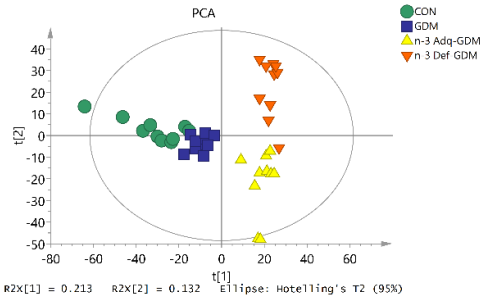
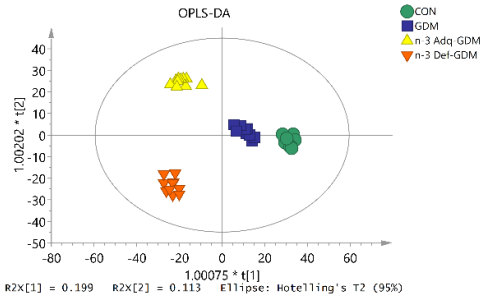
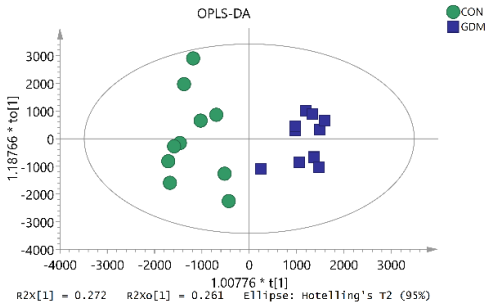
Supplementary Figure S1. Score plots of PCA and OPLS-DA of all groups and pairwise OPLS-DA between groups and corresponding permutation tests of liver when offspring grew to 11 months old. n=8 ~ 10 rats/group.



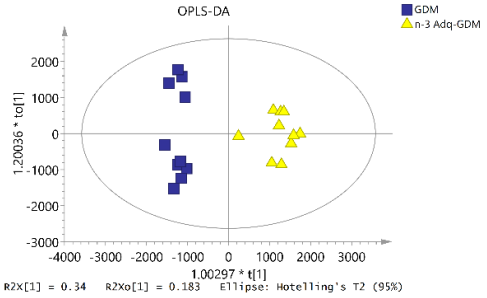
(PCA)



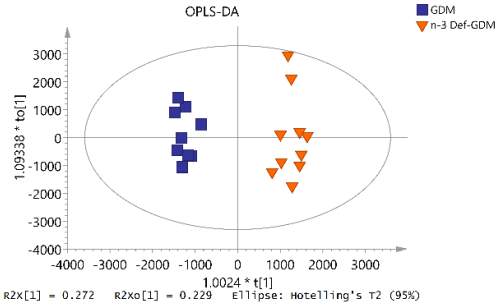
(OPLS-DA)



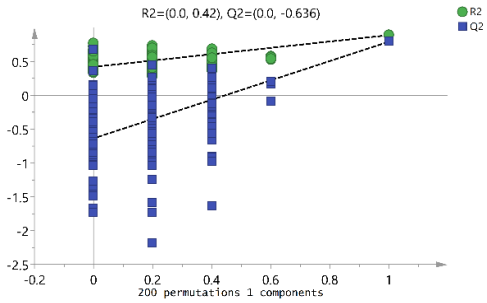
(OPLS-DA (GDM vs. Con))



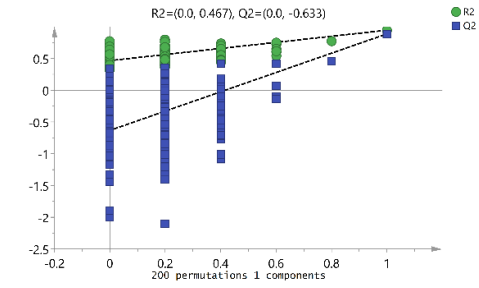
(OPLS-DA (n-3 Adq-GDM vs. GDM))



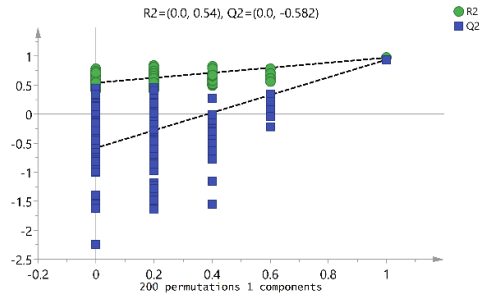
(OPLS-DA (n-3 Def-GDM vs. GDM))



(Permutation test (GDM vs. Con))

