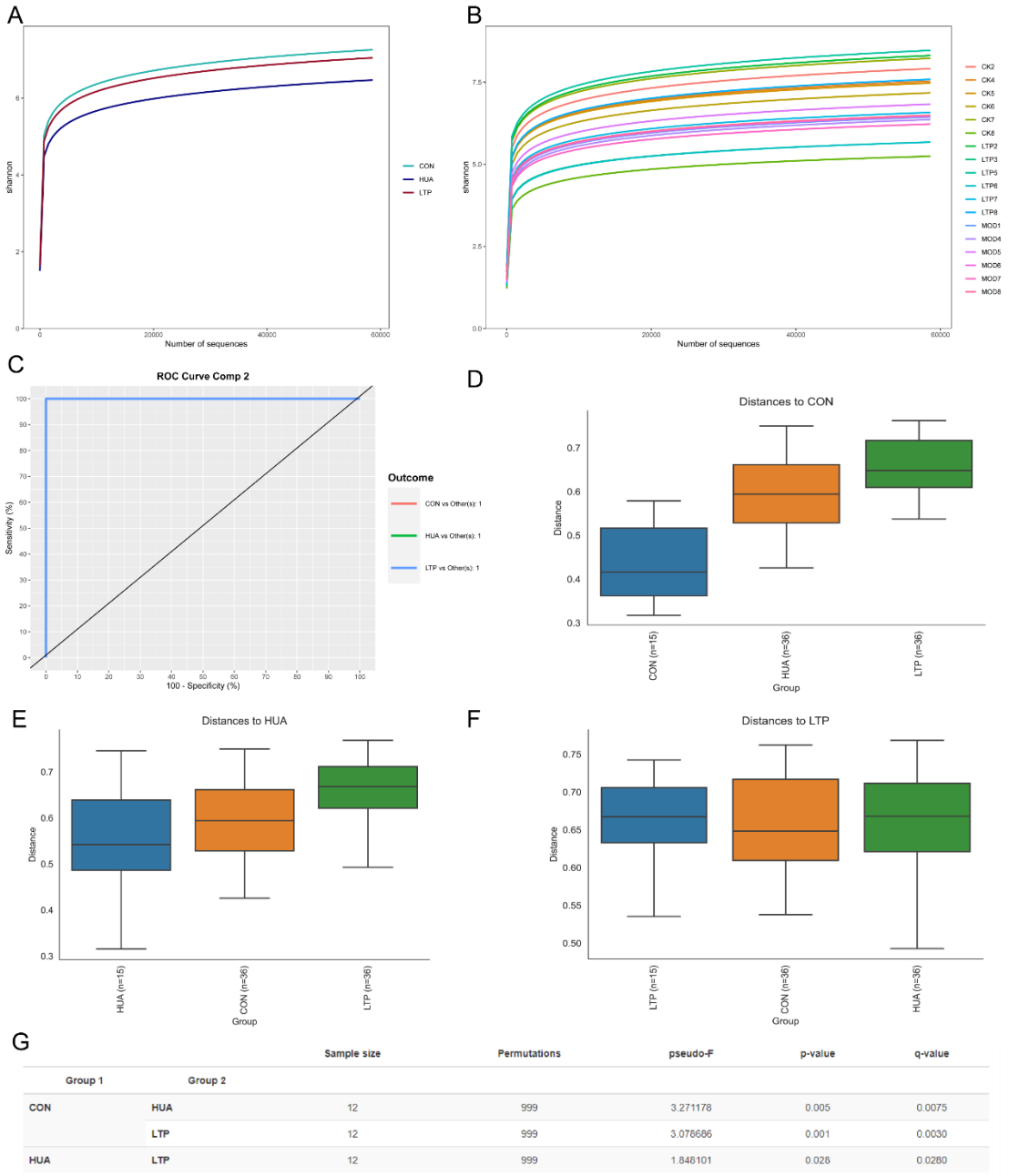
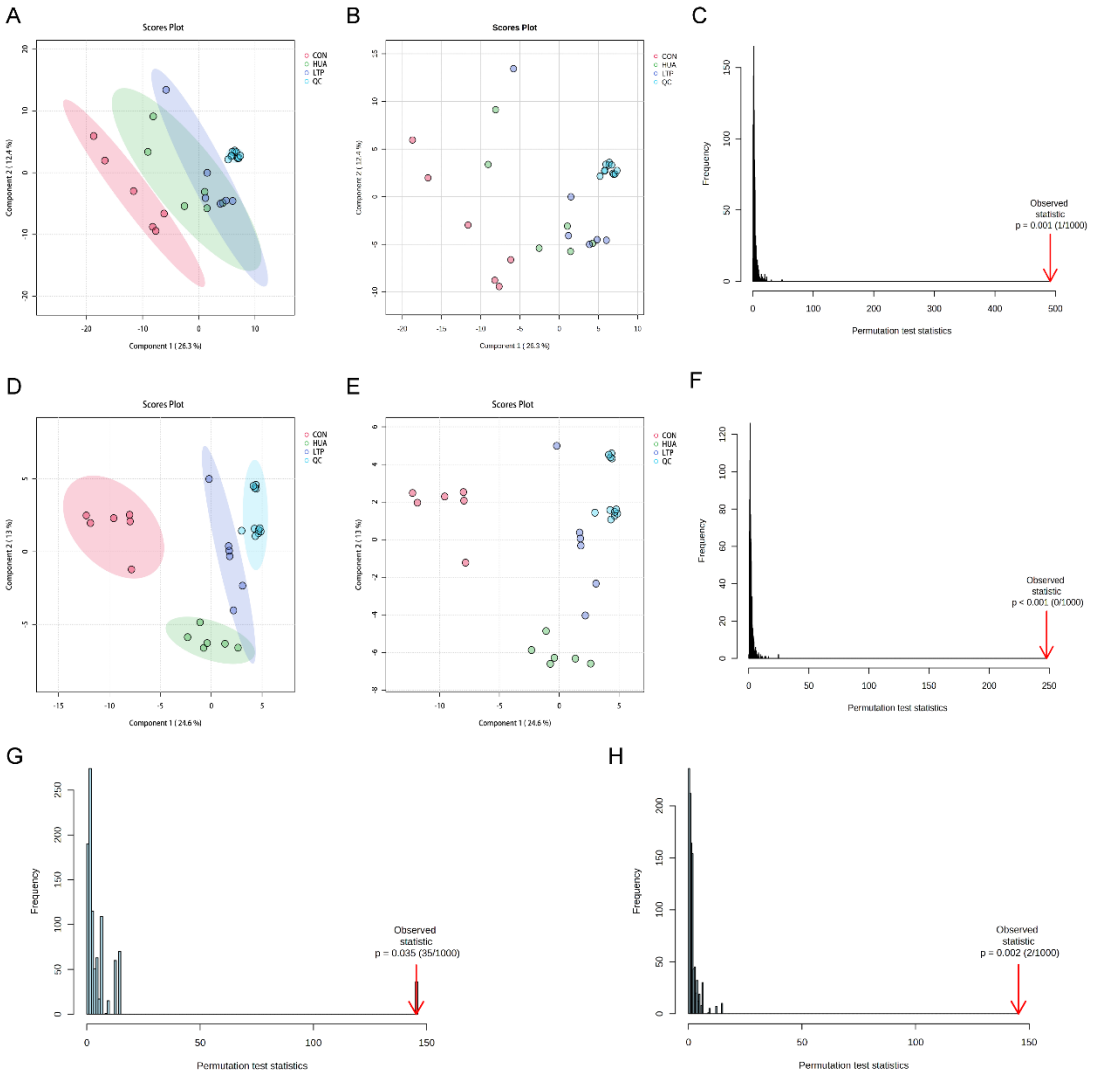
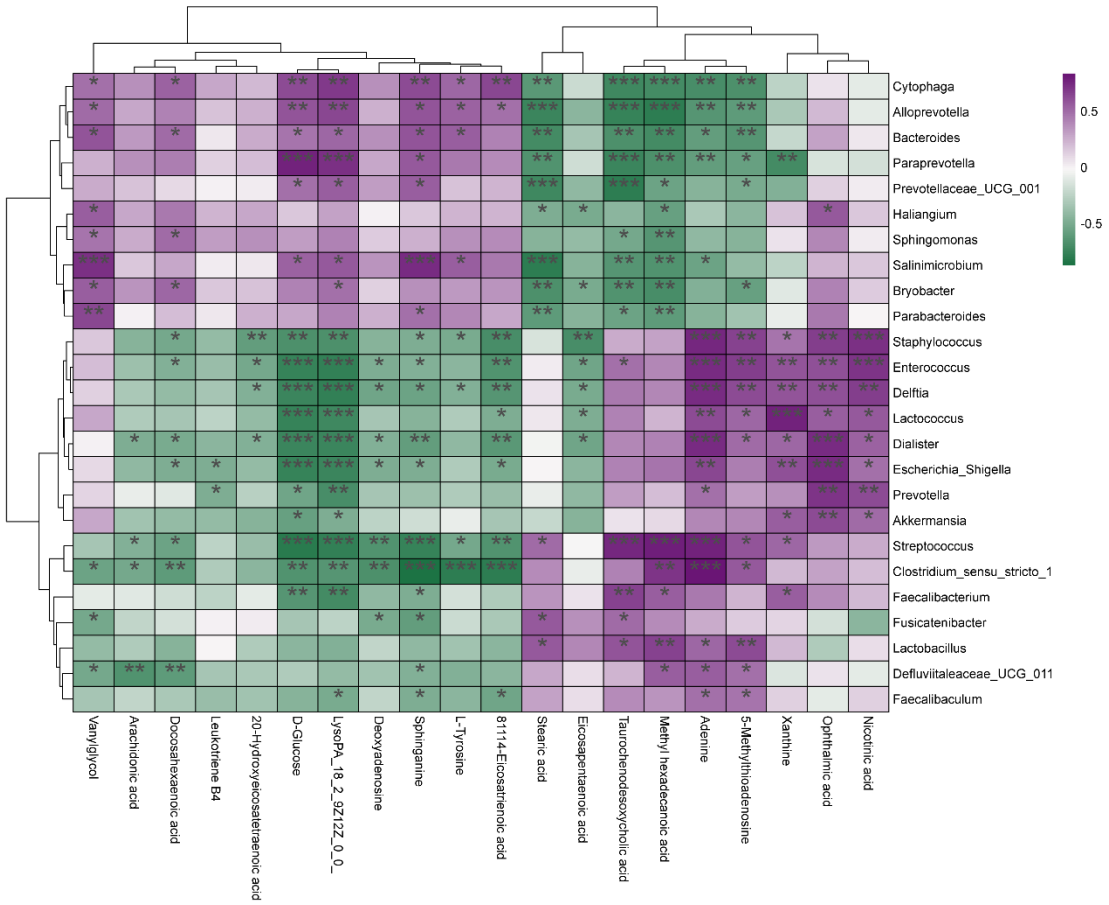


