

Table S1. AMOVA among gestational groups based on unweighted and weighted UniFrac distances

	SS	df	MS	Fs	<i>p</i> value
Unweighted					
G1-G2	0.559(32.359)	1(160)	0.559(0.202)	2.762	0.002
G1-G3	0.524(31.629)	1(160)	0.524(0.198)	2.651	0.007
G2-G3	0.333(31.177)	1(160)	0.333(0.195)	1.707	0.031
G1-G2-G3	0.944(47.583)	2(240)	0.472(0.198)	2.38	0.002
Weighted					
G1-G2	0.464(21.010)	1(160)	0.464(0.131)	3.53	0.006
G1-G3	0.453(20.994)	1(160)	0.453(0.131)	3.45	0.011
G2-G3	0.371(22.235)	1(160)	0.371(0.139)	2.667	0.023
G1-G2-G3	0.858(32.120)	2(240)	0.429(0.134)	3.205	0.003

G1, G2, and G3 stand for early, middle and late pregnancy, respectively.
 Bold numbers indicate a statistical significance ($p < 0.05$).

Table S2. Envfit fits the environmental factors onto Canonical correlation analysis (CCA) ordination plots.

	CCA1	CCA2	r ²	Pr(>r)
Age	0.695	-0.719	0.012	0.215
PreBMI	-0.713	0.701	0.007	0.414
GWG	0.970	0.243	0.015	0.152
Gravidity	0.369	0.929	0.012	0.214
Parity	-0.947	0.321	0.003	0.764
N.Fetus	0.868	0.496	0.005	0.425
FBG	-0.842	0.540	0.051	0.005
GW.S	-0.973	-0.229	0.077	0.000

GWG stands for gain weight during the whole pregnancy, N.Fetus stands for the number of fetuses, FBG stands for fasting blood glucose, GW.S stands for the gestational week of sampling.

Bold numbers indicate a statistical significance ($p < 0.05$).

Table S3A. Families of *Proteobacteria* phylum which were significantly correlated with FBG

	Zero correlation		Partial correlation*	
	r	<i>p</i> value	r	<i>p</i> value
<i>Pasteurellaceae</i>	-0.154	0.016	-0.132	0.043
<i>Rhodocyclaceae</i>	-0.146	0.023	-0.161	0.013
<i>Legionellaceae</i>	-0.138	0.032	-0.131	0.044
<i>Methylococcaceae</i>	-0.147	0.022	-0.160	0.013
<i>Neisseriaceae</i>	-0.122	0.057	-0.142	0.029

*adjusting for age, preBMI, GWG, gravidity, parity and N.Fetus

Bold numbers indicate a statistical significance ($p < 0.05$).

Table S3B. Genera of *Proteobacteria* phylum which were significantly correlated with FBG

	Zero correlation		Partial correlation*	
	r	p value	r	p value
<i>Advenella</i>	-0.150	0.019	-0.154	0.018
<i>Alcaligenes</i>	-0.128	0.047	-0.120	0.065
<i>Alkanindiges</i>	-0.126	0.050	-0.135	0.038
<i>Aquamicrobium</i>	-0.132	0.04	-0.139	0.033
<i>Aureimonas</i>	-0.154	0.017	-0.158	0.015
<i>Bartonella</i>	0.133	0.039	0.131	0.044
<i>Bdellovibrio</i>	-0.160	0.013	-0.150	0.021
<i>Buchnera</i>	-0.154	0.016	-0.157	0.016
<i>Candidatus_Accumulibacter</i>	-0.120	0.062	-0.133	0.041
<i>Candidatus_Portiera</i>	0.136	0.035	0.132	0.042
<i>Dyella</i>	-0.131	0.041	-0.119	0.067
<i>Elioraea</i>	0.135	0.036	0.135	0.039
<i>Enhydrobacter</i>	-0.147	0.022	-0.150	0.021
<i>Filomicrobium</i>	-0.134	0.037	0.017	0.791
<i>Gemmobacter</i>	-0.149	0.020	-0.159	0.014
<i>Legionella</i>	-0.138	0.032	-0.126	0.052
<i>Luteimonas</i>	-0.150	0.019	-0.159	0.015
<i>Massilia</i>	-0.139	0.030	-0.121	0.062
<i>Methylophilus</i>	-0.122	0.058	-0.133	0.041
<i>Neisseria</i>	-0.116	0.072	-0.129	0.048
<i>Oceanibaculum</i>	0.148	0.021	0.165	0.011
<i>Pantoea</i>	-0.144	0.025	-0.132	0.042
<i>Photobacterium</i>	-0.127	0.047	-0.134	0.040
<i>Polymorphobacter</i>	-0.127	0.048	-0.128	0.050
<i>Porticoccus</i>	0.130	0.043	0.140	0.031
<i>Propionivibrio</i>	-0.157	0.014	-0.170	0.009

