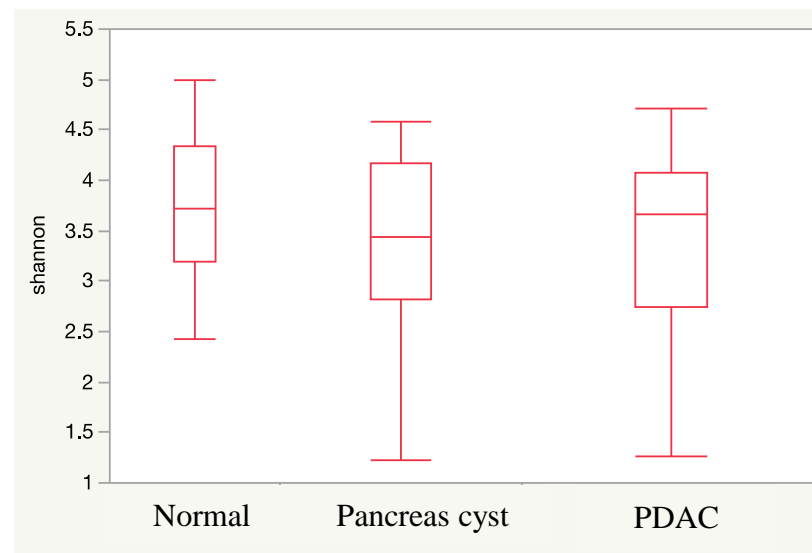




A**Observed OTUs** $P = .001^*$ **Shannon Index** $P = .001^*$ **Faith PD** $P = .06$ **B****Observed OTUs** $P = .78$ **Shannon Index** $P = .88$ **Faith PD** $P = .83$ 



A**B****C****D****E****F**

A**Observed OTUs** $P = .025^*$ **Shannon Index** $P = .23$ **Faith PD** $P = .004^*$ **B****Observed OTUs** $P = .21$ **Shannon Index** $P = .41$ **Faith PD** $P = .21$ 