Group 1	Group 2	Sample size	Permutations	pseudo-F	p-value	q-value
CON	HUA	12	999	3.271178	0.005	0.0075
	LTP	12	999	3.078686	0.001	0.0030
HUA	LTP	12	999	1.848101	0.028	0.0280

Supplementary Figure 1 Alpha rarefaction Curve, ROC curve for PLS-DA，permanova statistics for PCoA plots. (A,B) Alpha rarefaction Curve of all samples. (C) ROC curve for PLS-DA. (D-G) permanova statistics for PCoA plots among all group.



Supplementary Figure 2 Data assessment of Con, HUA and LTP group samples in serum metabolite composition. (A-B and D-E) PLS-DA score plot of all analyzed samples(including the quality control samples; A-B. ESI+, D-E. ESI-).(C,F) Permutation test charts for partial least squares discriminant analysis model of all analyzed samples (C. ESI+, F. ESI-, n=1000). (G,H) Permutation test charts for partial least squares discriminant analysis model of CON, HUA,and LTP group(G. ESI+, H. ESI-, n=1000).



Supplementary Figure 3 Correlation analysis between gut microbiota and metabolites from all group. The R values are represented by gradient colors, where purple and green cells indicate positive and negative correlations, respectively; *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

Supplementary Table 1 Ammonium sulfate solution saturation table (4℃)

Final concentration of ammonium sulfate at 4°C, % saturation																		
		20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
			Grams of solid ammonium sulphate per 100 ml of solution															
Ammonium sulfate initial concentration, % saturation	0	11	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###
	5	8	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###
	10	5	8.1	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###
	15	3	5.4	8.2	###	###	###	###	###	###	###	###	###	###	###	###	###	###
	20	0	2.7	5.5	8.3	###	###	###	###	###	###	###	###	###	###	###	###	###
	25		0	2.7	5.6	8.4	###	###	###	###	###	###	###	###	###	###	###	###
	30			0	2.8	5.6	8.6	###	###	###	###	###	###	###	###	###	###	###
	35				0	2.8	5.7	8.7	###	###	###	###	###	###	###	###	###	###
	40					0	2.9	5.8	8.9	###	###	###	###	###	###	###	###	###
	45						0	2.9	5.9	9.0	###	###	###	###	###	###	###	###
	50							0	3.0	6.0	9.2	###	###	###	###	###	###	###
	55								0	3.0	6.1	9.3	###	###	###	###	###	###
	60									0	3.1	6.2	9.5	###	###	###	###	###
	65										0	3.1	6.3	9.7	###	###	###	###
	70											0	3.2	6.5	9.9	###	###	###
	75												0	3.2	6.6	###	###	###
	80													0	3.3	6.7	###	###
	85														0	3.4	6.8	###
	90															0	3.4	7.0
	95																0	3.5
	100																	0

Supplementary Table 2 The identification of potential biomarkers based on untargeted metabolomics