<i>Proteus</i>	-0.139	0.030	-0.136	0.036
<i>Providencia</i>	-0.129	0.045	-0.127	0.051
<i>Pseudoalteromonas</i>	0.112	0.081	0.129	0.047
<i>Psychroglacielcola</i>	-0.143	0.025	-0.138	0.034
<i>Rhodoligotrophos</i>	-0.144	0.025	-0.140	0.031
<i>Roseiarcus</i>	-0.139	0.030	-0.130	0.045
<i>Skermanella</i>	-0.145	0.024	-0.140	0.031
<i>Undibacterium</i>	0.129	0.044	0.120	0.066
<i>unidentified_Sandaracinaceae</i>	-0.129	0.045	-0.134	0.039
<i>unidentified_Xanthomonadacea</i>	-0.140	0.029	-0.155	0.017

*adjusting for age, preBMI, GWG, gravidity, parity and N.Fetus

Bold numbers indicate a statistical significance ($p < 0.05$).

Table S4. Changes in FBG levels in the GDM+ and GDM- groups

	GDM-(n=67)	GDM+(n=14)	<i>p</i> value
G1	4.672±0.384	4.979±0.387	0.015
G2	4.563±0.324 ^a	4.893±0.345 ^b	0.004
G3	4.985±0.575 ^{c e}	5.350±0.658 ^{d f}	0.029

G1, G2, and G3 stand for early, middle and late pregnancy, respectively.

Differences between the GDM+ group and GDM- group were calculated with the Mann-Whitney U-test.

Changes in FBG levels between trimesters in both groups were evaluated by the paired T test. compared to G1: ^a $p=0.029$, ^b $p=0.342$, ^c $p=0.000$, ^d $p=0.030$; compared to G2: ^e $p=0.000$, ^f $p=0.006$

Bold numbers indicate a statistical significance ($p < 0.05$).

Table S5. Comparisons of Chao1 and Shannon indexes between the GDM+ and GDM- groups.

Indexes	GDM-	GDM+	<i>p</i> value
Chao1			
G1	1379.931±931.749	1527.710±1048.409	0.589
G2	1394.374±673.488	1203.397±543.066	0.382
G3	1295.5829±613.952	1122.599±463.611	0.549
Shannon			
G1	6.122±1.020	6.379±0.774	0.226
G2	5.989±0.794	5.938±1.231	0.484
G3	5.996±0.941	6.084±0.909	0.842

G1, G2, and G3 stand for early, middle and late pregnancy, respectively.

Differences between the GDM+ group and the GDM- group were calculated with the Mann-Whitney U-test.

Table S6. AMOVA between the GDM+ and GDM- groups based on unweighted and weighted UniFrac distances

		SS	df	MS	Fs	<i>p</i> value
Unweighted						
	G1	0.163(16.242)	1(79)	0.163(0.206)	0.792	0.684
	G2	0.205(15.748)	1(79)	0.205(0.199)	1.03	0.38
	G3	0.147(15.077)	1(79)	0.147(0.191)	0.771	0.783
Weighted						
	G1	0.269(9.615)	1(79)	0.269(0.122)	2.211	0.065
	G2	0.145(10.980)	1(79)	0.145(0.139)	1.045	0.375
	G3	0.109(11.001)	1(79)	0.109(0.139)	0.783	0.545

G1, G2, and G3 stand for early, middle and late pregnancy, respectively.

Table S7. AMOVA between gestational groups based on unweighted and weighted UniFrac distances in GDM-women

	SS	df	MS	Fs	<i>p</i> value
Unweighted					
G1-G2	0.523(26.700)	1(132)	0.559(0.202)	2.587	0.003
G1-G3	0.435(26.062)	1(132)	0.435(0.197)	2.205	0.013
G2-G3	0.351(25.856)	1(132)	0.351(0.196)	1.792	0.023
G1-G2-G3	0.873(39.309)	2(198)	0.437(0.199)	2.199	0.001
Weighted					
G1-G2	0.544(17.334)	1(132)	0.544(0.131)	4.142	0.002
G1-G3	0.590(17.538)	1(132)	0.590(0.133)	4.437	0.001
G2-G3	0.325(18.008)	1(132)	0.325(0.133)	4.437	0.046
G1-G2-G3	0.972(26.44)	2(198)	0.486(0.134)	3.64	0.001

G1, G2, and G3 stand for early, middle and late pregnancy, respectively.
 Bold numbers indicate a statistical significance ($p < 0.05$).