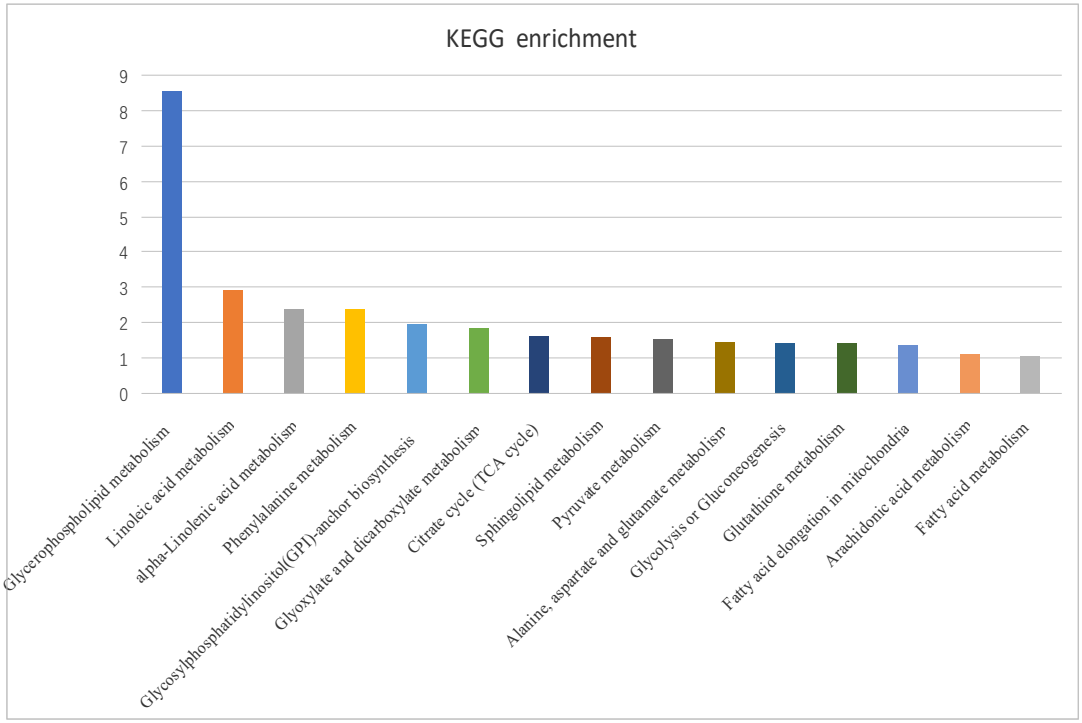


(Permutation test (n-3 Adq-GDM vs. GDM))

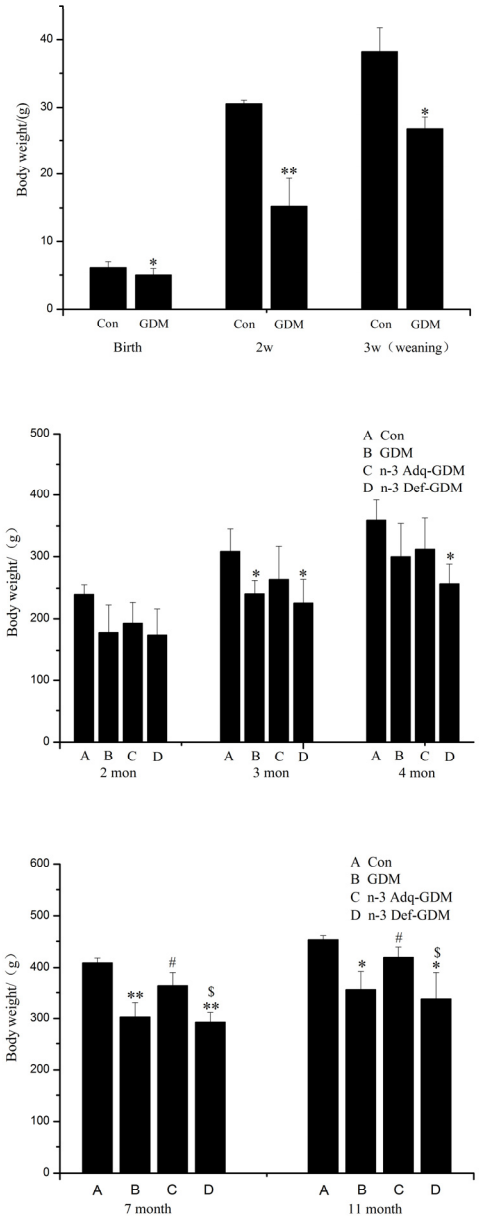


(Permutation test (n-3 Def-GDM vs. GDM))