The identification of potential biomarkers based on widely targeted metabolomics

NO	identification	formula	CON vs HUA				HUA vs LTP			
			VIP	FC	trend	raw.pval	VIP	FC	trend	raw.pval
1	Puromycin	C22 H29 N7 O5	1.441166	1.7635	↑ **	0.008658	2.362721	0.023134	↓ ***	3.30E-06
2	(+/-)11(12)-EET Ethanolamide	C22H37NO3	1.2984	0.61045	↓ **	0.041126	1.839303	2.6936	↑ **	0.004363
3	(E)-2-Tridecene-4,6,8-triyn-1-ol	C13 H14 O	1.267878	0.60507	↓	0.064935	1.785982	2.6595	↑ **	0.006059
4	(3aR,4aS,5R,6S,8S,9aR)-5,6-dihydroxy-4a,8-dimethyl-	C15 H22 O4	2.191427	0.005632	↓ **	0.002165	1.368067	1.865	↑	0.062188
5	5-Decanoyl-2-nonylpyridine	C24H41NO	1.22604	1.993	↑	0.093074	1.924274	0.54401	↓ *	0.01147
6	1,7-Dihydroxy-6,6-dimethyl-3,5,5a,6,7,8,9a,9b-octahy	C14 H20 O4	2.0957	0.066541	↓ **	0.002165	1.11331	2.2942	↑ **	0.006822
7	2-(14,15-Epoxyeicosatrienoyl) glycerol	C23 H38 O5	1.759813	0.15391	↓ **	0.015152	1.067883	2.6192	↑	0.076188
8	2-(Hydroxymethyl)-3,5-dimethoxyphenol	C9 H12 O4	2.190829	0.008864	↓ **	0.002165	1.517781	1.9526	↑ *	0.028933
9	2,4-diacetamido-2,4,6-trideoxy-beta-L-altrose	C10 H18 N2 O5	2.173417	0.015676	↓ **	0.002165	1.396757	1.728	↑	0.08288
10	20,21-dihydroxy-10-methoxy-1,4,14,19,19-pentamethy	C25 H32 O8	1.402158	4.4564	↑ *	0.041126	1.549242	0.24172	↓ *	0.010637
11	2'-Deoxyadenosine	C10 H13 N5 O3	1.08902	0.64845	↓	0.093074	1.392425	2.7155	↑ *	0.034026
12	2-Isobutoxynaphthalene	C14 H16 O	1.262554	0.60704	↓	0.064935	1.80064	2.862	↑ **	0.005144
13	2-Phenylethyl decanoate	C18 H28 O2	1.723851	0.57147	↓ **	0.004329	1.467641	1.5619	↑	0.073004
14	2-tert-Butyl-1,4-benzenediol	C10 H14 O2	1.389315	0.55509	↓ *	0.041126	1.274586	2.9818	↑ **	0.004205
15	3-(3'-methylthio)propylmalate	C8 H14 O5 S	1.784899	0.38911	↓ **	0.008658	1.210144	1.7229	↑	0.095773
16	3,4-Dihydrocadalene	C15 H20	1.265913	0.6119	↓	0.093074	1.883963	2.9015	↑ **	0.003065
17	3-hydroxytridecanoyl carnitine	C20 H39 N O5	1.287015	0.48086	↓ **	0.002165	2.123812	5.056	↑ ***	0.000239
18	3-deoxyestradiol	C18 H24 O	1.31182	0.58071	↓ *	0.041126	1.898453	2.9707	↑ **	0.00327
19	3-methyl-5-(4-methyl-1,2,3-thiadiazol-5-yl)-4-isoxazole	C8 H8 N4 O2 S	1.841197	0.3127	↓ **	0.004329	1.518052	1.8642	↑ *	0.033563
20	3-Methylcrotonylglycine	C7 H11 N O3	1.455123	0.38242	↓ *	0.015152	1.694108	2.1005	↑ *	0.025545
21	4-(Trimethylammonio)-3-(undecanoyloxy)butanoate	C18 H35 N O4	1.980624	0.50763	↓ **	0.002165	2.305613	2.9823	↑ ***	1.41E-06
22	4,6,8-trihydroxy-7-methoxy-3-methyl-3,4-dihydro-1H-	C11 H12 O6	1.507635	0.47851	↓ **	0.008658	1.187671	1.9554	↑	0.076512
23	4-Fluoro tetrahydrofuran fentanyl	C24 H29 F N2 O	1.169644	2.35	↑ *	0.041126	1.727536	0.30717	↓ *	0.023967
24	5-Hydroxy-2-furoic acid	C5 H4 O4	1.654562	0.56042	↓ **	0.002165	2.13154	2.6843	↑ ***	0.000107
25	5'-S-Methyl-5'-thioadenosine	C11 H15 N5 O3	1.479251	1.5364	↑ *	0.041126	1.907191	0.29651	↓ **	0.005831
26	6-Amino-1,5-dihydro-4H-imidazo[4,5-c]pyridin-4-one	C6 H6 N4 O	1.448979	0.47948	↓ *	0.025974	1.660693	0.21539	↓ *	0.028004
27	6beta-Hydroxytestosterone	C19 H28 O3	1.369278	1.6339	↑	0.064935	2.296762	0.23609	↓ ***	3.76E-07
28	9,10-Epoxyoctadecanoic acid	C18 H34 O4	1.351273	0.50832	↓ *	0.025974	1.518485	1.8965	↑ *	0.040697
29	3-Oxoglutaric acid	C5 H6 O5	1.711876	0.54323	↓ **	0.002165	2.130389	2.5609	↑ ***	0.000151
30	Adenine	C5 H5 N5	1.703175	2.4785	↑ **	0.008658	2.187711	0.19589	↓ ***	4.91E-05
31	Arachidonic acid	C20 H32 O2	1.580005	0.45268	↓ *	0.025974	1.059159	2.5691	↑ **	0.002182
32	Benzyl butyrate	C11 H14 O2	1.277979	0.57975	↓	0.064935	1.819532	3.2827	↑ **	0.004457
33	Cannabidiolic acid	C22 H30 O4	1.341115	0.55878	↓ *	0.041126	1.737613	3.381	↑ **	0.005048
34	Cinnamoylglycine	C11 H11 N O3	1.330759	0.57839	↓	0.064935	1.770847	2.0496	↑ *	0.027426
35	cis-3-Hexenyl phenylacetate	C14 H18 O2	1.242421	0.60201	↓	0.093074	1.785141	2.771	↑ **	0.006173
36	Diethanolamine	C4 H11 N O2	1.512709	0.47849	↓ *	0.041126	1.366521	1.7368	↑	0.05516
37	Docosahexaenoic acid methyl ester	C23 H34 O2	1.409309	0.41083	↓ *	0.015152	1.307373	2.7763	↑	0.076189
38	Drofenine	C20 H31 N O2	1.819255	0.54058	↓ **	0.004329	1.245157	1.5862	↑ **	0.003637
39	Ethamivan	C12 H17 N O3	2.107661	0.019543	↓ **	0.002165	1.344039	3.5189	↑ *	0.045767
40	gamma-L-glutamyl-L-tyrosine	C14 H18 N2 O6	2.142398	0.034129	↓ **	0.002165	1.330809	1.8713	↑	0.078574
41	Phenylalanylglycine	C11 H14 N2 O3	1.908717	4.8431	↑ **	0.002165	1.314786	0.54761	↓ *	0.041999
42	Hexylresorcinol	C12 H18 O2	1.7477	0.10854	↓ **	0.002165	1.805323	7.2038	↑ **	0.007614
43	Lenticin	C14 H18 N2 O2	2.162446	0.018217	↓ **	0.002165	2.023148	1.7209	↑ **	0.003441
44	Incadronic acid	C8 H19 N O6 P2	1.28715	0.66608	↓	0.064935	1.774529	1.7372	↑ **	0.009095
45	menoctone	C24 H32 O3	1.49903	0.43384	↓ *	0.015152	1.696621	2.5303	↑ **	0.007949
46	N-[4-(5-Amino-2,2-dimethyl-4-oxo-3,4-dihydro-2H-ch	C16 H20 N2 O5	1.343914	1.5037	↑ *	0.041126	1.26752	1.5113	↑	0.090414
47	N6-Methyladenosine	C11 H15 N5 O4	1.831252	0.21811	↓ **	0.002165	2.149146	161.21	↑ ***	6.77E-06
48	Nicotinic acid	C6 H5 N O2	1.219663	0.32188	↓ *	0.041126	1.604527	0.30586	↓ *	0.042866
49	Noramidopyrine	C12 H15 N3 O	1.428239	1.8055	↑ *	0.041126	1.548548	1.6322	↑	0.066135
50	ophthalmic acid	C11 H19 N3 O6	1.437106	0.52005	↓ *	0.025974	1.457151	0.48186	↓ *	0.034013
51	Palmitic Acid	C16 H32 O2	1.017306	0.57625	↓ *	0.015152	1.504644	2.6738	↑ *	0.041463
52	Palmitoyl Serinol	C19 H39 N O3	1.098435	0.57929	↓ **	0.004329	1.724458	3.9843	↑ **	0.003843
53	Procaine	C13 H20 N2 O2	1.059921	0.60845	↓	0.093074	1.599523	0.51721	↓ *	0.048183
54	L-prolinamide	C5H10N2O	1.611813	0.44197	↓ *	0.015152	1.37127	1.6729	↑	0.064297
55	Resorcinol Monoacetate	C8 H8 O3	2.191745	0.007175	↓ **	0.002165	1.510586	1.9436	↑ *	0.029723
56	Acetaminophen	C22 H20 O6	1.645275	0.62827	↓ **	0.004329	2.123391	1.6561	↑ ***	0.000135
57	Sorgolactone	C18 H20 O5	2.173685	0.024569	↓ **	0.002165	1.583017	1.8155	↑ *	0.021985
58	Stanozolol	C21H32N2O	1.70239	0.50657	↓ **	0.002165	1.95427	1.8909	↑ **	0.002939
59	Traumatin	C12 H20 O3	1.919803	0.21882	↓ **	0.002165	2.069457	5.0273	↑ ***	0.00045
60	Barbital	C8 H12 N2 O3	2.16939	0.030479	↓ **	0.002165	1.477377	5.4265	↑ *	0.019114
61	(1Z,2S)-N-[(2S,3R,4E,8E)-1,3-Dihydroxy-4,8-octadec	C36 H69 N O4	1.702879	3.7616	↑ **	0.002165	1.500106	0.46931	↓ *	0.028718
62	(all-Z)-20-hydroxy-5,8,11,14-Eicosatetraenoic acid	C20 H32 O3	1.282866	0.61554	↓ *	0.015152	1.694351	2.3667	↑ **	0.008804
63	15S-hydroxyeicosatrienoic acid	C20 H34 O3	1.531417	0.4396	↓ *	0.015152	1.827077	2.2423	↑ **	0.003609
64	2,4-di-tert-Butylphenol	C14 H22 O	1.649067	2.3972	↑ **	0.002165	1.646281	0.2459	↓ **	0.009148
65	2-Dodecylbenzenesulfonic acid	C18 H30 O3 S	1.162741	3.4423	↑ *	0.041126	1.657688	0.12952	↓ ***	0.000126
66	2-methoxyacetaminophen sulfate	C9 H11 N O6 S	1.419992	0.32756	↓ **	0.004329	1.492303	2.1734	↑ *	0.025465
67	3-Hydroxybutyric acid	C4 H8 O3	1.325522	0.66611	↓ *	0.015152	1.61165	0.47073	↓ *	0.013866
68	3-beta-D-galactosyl-sn-glycerol	C9 H18 O8	1.913246	0.025904	↓ **	0.002165	1.14692	0.49099	↓	0.094811
69	4-oxo-4-(4-toluidino)but-2-enoic acid	C11 H11 N O3	1.203187	0.56006	↓	0.064935	1.678022	2.5768	↑ *	0.013121
70	5-Hydroxyindoleacetic acid	C10 H9 N O3	1.150643	1.8549	↑ *	0.041126	1.713097	0.1804	↓ **	0.007821
71	6-beta-Naltrexol	C20 H25 N O4	1.951637	0.015821	↓ **	0.002165	1.458417	1.7554	↑ *	0.030026
72	Castanospermine	C8 H15 N O4	1.225542	0.57109	↓	0.064935	1.616437	2.0246	↑ *	0.012179
73	Cerulenin	C12 H17 N O3	1.889468	0.031004	↓ **	0.002165	1.234659	2.0169	↑	0.073927
74	Citric acid	C6 H8 O7	1.404107	0.59217	↓ *	0.015152	1.883869	1.9188	↑ **	0.00146
75	Eicosapentanoic acid	C20 H30 O2	1.449796	2.4731	↑ *	0.015152	1.296027	1.6579	↑	0.074653
76	Ethyl myristate	C16 H32 O2	1.779687	5.8801	↑ **	0.002165	1.569281	0.25784	↓ **	0.002478
77	Ginkgoic acid	C22 H34 O3	1.606275	0.32567	↓ **	0.004329	1.803278	3.0523	↑ **	0.003867
78	Kynurenic acid	C10 H7 N O3	1.919181	22.65	↑ **	0.002165	2.261226	0.021867	↓ ***	2.88E-08
79	Leukotriene B4	C20 H32 O4	1.068094	0.57877	↓	0.064935	1.576534	2.5789	↑ *	0.01944
80	Linalyl butyrate	C14 H24 O2	1.625953	3.0811	↑ **	0.004329	1.769545	0.15722	↓ **	0.005471
81	LysoPA(18:1(9Z)/0:0)	C21H41O7P	1.814278	0.034336	↓ **	0.002165	2.249913	89.942	↑ ***	3.59E-07
82	Margaric acid	C17 H34 O2	1.202005	1.8868	↑ *	0.041126	1.878658	0.42078	↓ **	0.00135
83	Myristoleic acid	C14 H26 O2	1.680872	2.2415	↑ **	0.002165	1.786415	0.25663	↓ **	0.004793
84	N-({(2R,4S,5R)-5-[3-(3,4-Dimethoxyphenyl)-1-methyl	C25 H36 N4 O3	1.770343	0.086589	↓ **	0.002165	1.691014	4.0636	↑ **	0.008392
85	N-(4-{(R)-Hydroxy[(3R)-5-oxo-4-(3-phenylpropyl)-3-r	C25 H26 N2 O4	1.436777	3.2624	↑ *	0.025974	1.700604	0.31776	↓ *	0.013227
86	Nitrendipine	C18 H20 N2 O6	1.298015	1.5886	↑ **	0.008658	1.574158	0.19067	↓ *	0.021368
87	N-Tigloylglycine	C7 H11 N O3	1.280475	0.45499	↓ *	0.015152	1.67554	2.1474	↑ **	0.009649
88	Ostruthin	C19 H22 O3	1.030583	0.15921	↓ **	0.008658	1.602451	35.242	↑ ***	2.11E-06
89	Palmitoleic Acid	C16 H30 O2	1.441406	2.0078	↑ *	0.025974	1.321895	0.647	↓	0.054668
90	Pregnane-3,20-dione	C21 H32 O2	1.676356	3.1912	↑ **	0.002165	1.399237	1.8446	↑ *	0.048066
91	Sebacic acid	C10 H18 O4	1.08721	1.7926	↑ *	0.041126	1.499072	0.59854	↓ *	0.028118
92	Stearic acid	C18 H36 O2	1.569683	2.1151	↑ **	0.002165	2.004543	0.554	↓ ***	0.000339
93	Taurochenodeoxycholic acid	C26 H45 N O6 S	1.794959	36.771	↑ **	0.002165	2.235298	0.035891	↓ ***	1.19E-06
94	thymol sulfate	C10 H14 O4 S	1.937826	202.34	↑ **	0.002165	1.475687	0.33451	↓ *	0.01956
95	trans-10-Heptadecenoic Acid	C17 H32 O2	1.591527	2.1807	↑ **	0.004329	1.149762	0.65029	↓	0.093511
96	Vanylglycol	C9H12O4	1.956511	0.001764	↓ **	0.002165	1.238019	1.5648	↑	0.071106
97	Xanthine	C5 H4 N4 O2	1.428128	0.62297	↓ **	0.008658	1.159121	0.005904	↓ *	0.013658
98	sphinganine	C18H39NO2	2.187741	0.007657	↓ **	0.002165	2.029357	13.067	↑ ***	0.000159