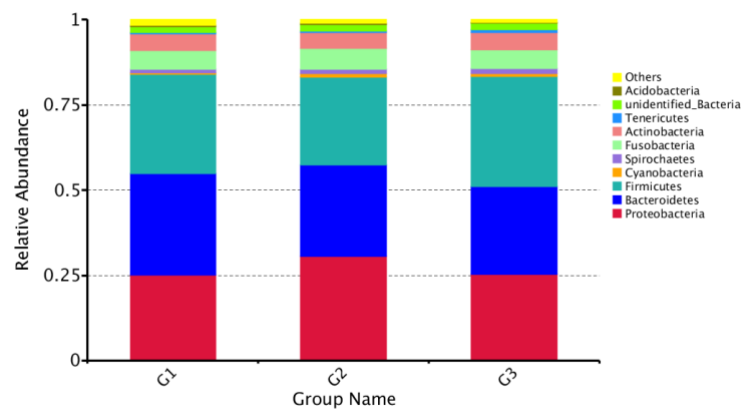


Figure S1. Compositions of the top 10 phyla in three gestational stages. G1, G2, and G3 stands for early, middle and late pregnancy, respectively.

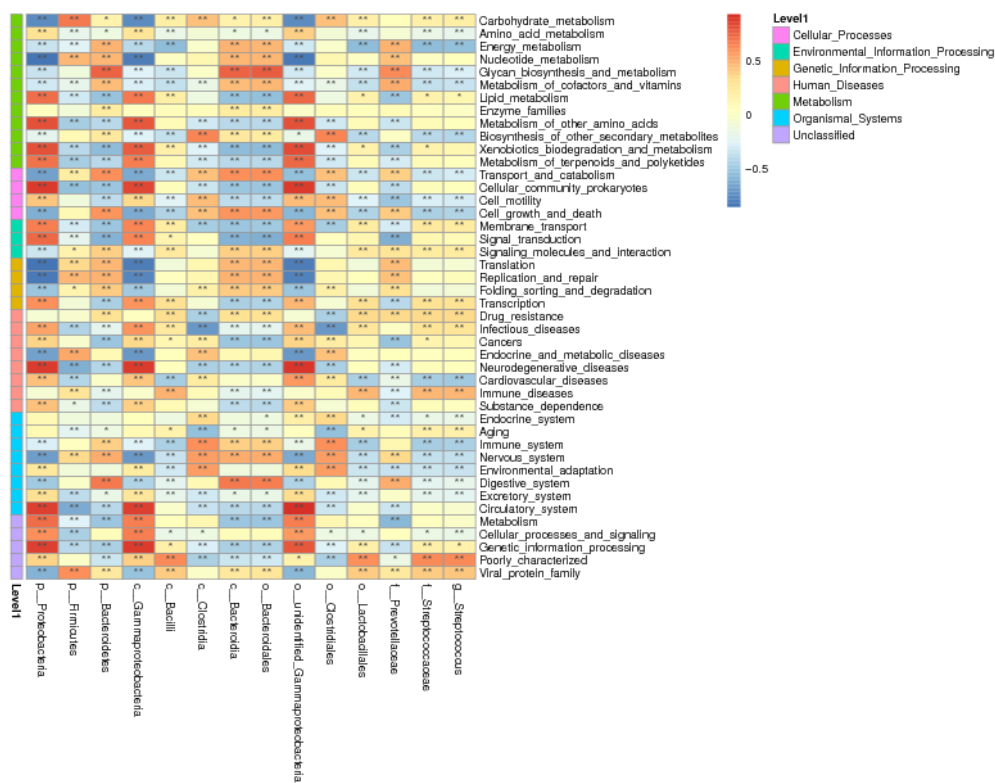


Figure S2. Spearman analysis of the associations between the differentially expressed taxa and important pathways during pregnancy

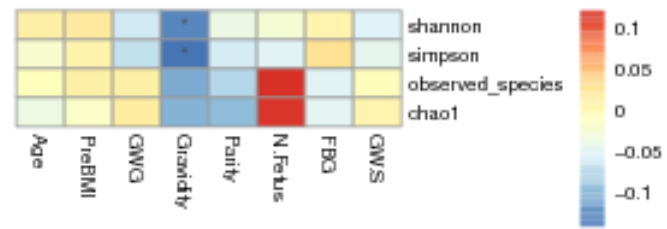


Figure S3. Spearman correlations of various alpha diversity indexes with maternal clinical characteristics