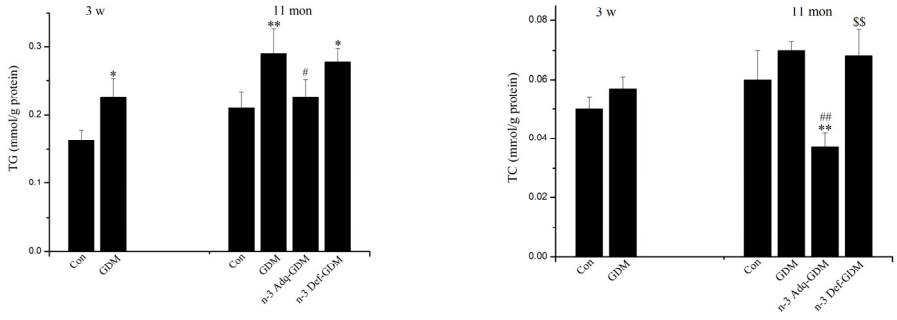
Supplementary Figure S2. Metabolic pathway enrichment maps of liver of offspring at 11 months old based on changed metabolites between GDM offspring vs Control offspring



Supplementary Figure S3. Effect of n-3 PUFA on body weight of gestational diabetes mellitus (GDM) offspring. Bars are mean ±SD. n=8 ~ 12 offspring rats/group. *P<0.05, **P<0.01, vs Control offspring (Con); $^{\#}$P<0.05, vs GDM offspring (GDM); $^{\$}$P<0.05, vs n-3 Adequate-GDM offspring (n-3 Adq-GDM).



Supplementary Figure S4. Effect of n-3 PUFA on TG and TC in liver of gestational diabetes mellitus (GDM) offspring. (A) TG; (B) TC. Bars are mean ±SD. n=8 ~ 10 offspring rats/group. *P<0.05, **P<0.01, vs Control offspring (Con); $^{\#}$P<0.05, $^{\#\#}$P<0.01, vs GDM offspring (GDM); $^{\$\$}$P<0.01, vs n-3 Adequate-GDM offspring (n-3 Adq-GDM).



(A) (**B**)

Supplementary Table S1. R^2Y and Q^2Y of pairwise OPLS-DA model.

	GDM vs. Con	**n-3 Adq-GDM vs. GDM**	**n-3 Def-GDM vs. GDM**
Liver	R^2Y:0.88, Q^2Y:0.79	R^2Y:0.94, Q^2Y:0.88	R^2Y:0.97, Q^2Y:0.93

Supplementary Table S2. Metabolites altered in liver of GDM offspring at 11 months old and modulating effects of n-3 PUFA.

Identification	RT (Min)	m/z	Change trend		
			GDM vs Con	n-3adq vs GDM	n-3def vs GDM
1-[4,9-Dihydro-2-(methylthio)-1,3-thiazino[6,5-b]indol-4-yl]-2-propanone	0.83	162.0271	↓	↑ **	-
1-Arachidonoylglycerophosphoinositol	12.22	643.2902	↑	↓ *	-
2-Hydroxy-4-oxo-5,12-heneicosadien-1-yl acetate	17.68	761.5907	↑	↓ *	-
Arginyl-Glutamic acid	9.00	616.1801	↑	↓ *	-
D-altro-D-manno-Heptose	0.83	233.0610	↓	↑ **	↑ **
Glutathione	0.83	308.0888	↓	↑ **	-
Isopetasoside	16.52	397.2217	↑	↓ *	-
LysoPC(22:6(4Z,7Z,10Z,13Z,16Z,19Z))	11.54	568.3379	↓	↑ **	↓ **
LysoPC(P-18:1(9Z))	14.08	506.3663	↑	↓ **	↓ **
MG(0:0/20:5(5Z,8Z,11Z,14Z,17Z)/0:0)	14.47	377.2693	↑	↓ **	-
N2-Fructopyranosylarginine	16.52	96.0324	↑	↓ *	↑ **
N-Ethyl trans-2-cis-6-nonadienamide	8.23	464.2876	↑	↓ *	↓ **
Nitrate	18.01	84.9775	↑	↓ **	↓ **
PC(14:0/18:0)	17.74	756.5515	↑	↓ *	-
PC(14:0/18:2(9Z,12Z))	17.45	752.5449	↑	↓ *	-
PC(14:0/20:3(5Z,8Z,11Z))	17.02	756.5533	↑	↓ **	-
PC(16:0/18:2(9Z,12Z))	13.71	780.5536	↓	↑ **	↑ *
PC(16:0/22:4(7Z,10Z,13Z,16Z))	17.97	832.5796	↑	↓ **	-
PC(16:0/22:5(7Z,10Z,13Z,16Z,19Z))	16.69	830.5665	↑	↓ **	-
PE(14:0/22:2(13Z,16Z))	16.01	744.5584	↑	↓ *	-
PE(18:3(6Z,9Z,12Z)/P-18:1(11Z))	16.64	724.5284	↑	↓ *	-
PE(20:3(5Z,8Z,11Z)/P-18:1(11Z))	16.01	769.5569	↑	↓ **	-
PE(O-16:1(1Z)/22:6(4Z,7Z,10Z,13Z,16Z,19Z))	16.71	748.5318	↓	↑ **	-
PE-NMe(18:2(9Z,12Z)/18:1(11Z))	14.04	756.5553	↑	↓ *	-
PS(22:2(13Z,16Z)/15:0)	17.78	824.5396	↑	↓ *	-
2,5-Dichloro-4-oxohex-2-enedioate	17.91	226.9504	↑	-	↓ **