Supplementary Table 3 Differential Metabolic Biomarkers in Hyperuricemic Mice Treated with *Poecilobdella manillensis* Total Protein Extract

Differential Metabolic Biomarkers in Hyperuricemic Mice Treated with Poecilobdella manillensis Total Protein Extract										
NO	identification	formula	CON vs HUA				HUA vs LTP			
			VIP	FC	trend	raw.pval	VIP	FC	trend	raw.pval
1	Deoxyadenosine	C10 H13 N5 O3	1.08901971	0.64845	↓	0.093074	1.39242482	2.7155	↑ *	0.034026
2	5'-Methylthioadenosine	C11 H15 N5 O3 S	1.4792507	1.5364	↑ *	0.041126	1.90719086	0.29651	↓ **	0.005831
3	Adenine	C5 H5 N5	1.7031755	2.4785	↑ **	0.008658	2.18771144	0.19589	↓ ***	4.91E-05
4	Arachidonic acid	C20 H32 O2	1.58000534	0.45268	↓ *	0.025974	1.05915863	2.5691	↑ **	0.002182
5	Docosahexaenoic acid	C23 H34 O2	1.40930888	0.41083	↓ *	0.015152	1.30737335	2.7763	↑	0.076189
6	Nicotinic acid	C6 H5 N O2	1.21966329	0.32188	↓ *	0.041126	1.604527	0.30586	↓ *	0.042866
7	ophthalmic acid	C11 H19 N3 O6	1.43710613	0.52005	↓ *	0.025974	1.45715114	0.48186	↓ *	0.034013
8	Methyl hexadecanoic acid	C16 H32 O2	1.01730576	0.57625	↓ *	0.015152	1.50464373	2.6738	↑ *	0.041463
9	20-Hydroxyeicosatetraenoic a	C20 H32 O3	1.28286573	0.61554	↓ *	0.015152	1.69435078	2.3667	↑ **	0.008804
10	8,11,14-Eicosatrienoic acid	C20 H34 O3	1.53141706	0.4396	↓ *	0.015152	1.82707704	2.2423	↑ **	0.003609
11	5-Hydroxyindoleacetic acid	C10 H9 N O3	1.15064324	1.8549	↑ *	0.041126	1.71309667	0.1804	↓ **	0.007821
12	Eicosapentaenoic acid	C20 H30 O2	1.44979605	2.4731	↑ *	0.015152	1.29602732	1.6579	↑	0.074653
13	Leukotriene B4	C20 H32 O4	1.06809404	0.57877	↓	0.064935	1.57653439	2.5789	↑ *	0.01944
14	LysoPA(18:2(9Z,12Z)/0:0)	C21H41O7P	1.81427829	0.034336	↓ **	0.002165	2.24991255	89.942	↑ ***	3.59E-07
15	5a-Pregnane-3,20-dione	C21 H32 O2	1.67635594	3.1912	↑ **	0.002165	1.39923672	1.8446	↑ *	0.048066
16	Stearic acid	C18 H36 O2	1.56968283	2.1151	↑ **	0.002165	2.00454318	0.554	↓ ***	0.000339
17	Taurochenodesoxycholic acid	C26 H45 N O6 S	1.79495908	36.771	↑ **	0.002165	2.23529798	0.035891	↓ ***	1.19E-06
18	Vanylglycol	C9H12O4	1.95651094	0.001764	↓ **	0.002165	1.23801871	1.5648	↑	0.071106
19	Xanthine	C5 H4 N4 O2	1.42812841	0.62297	↓ **	0.008658	1.15912088	0.005904	↓ *	0.013658
20	sphinganine	C18H39NO2	2.18774056	0.007657	↓ **	0.002165	2.02935705	13.067	↑ ***	0.000159
21	D-Glucose	C6 H12 O6	1.74262168	0.16137	↓ **	0.002165	1.77068765	2.8678	↑ **	0.00507
22	L-Tyrosine	C9 H11 N O3	1.56604439	0.31993	↓	0.064935	1.63727876	3.9373	↑ *	0.01229

Supplementary Table 4 P value matrix for correlation analysis between gut microbiota and metabolites from all groups

	Adenine	Deoxyade	D-Glucose	L-Tyrosine	Sphingani	Xanthine	Stearic aci	Taurocher	Arachidon	5-Methylt	Vanylglyc	Eicosapen	Docosahe	Ophthalm	LysoPA_18	Methyl he	Leukotrien	20-Hydro	81114-Eic	Nicotinic a
Bryobacte	0.052224	0.602304	0.086179	0.180485	0.129067	0.685431	0.002026	0.003567	0.16156	0.01349	0.016546	0.030715	0.028312	0.086179	0.041414	0.001642	0.506785	0.457929	0.145334	0.549297
Bacteroide	0.011451	0.127873	0.048169	0.016038	0.011451	0.413635	0.001037	0.00236	0.168071	0.004322	0.010743	0.170838	0.03614	0.229322	0.025867	0.001089	0.886853	0.287484	0.077783	0.867607
Alloprevot	0.004002	0.315513	0.009747	0.020783	0.010403	0.200205	0.000335	0.000233	0.261026	0.008254	0.031069	0.065782	0.081019	0.376225	0.004663	7.30E-05	0.488839	0.307345	0.042836	0.729259
Paraprevo	0.009128	0.252992	0.000134	0.057548	0.012803	0.001075	0.003202	0.000338	0.139849	0.013621	0.336049	0.476122	0.071463	0.551338	0.000716	0.002342	0.605185	0.448039	0.121276	0.502387
Prevotella	0.043367	0.187119	0.019899	0.224953	0.14364	0.127023	0.759685	0.190098	0.765921	0.190098	0.63835	0.087065	0.644243	0.001001	0.001685	0.417463	0.03844	0.27492	0.107706	0.006567
Prevotella	0.055216	0.197128	0.042836	0.478445	0.018028	0.052786	0.000622	7.30E-05	0.483628	0.035254	0.303309	0.081019	0.698742	0.598461	0.017513	0.015569	0.983788	0.912608	0.367178	0.912608
Parabacte	0.06301	0.33649	0.246615	0.102535	0.037965	0.778883	0.006711	0.017513	0.977304	0.162629	0.004322	0.059017	0.423288	0.060326	0.087785	0.006711	0.874015	0.328004	0.253756	0.996757
Cytophaga	0.001499	0.131143	0.005	0.024839	0.00524	0.307781	0.005489	0.000623	0.125364	0.001885	0.042839	0.439052	0.023189	0.824831	0.001781	0.000865	0.268362	0.402314	0.004769	0.72213
Salinimicro	0.018755	0.163111	0.023254	0.018462	0.000372	0.318564	9.34E-05	0.004492	0.5148	0.093925	0.000643	0.059647	0.243016	0.3394	0.012878	0.003046	0.900559	0.868825	0.060369	0.538564
Faecalibac	0.039419	0.348671	0.058654	0.071319	0.042402	0.606176	0.237963	0.110635	0.366561	0.045555	0.166114	0.764009	0.192211	0.714154	0.030623	0.16066	0.119173	0.14756	0.020952	0.617846
Enterococ	0.000498	0.041449	0.000239	0.076077	0.047404	0.008835	0.90798	0.04033	0.130989	0.001824	0.435644	0.019748	0.04996	0.007874	0.000122	0.101966	0.113435	0.026162	0.003559	0.000856
Lactobacil	0.024514	0.349454	0.074643	0.162629	0.079389	0.390027	0.012582	0.010743	0.232717	0.005215	0.106485	0.091318	0.061657	0.236143	0.052786	0.002791	0.964342	0.22596	0.076201	0.766392
Lactococc	0.006295	0.169753	0.000206	0.223716	0.058919	0.000161	0.873269	0.087625	0.232234	0.025698	0.268362	0.03791	0.169753	0.016182	0.000623	0.344956	0.307781	0.09441	0.03791	0.013374
Streptococ	0.000158	0.003248	4.40E-05	0.027745	0.000267	0.02556	0.036092	0.000285	0.047369	0.010989	0.171427	0.923274	0.016567	0.16857	0.000169	9.63E-05	0.330286	0.120305	0.003384	0.304756
Staphyloc	0.000237	0.054923	0.002123	0.036582	0.040501	0.048619	0.555849	0.293938	0.056403	0.002872	0.50415	0.001271	0.024126	0.001913	0.001964	0.234655	0.100494	0.00976	0.001421	0.000795
Clostridiur	1.50E-05	0.002111	0.002629	8.94E-05	2.59E-06	0.404216	0.113691	0.086217	0.02556	0.012118	0.017594	0.76594	0.008384	0.221619	0.004482	0.001088	0.228496	0.068298	7.69E-05	0.439152
Defluviital	0.017319	0.146658	0.227149	0.050287	0.048551	0.597438	0.251904	0.340319	0.003525	0.03717	0.024074	0.774877	0.008451	0.822981	0.102518	0.015594	0.176627	0.213732	0.074171	0.687256
Fusicateni	0.296293	0.03055	0.166785	0.448877	0.010146	0.672764	0.012266	0.031498	0.37218	0.555849	0.026138	0.139169	0.532946	0.532946	0.325437	0.116164	0.953676	0.899819	0.209067	0.072903
Faecalibac	0.05868	0.088473	0.004291	0.52971	0.039922	0.016669	0.146497	0.002601	0.644474	0.348359	0.690663	0.834998	0.491595	0.118721	0.001134	0.018178	0.317999	0.694262	0.232619	0.380317
Dialister	0.000411	0.04996	0.000467	0.087343	0.009888	0.027785	0.878714	0.10419	0.04033	0.036083	0.988936	0.020392	0.030367	0.000438	0.000467	0.081567	0.065918	0.048669	0.005485	0.023866
Haliangiur	0.199223	0.9593	0.506785	0.356206	0.526428	0.495719	0.040384	0.072653	0.257183	0.076699	0.01813	0.032402	0.062873	0.013707	0.242257	0.013062	0.363176	0.268747	0.344759	0.526428
Sphingom	0.0859	0.543663	0.189185	0.132838	0.33559	0.795637	0.057358	0.026838	0.294086	0.059971	0.046644	0.106533	0.031427	0.096757	0.089415	0.003665	0.198359	0.142533	0.112727	0.924739
Delftia	0.000385	0.023866	0.000337	0.046164	0.017329	0.008835	0.799106	0.058253	0.208962	0.005044	0.59981	0.03313	0.091354	0.006999	0.000132	0.095498	0.187988	0.048669	0.003891	0.001918
Escherichi	0.004725	0.042906	0.00031	0.221318	0.044007	0.007223	0.954987	0.089991	0.088111	0.072458	0.718006	0.075744	0.037712	0.000351	0.000449	0.052328	0.036733	0.099828	0.031267	0.03871
Akkerman	0.101761	0.314479	0.013983	0.753462	0.482709	0.018263	0.384388	0.828986	0.153782	0.092382	0.267395	0.061055	0.101761	0.005095	0.041342	0.734881	0.101761	0.063769	0.187119	0.035697

Supplementary Table 5 Spearman rank correlation matrix for Correlation analysis between gut microbiota and metabolites from all groups