2,8-Dihydroxyadenine	0.79	116.0814	↑	-	-
Adenosine monophosphate	0.83	348.0719	↑	-	-
Dihydroasparagusic acid	18.23	96.9773	↓	-	-
Hexyl benzoate	10.15	583.3291	↑	-	-
LysoPC(15:0)	14.02	482.3192	↓	-	↓*
LysoPC(16:0)	11.95	496.3401	↑	-	-
LysoPC(18:0)	13.71	524.3702	↓	-	-
LysoPC(18:1(9Z))	12.70	522.3575	↓	-	↓**
LysoPE(0:0/18:0)	13.67	482.3279	↓	-	-
LysoPE(0:0/20:2(11Z,14Z))	11.89	528.3044	↓	-	↓**
LysoPE(18:0/0:0)	13.67	341.3063	↓	-	↓*
MG(0:0/18:1(11Z)/0:0)	15.88	379.2849	↓	-	↓**
N2-Fructopyranosylarginine	14.20	337.1706	↑	-	-
Palmitic acid	8.64	274.2722	↑	-	-
PC(18:0/18:3(9Z,12Z,15Z))	15.59	784.5858	↓	-	↑*
PC(18:0/22:6(4Z,7Z,10Z,13Z,16Z,19Z))	17.02	856.5822	↓	-	-
PC(18:0/P-18:1(11Z))	16.01	794.6018	↑	-	-
PE(14:0/22:4(7Z,10Z,13Z,16Z))	17.04	762.5082	↓	-	-
PE(15:0/24:0)	15.97	812.6143	↓	-	-
PE(16:0/20:4(5Z,8Z,11Z,14Z))	17.04	144.9913	↓	-	↓**
PE(16:0/22:4(7Z,10Z,13Z,16Z))	16.12	790.5354	↓	-	-
PE(20:3(5Z,8Z,11Z)/22:5(4Z,7Z,10Z,13Z,16Z))	15.04	833.5901	↓	-	-
PE(P-16:0e/0:0)	12.70	438.3024	↓	-	↓*
PE-NMe(18:0/20:1(11Z))	14.29	810.5989	↓	-	-
PE-NMe(18:3(9Z,12Z,15Z)/20:0)	17.45	784.5837	↑	-	↑**
PE-NMe2(18:1(9Z)/18:1(9Z))	17.20	772.5825	↑	-	↑*
PG(16:0/18:1(11Z))	15.59	766.5679	↓	-	-
PGP(18:0/22:4(7Z,10Z,13Z,16Z))	17.80	929.5263	↑	-	-
PS(16:0/16:0)	16.21	736.5092	↓	-	↓*
SM(d18:0/16:1(9Z))	17.74	725.5534	↑	-	↑**

TG(8:0/i-16:0/i-17:0)	15.59	731.6100	↓	-	-
25-Acetylvulgaroside 25	11.56	479.2993	↓	↓ *	-
Araliacerebroside	16.69	732.5555	↑	↑ *	↑ *
Lysyl-Methionine	13.25	555.2979	↑	↑ **	-
Oleamide	15.63	265.2553	↓	↓ **	↓ **
PA(20:4(5Z,8Z,11Z,14Z)/24:1(15Z))	17.06	824.6194	↓	↓ *	↓ *
PC(16:0/22:6(4Z,7Z,10Z,13Z,16Z,19Z))	17.32	828.5448	↑	↑ **	↑ *
PC(DiMe(9,3)/DiMe(9,3))	15.57	833.5899	↓	↓ **	-
Tryptophyl-Proline	12.20	603.2981	↓	↓ *	-

The " ↑ " and " ↓ " arrows represent a significant increasing or decreasing trend of metabolites of GDM offspring. Green arrows show modulating effect on altered metabolites, and the red shows aggravating result. "-" means no significant change. *P<0.05, **P<0.01, vs GDM offspring.