	Adenine	Deoxyade	D-Glucose	L-Tyrosine	Sphingani	Xanthine	Stearic aci	Taurocher	Arachidon	5-Methylt	Vanylglyc	Eicosapen	Docosahe	Ophthalm	LysoPA_18	Methyl he	Leukotrier	20-Hydrox	81114-Eic	Nicotinic a
Bryobacte	-0.46434	0.131743	0.415745	0.330436	0.371471	-0.10259	-0.67707	-0.64899	0.344475	-0.57016	0.556127	-0.50969	0.516172	0.415745	0.484856	-0.68679	0.167378	0.186815	0.357433	0.15118
Bacteroide	-0.58101	0.372549	0.47162	0.558308	0.581011	-0.20537	-0.70691	-0.66976	0.339525	-0.6388	0.585139	-0.33746	0.496388	0.298246	0.52322	-0.70485	0.03612	0.265222	0.426213	0.042312
Alloprevot	-0.64293	0.250774	0.591331	0.539732	0.587203	-0.31682	-0.75026	-0.76264	0.27967	-0.60165	0.508772	-0.44272	0.422085	0.221878	0.634675	-0.79773	0.174407	0.254902	0.48194	-0.08772
Paraprevo	-0.59544	0.284236	0.780093	0.4554	0.573659	-0.7054	-0.65457	-0.75001	0.362038	-0.56951	0.240667	-0.17946	0.434653	-0.15042	0.722001	-0.67013	0.130707	0.190874	0.378636	-0.16909
Prevotella	0.48087	-0.32575	-0.54292	-0.30093	-0.35884	0.37332	-0.07756	0.323682	-0.07549	0.323682	0.118925	-0.41469	-0.11686	0.708378	-0.68563	0.203723	-0.49121	-0.27198	-0.39193	0.615306
Prevotella	-0.45924	0.318885	0.48194	0.178535	0.550052	-0.46336	-0.72755	-0.79773	0.176471	-0.49845	0.256966	-0.42208	0.098039	0.133127	0.552116	-0.56037	0.00516	0.027864	0.226006	0.027864
Parabacte	-0.44685	0.240454	0.287926	0.397317	0.49226	-0.07121	-0.61404	-0.55212	0.007224	-0.34365	0.638803	-0.45304	0.201238	0.45098	0.413829	-0.61404	0.040248	0.244582	0.283798	-0.00103
Cytophaga	-0.6909	0.369613	0.630823	0.526339	0.628211	-0.25468	-0.6256	-0.72747	0.374837	-0.68045	0.481933	-0.1946	0.531563	0.05616	0.683065	-0.71441	0.275577	0.210274	0.633435	-0.09012
Salinimicro	-0.54721	0.343283	0.531353	0.548347	0.746613	-0.24925	-0.7908	-0.63672	0.164278	-0.40673	0.72622	-0.45205	0.290035	0.239052	0.573272	-0.65711	0.031723	0.041919	0.450913	0.155214
Faecalibac	0.489078	-0.23463	-0.45362	-0.43485	-0.48282	0.130351	0.293029	0.388968	-0.22629	0.476564	-0.341	0.076125	-0.32223	-0.09281	-0.50993	0.34517	-0.38063	-0.3556	-0.53913	0.12618
Enterococ	0.735978	-0.48478	-0.7618	-0.42844	-0.47304	0.597468	0.029345	0.48713	-0.36975	0.681983	0.196026	-0.54347	-0.46835	0.604511	-0.78293	0.397921	-0.38618	-0.52234	-0.64912	0.714849
Lactobacil	0.527348	-0.23426	-0.43034	-0.34365	-0.42415	0.215686	0.574819	0.585139	-0.29618	0.628483	-0.39319	0.409701	-0.44892	-0.29412	-0.46336	0.661507	-0.01135	-0.30031	-0.42828	0.075335
Lactococc	0.617763	-0.33827	-0.76665	-0.3017	-0.4532	0.774489	0.040488	0.414018	-0.29647	0.523727	0.275577	-0.49238	-0.33827	0.557684	-0.72747	0.236395	-0.25468	-0.40618	-0.49238	0.570745
Streptoco	0.775051	-0.65385	-0.8112	-0.51776	-0.75804	0.524143	0.4965	0.755914	-0.47311	0.58368	-0.33702	-0.02445	-0.55604	0.339151	-0.77292	0.789935	-0.24347	-0.37955	-0.65172	0.256224
Staphyloc	0.762113	-0.45973	-0.67484	-0.49537	-0.48677	0.470789	-0.14873	0.261823	-0.45727	0.660088	0.168402	-0.69819	-0.52856	0.679756	-0.67853	0.295012	-0.39949	-0.59125	-0.69328	0.717861
Clostridiur	0.836715	-0.67511	-0.66448	-0.79206	-0.87074	0.209444	0.385931	0.415699	-0.52414	0.577301	-0.55179	-0.07549	-0.60069	0.303003	-0.63684	0.704882	-0.29875	-0.43909	-0.79631	0.19456
Defluviital	0.552905	-0.35634	-0.29958	-0.46776	-0.47092	-0.1335	0.284862	0.238611	-0.64961	0.49404	-0.52873	0.072529	-0.60021	0.056762	-0.39733	0.560263	-0.33321	-0.30799	-0.43097	-0.10196
Fusicateni	0.260594	-0.51012	-0.34049	-0.19053	-0.58879	0.106942	0.576502	0.507666	-0.22372	0.148735	-0.52242	0.362618	-0.15734	-0.15734	-0.24584	0.383515	0.014751	0.03196	-0.31099	-0.43268
Faecalibac	0.45358	-0.41302	-0.63919	-0.15857	-0.488	0.555605	0.356472	0.665005	-0.11678	0.23478	-0.1008	0.052856	-0.17332	0.381057	-0.70311	0.549459	-0.24953	-0.09957	-0.29624	0.220029
Dialister	0.743021	-0.46835	-0.73833	-0.41435	-0.59043	0.517649	-0.03874	0.395573	-0.48713	0.496521	0.003521	-0.54113	-0.51061	0.740673	-0.73833	0.421397	-0.44253	-0.4707	-0.62564	0.529388
Haliangiur	-0.31748	0.012958	0.167378	0.23109	0.159819	0.171697	-0.48702	-0.43302	0.281843	-0.42762	0.549648	-0.50537	0.447061	0.569085	0.290482	-0.57232	0.22785	0.275364	0.236489	0.159819
Sphingom	-0.41608	0.153293	0.324314	0.368112	0.240889	0.065697	-0.45571	-0.52036	0.261745	-0.45154	0.474478	-0.39314	0.507848	0.403567	0.41191	-0.64758	0.318057	0.359769	0.386882	0.023985
Delftia	0.745368	-0.52939	-0.75006	-0.47539	-0.55286	0.597468	0.064559	0.454264	-0.31106	0.630335	0.13264	-0.50356	-0.40966	0.611554	-0.78058	0.404964	-0.32514	-0.4707	-0.64442	0.679635
Escherichi	0.633946	-0.4818	-0.75302	-0.30319	-0.47959	0.60969	-0.01433	0.411238	-0.41344	0.433288	0.091509	-0.42888	-0.49282	0.748607	-0.73979	0.464159	-0.49503	-0.40021	-0.50826	0.490619
Akkerman	0.398139	-0.25129	-0.56774	-0.07963	-0.17684	0.549122	-0.2182	0.054809	-0.35057	0.408481	0.276112	-0.44985	-0.39814	0.629784	-0.48501	0.085833	-0.39814	-0.44571	-0.32575	0.497416

Supplementary Table 6 P value matrix for correlation analysis between the gut microbiota and metabolites from HUA and LTP groups

	Adenine	Deoxyade	D-Glucose	L-Tyrosine	Sphingani	Xanthine	Stearic aci	Taurocher	Arachidon	5-Methylt	Vanylglyc	Eicosapen	Docosahe	Ophthalm	LysoPA_18	Methyl he	Leukotrier	20-Hydro	81114-Eic	Nicotinic a
Bryobacte	0.03152	0.335508	0.077052	0.150935	0.202808	0.126919	0.105548	0.004117	0.185824	0.010054	0.871178	0.648215	0.084229	0.624676	0.010054	0.03152	0.225327	0.173686	0.041075	0.074756
Bifidobact	0.024003	0.137658	0.022034	0.137658	0.03317	0.151735	0.275567	0.041521	0.1667	0.070894	0.075362	0.378569	0.044609	0.124455	0.010245	0.112109	0.391097	0.245265	0.026097	0.275567
Collinsella	0.025161	0.016989	0.008624	0.17281	0.012286	0.263403	0.511289	0.027585	0.06182	0.190954	0.125051	0.210231	0.057492	0.003803	0.003803	0.012286	0.01373	0.125051	0.025161	0.376781
Bacteroide	0.00026	0.013906	0.00824	0.00026	0.002586	0.124455	0.1667	0.044609	0.015317	0.024003	0.084869	0.070894	0.003446	0.226206	0.000332	0.00824	0.118176	0.011374	0.002586	0.030676
Alloprevot	0.001615	0.151735	0.018453	0.044609	0.024003	0.03317	0.013906	0.000521	0.118176	0.002993	0.556737	0.617523	0.084869	0.354148	0.0019	0.004508	0.378569	0.137658	0.013906	0.016831
Paraprevo	0.127893	0.141425	0.010567	0.251553	0.052774	0.000158	0.004078	0.011731	0.082308	0.068541	0.69463	0.810876	0.134549	0.213512	0.022709	0.072939	0.844854	0.662387	0.45353	0.362722
Prevotella	0.000521	0.006543	0.0019	0.084869	0.000521	0.151735	0.208063	0.016831	0.013906	0.054842	0.041521	0.21702	0.02832	0.000332	0.001615	0.007355	0.118176	0.095157	0.030676	0.199335
Prevotella	0.084869	0.245265	0.058589	0.571701	0.030676	0.002223	0.001363	0.000643	0.319139	0.112109	0.648796	0.648796	0.680598	0.208063	0.038588	0.041521	0.845931	0.948402	0.470532	0.330589
Rikenellac	0.230003	0.086718	0.059984	0.150935	0.290588	0.274671	0.556033	0.290588	0.015807	0.054324	0.795063	0.211643	0.002512	0.126919	0.185824	0.047374	0.143798	0.254246	0.120547	0.244376
Parabacte	0.022034	0.226206	0.354148	0.022034	0.080019	0.633091	0.255138	0.391097	0.96559	0.527302	0.030676	0.862898	0.648796	0.931234	0.054842	0.144586	0.416775	0.182564	0.054842	0.190836
Bilophila	0.001481	0.072334	0.105589	0.027655	0.026537	0.480487	0.144147	0.170335	0.208138	0.047092	0.039299	0.606586	0.147719	0.133768	0.089184	0.012128	0.494665	0.178331	0.016296	0.03509
Faecalibac	0.085853	0.266468	0.071528	0.073792	0.062948	0.217296	0.732825	0.266468	0.166105	0.174049	0.293268	0.339168	0.065022	0.549541	0.047978	0.076106	0.261285	0.053261	0.028117	0.051457
Enterococ	0.001167	0.027866	0.00096	0.003736	0.004947	0.035814	0.058366	0.001998	0.002172	0.000448	0.447411	0.040343	0.001683	0.089297	0.002358	0.001167	0.144257	0.033005	0.00096	0.004015
Lactobacil	0.095157	0.745609	0.208063	0.330589	0.265239	0.235621	0.416775	0.066612	0.190836	0.013906	0.982792	0.712884	0.124455	0.845931	0.151735	0.095157	0.778725	0.182564	0.075362	0.016831
Lactococc	0.025161	0.111294	0.000916	0.035863	0.012286	0.000463	0.006684	0.002354	0.081393	0.018816	0.699238	0.363094	0.053379	0.24128	0.00198	0.022896	0.434119	0.230645	0.035863	0.06182
Clostridia_	0.084869	0.080019	0.010245	0.062511	0.016831	0.005801	0.007355	0.051266	0.391097	0.378569	0.296904	0.512841	0.330589	0.226206	0.007355	0.208063	0.586824	0.586824	0.226206	0.617523
Clostridiur	0.000916	0.00198	0.057492	0.001654	0.002354	0.495392	0.230645	0.16416	0.057492	0.071145	0.009739	0.125051	0.025161	0.04578	0.042283	0.003803	0.274889	0.132328	0.00137	0.081393
Faecalibac	0.04689	0.027344	0.010093	0.296896	0.005872	0.015352	0.030094	0.003707	0.271611	0.358405	0.426064	0.887689	0.380293	0.027344	0.000988	0.028695	0.23046	0.596082	0.23046	0.777247
Dialister	0.00096	0.001683	0.001167	0.015905	0.000179	0.113004	0.097752	0.004309	0.022287	0.040343	0.064714	0.071526	0.025526	0.001683	0.001683	0.001407	0.081352	0.126281	0.001407	0.116233
Haliangiur	0.263447	0.922389	0.974099	0.300583	0.845395	0.428244	0.408574	0.616271	0.284326	0.201942	0.948221	0.334615	0.129422	0.370632	0.279021	0.421637	0.078773	0.021417	0.23385	0.180877
Sphingom	0.359293	0.93971	0.688104	0.274671	0.93971	0.753434	0.390234	0.736944	0.323944	0.285226	0.786694	0.365374	0.089257	0.435736	0.198476	0.490702	0.054324	0.018175	0.216147	0.207197
Delftia	0.000425	0.00757	0.001015	0.001231	0.000291	0.014089	0.008044	0.003626	0.024036	0.006685	0.192878	0.150973	0.014089	0.073217	0.001231	0.001119	0.338525	0.128886	0.001769	0.024036
Escherichi	0.016163	0.004017	6.92E-05	0.067587	0.002591	0.023429	0.12857	0.008563	0.01955	0.081657	0.257052	0.236742	0.016163	0.001882	0.000386	0.001589	0.023429	0.142564	0.023429	0.246774
Akkerman	0.118176	0.174519	0.000201	0.182564	0.095157	0.020185	0.265239	0.106252	0.02832	0.054842	0.571701	0.319139	0.015317	0.03317	0.026097	0.058589	0.080019	0.112109	0.124455	0.118176

Supplementary Table 7 Spearman rank correlation matrix for correlation analysis between the gut microbiota and metabolites from HUA and LTP groups

	Adenine	Deoxyade	D-Glucose	L-Tyrosine	Sphingani	Xanthine	Stearic aci	Taurocher	Arachidon	5-Methylt	Vanylglyc	Eicosapen	Docosahe	Ophthalm	LysoPA_18	Methyl he	Leukotrier	20-Hydro	81114-Eic	Nicotinic a
Bryobacte	-0.61997	0.304729	0.528897	0.441332	0.395797	-0.46585	-0.49037	-0.76007	0.409808	-0.70753	0.052539	0.147111	0.51839	-0.15762	0.707532	-0.61997	0.378284	0.420316	0.595447	-0.5324
Bifidobact	0.643357	-0.45455	-0.65035	-0.45455	-0.61538	0.440559	0.342657	0.594406	-0.42657	0.538462	-0.53147	-0.27972	-0.58741	0.468531	-0.70629	0.482517	-0.27273	-0.36364	-0.63636	0.342657
Collinsella	0.639436	-0.67063	-0.71742	-0.42109	-0.69402	0.35091	0.210546	0.631638	-0.55366	0.405496	-0.46788	-0.3899	-0.56146	0.764204	-0.7642	0.694022	-0.68622	-0.46788	-0.63944	0.280728
Bacteroide	-0.86713	0.685315	0.72028	0.867133	0.783217	-0.46853	-0.42657	-0.58741	0.678322	-0.64336	0.517483	0.538462	0.769231	-0.37762	0.86014	-0.72028	0.475524	0.699301	0.783217	-0.62238
Alloprevot	-0.8042	0.440559	0.664336	0.587413	0.643357	-0.61538	-0.68531	-0.84615	0.475524	-0.77622	0.188811	0.160839	0.517483	-0.29371	0.797203	-0.75524	0.27972	0.454545	0.685315	-0.67133
Paraprevo	-0.4648	0.450715	0.704243	0.359164	0.570437	-0.8803	-0.76058	-0.6972	0.52114	-0.54227	-0.12676	0.077467	0.457758	-0.38733	0.647903	-0.53522	0.063382	0.140849	0.239443	-0.28874
Prevotella	0.846154	-0.73427	-0.7972	-0.51748	-0.84615	0.440559	0.391608	0.671329	-0.68531	0.566434	-0.59441	-0.38462	-0.62937	0.86014	-0.8042	0.727273	-0.47552	-0.5035	-0.62238	0.398601
Prevotella	-0.51748	0.363636	0.559441	0.181818	0.622378	-0.79021	-0.81119	-0.83916	0.314685	-0.48252	-0.14685	-0.14685	0.132867	-0.39161	0.601399	-0.59441	-0.06294	0.020979	0.230769	-0.30769
Rikenellac	-0.37478	0.514887	0.556919	0.441332	0.33275	-0.34326	-0.18914	-0.33275	0.676008	-0.56743	0.084063	0.388792	0.78459	-0.46585	0.409808	-0.58144	0.448337	0.357268	0.472855	-0.36427
Parabacte	-0.65035	0.377622	0.293706	0.65035	0.524476	-0.15385	-0.35664	-0.27273	0.013986	-0.2028	0.622378	0.055944	0.146853	-0.02797	0.566434	-0.44755	0.258741	0.412587	0.566434	-0.40559
Bilophila	-0.80779	0.536176	0.490319	0.631418	0.634945	-0.22576	-0.44799	-0.4233	0.39155	-0.58203	0.599671	0.165791	0.444462	-0.45857	0.511484	-0.69491	0.218703	0.416242	0.673748	-0.61025
Faecalibac	0.516096	-0.34881	-0.53745	-0.53389	-0.55169	0.384402	0.110338	0.34881	-0.42711	0.419995	-0.33101	-0.30254	-0.54813	0.192201	-0.58016	0.530333	-0.35237	-0.56949	-0.62999	0.573044
Enterococ	0.81738	-0.63076	-0.82485	-0.76513	-0.7502	0.60837	0.55985	0.794986	-0.79125	0.850971	-0.2426	-0.59717	-0.80245	0.511329	-0.78752	0.81738	-0.44788	-0.61583	-0.82485	0.761395
Lactobacil	0.503497	-0.1049	-0.39161	-0.30769	-0.34965	0.370629	0.258741	0.545455	-0.40559	0.685315	-0.00699	-0.11888	-0.46853	0.062937	-0.44056	0.503497	-0.09091	-0.41259	-0.53147	0.671329
Lactococc	0.639436	-0.48348	-0.82659	-0.60824	-0.69402	0.849982	0.733012	0.787598	-0.52247	0.66283	-0.12477	-0.28853	-0.56925	0.366506	-0.7954	0.647234	-0.24954	-0.3743	-0.60824	0.553658
Clostridia_	-0.51748	0.524476	0.706294	0.552448	0.671329	-0.74126	-0.72727	-0.57343	0.272727	-0.27972	0.328671	0.20979	0.307692	-0.37762	0.727273	-0.39161	0.174825	0.174825	0.377622	-0.16084
Clostridiur	0.826588	-0.7954	-0.56146	-0.80319	-0.7876	0.218344	0.374304	0.42889	-0.56146	0.538062	-0.70962	-0.46788	-0.63944	0.58485	-0.59265	0.764204	-0.34311	-0.46008	-0.81099	0.522466
Faecalibac	0.582464	-0.63239	-0.70728	-0.32868	-0.74056	0.678155	0.624069	0.765525	-0.34532	0.291232	-0.25379	-0.04577	-0.27875	0.63239	-0.82377	0.628229	-0.37444	-0.17058	-0.37444	0.09153
Dialister	0.824845	-0.80245	-0.81738	-0.67555	-0.8771	0.481471	0.500132	0.757663	-0.64943	0.597173	-0.54865	-0.53746	-0.63823	0.802451	-0.80245	0.809916	-0.52253	-0.46654	-0.80992	0.477738
Haliangiur	-0.35088	0.031579	-0.01053	0.326318	-0.06316	0.252633	0.26316	-0.1614	0.336844	-0.39649	0.021053	0.305265	0.463161	0.284212	0.340353	-0.25614	0.526319	0.652636	0.371932	-0.41404
Sphingom	-0.29072	0.024518	0.129597	0.343258	-0.02452	0.101576	0.273205	-0.10858	0.311734	-0.33625	0.087566	0.287216	0.511384	0.248687	0.3993	-0.22067	0.567426	0.6655	0.38529	-0.39229
Delftia	0.852672	-0.72552	-0.82275	-0.81527	-0.86389	0.684381	0.721779	0.766657	-0.64324	0.732998	-0.4039	-0.44129	-0.68438	0.53479	-0.81527	0.819014	-0.30292	-0.46373	-0.80031	0.643244
Escherichi	0.674356	-0.76137	-0.89914	-0.54384	-0.78312	0.645351	0.464073	0.717863	-0.65985	0.522082	-0.35531	-0.36981	-0.67436	0.797625	-0.85563	0.804876	-0.64535	-0.44957	-0.64535	0.362557
Akkerman	0.475524	-0.41958	-0.87413	-0.41259	-0.5035	0.657343	0.34965	0.48951	-0.62937	0.566434	-0.18182	-0.31469	-0.67832	0.615385	-0.63636	0.559441	-0.52448	-0.48252	-0.46853	0.475524

Supplementary Table 8 P value matrix for correlation analysis between gut microbiota and HUA-related parameters

	SUA	UUA	SCRE	BUN	L-XOD	K-URAT1	J-URAT1	K-ABCG2	J-ABCG2	K-Occludi	J-Occludi	K-ZO-1	J-ZO-1	K-GLUT9	J-GLUT9
Bryobacte	0.004398	0.512085	0.003596	0.050765	0.006793	0.003355	0.18088	0.010601	0.104846	0.018175	0.185824	0.00291	0.034067	0.571016	0.230003
Bifidobact	0.000521	0.862898	0.002586	0.366251	0.038588	0.005801	0.335508	0.015317	0.047374	0.044609	0.130948	0.038588	0.03317	0.245265	0.038588
Collinsella	0.010957	0.181741	0.008624	0.735559	0.06182	0.002779	0.610435	0.00198	0.016725	0.015296	0.005847	0.020783	0.053379	0.049477	0.139875
Bacteroide	0.009202	0.948402	0.00824	0.484452	0.002993	0.001615	1	0.00395	0.036759	0.001143	0.035806	0.000521	0.002993	0.21702	0.02832
Alloprevot	0.002993	0.633091	0.001363	0.084869	0.001363	0.001615	0.593787	0.022034	0.015807	0.00395	0.062511	0.005801	0.00395	0.484452	0.137658
Paraprevo	0.222673	0.187418	0.33869	0.072939	0.019022	0.022709	0.501834	0.0603	0.480499	0.134549	0.0085	0.261643	0.001962	0.163399	0.481287
Prevotella	0.009202	0.680598	0.026097	0.795415	0.047856	0.002586	0.948312	0.03317	0.000498	0.003446	0.004508	0.062511	0.012593	0.084869	0.1667
Prevotella	0.265239	0.044609	0.199335	0.151735	0.038588	0.041521	0.239528	0.174519	0.086718	0.1667	0.018453	0.416775	0.02832	0.470532	0.633091
Rikenellac	0.012375	0.99138	0.054324	0.512085	0.074756	0.147339	0.129425	0.009024	0.585491	0.140313	0.126919	0.074756	0.04259	0.023677	0.169753
Parabacte	0.124455	0.541936	0.058589	0.556737	0.199335	0.182564	0.624676	0.541936	0.063977	0.137658	0.527302	0.112109	0.151735	0.829024	0.391097
Bilophila	0.003227	0.203706	0.00743	0.70226	0.089184	0.174305	0.685466	0.399523	0.002518	0.036455	0.297865	0.147719	0.047092	0.3261	0.226449
Faecalibac	0.034354	0.817421	0.001897	0.895145	0.170048	0.083341	0.71572	0.011062	0.205065	0.104884	0.110797	0.022741	0.034354	0.363483	0.005539
Enterococ	0.006433	0.694318	0.004947	0.405191	6.81E-05	0.000782	0.472171	0.00096	0.03686	6.81E-05	0.010383	0.000565	0.002555	0.180586	0.019359
Lactobacil	0.016831	0.982792	0.0019	0.416775	0.112109	0.112109	0.244376	0.051266	0.123706	0.106252	0.391097	0.044609	0.100603	0.931234	0.038588
Lactococc	0.038979	0.376781	0.030172	0.111294	0.001125	0.00137	0.894528	0.008624	0.209362	0.01373	0.006684	0.022896	0.000359	0.210231	0.076151
Clostridia_	0.354148	0.456801	0.484452	0.1667	0.026097	0.013906	0.318245	0.190836	0.409428	0.100603	0.022034	0.245265	0.012593	0.226206	0.484452
Clostridiur	0.000588	0.363094	0.002354	0.753912	0.01373	0.086876	0.847006	0.053379	0.005715	0.020783	0.155788	0.038979	0.04578	0.071145	0.042283
Faecalibac	0.10852	0.021268	0.11561	0.395258	0.034583	0.00221	0.346832	0.028695	0.061449	0.080195	0.001226	0.160048	0.015352	0.083061	0.569032
Dialister	0.003736	0.529908	0.005653	0.826649	0.001683	0.001167	0.785984	0.004309	0.002904	0.00096	0.004309	0.012252	0.016722	0.04877	0.056349
Haliangiur	0.25837	0.922389	0.168924	0.753012	0.434902	0.229118	0.149335	0.126163	0.485609	0.146543	0.811533	0.005206	0.777965	0.562806	0.49701
Sphingom	0.207197	0.948312	0.114389	0.845664	0.519302	0.181721	0.116709	0.072507	0.736497	0.189985	0.90537	0.006402	0.462837	0.845664	0.301483
Delftia	0.002675	0.880732	0.003899	0.202037	2.82E-05	0.002097	0.953924	0.006685	0.024806	0.001769	0.010753	0.008539	0.000478	0.096976	0.031225
Escherichi	0.00597	0.142564	0.008563	0.770747	0.010708	0.000486	0.761743	0.000233	0.054765	0.008563	3.27E-05	0.017798	0.000915	0.00597	0.121922
Akkerman	0.070894	0.617523	0.106252	0.96559	0.151735	0.022034	0.307014	0.044609	0.37151	0.03317	0.002993	0.112109	0.001143	0.062511	0.208063

Supplementary Table 9 Spearman rank correlation matrix for correlation analysis between gut microbiota and HUA-related parameters

	SUA	UUA	SCRE	BUN	L-XOD	K-URAT1	J-URAT1	K-ABCG2	J-ABCG2	K-Occludi	J-Occludi	K-ZO-1	J-ZO-1	K-GLUT9	J-GLUT9
Bryobacte	0.756569	-0.21016	0.767076	-0.57443	0.73205	0.770579	0.414035	-0.70403	-0.49123	-0.6655	-0.40981	-0.77758	-0.61296	0.182137	0.374782
Bifidobact	-0.84615	-0.05594	-0.78322	0.286713	-0.6014	-0.74126	-0.30473	0.678322	0.581437	0.587413	0.461538	0.601399	0.615385	-0.36364	-0.6014
Collinsella	-0.70182	0.413294	-0.71742	-0.10917	-0.55366	-0.7798	-0.16404	0.795396	0.671803	0.678426	0.74081	0.655032	0.569254	-0.57705	-0.45228
Bacteroide	0.713287	0.020979	0.72028	-0.22378	0.776224	0.804196	0	-0.76224	-0.60596	-0.81818	-0.60839	-0.84615	-0.77622	0.384615	0.629371
Alloprevot	0.776224	-0.15385	0.811189	-0.51748	0.811189	0.804196	0.171629	-0.65035	-0.67601	-0.76224	-0.55245	-0.74126	-0.76224	0.223776	0.454545
Paraprevo	0.380291	-0.40846	0.302824	-0.53522	0.661988	0.647903	-0.21517	-0.55635	-0.22575	-0.45776	-0.71833	-0.35212	-0.79579	0.429588	0.225358
Prevotella	-0.71329	0.132867	-0.63636	-0.08392	-0.58042	-0.78322	0.021016	0.615385	0.847637	0.769231	0.755245	0.552448	0.692308	-0.51748	-0.42657
Prevotella	0.34965	-0.58741	0.398601	-0.44056	0.601399	0.594406	-0.36778	-0.41958	-0.51489	-0.42657	-0.66434	-0.25874	-0.62937	0.230769	0.153846
Rikenellac	0.693521	0.003503	0.567426	-0.21016	0.5324	0.444834	0.463158	-0.71454	-0.17544	-0.45184	-0.46585	-0.5324	-0.59194	0.644484	0.423819
Parabacte	0.468531	0.195804	0.559441	-0.18881	0.398601	0.412587	-0.15762	-0.1958	-0.54991	-0.45455	-0.2028	-0.48252	-0.44056	0.06993	0.272727
Bilophila	0.772517	0.395077	0.72666	-0.12346	0.511484	0.419769	0.130745	-0.26809	-0.78447	-0.60673	-0.32806	-0.44446	-0.58203	0.310418	0.37744
Faecalibac	-0.6122	0.074745	-0.79728	-0.04271	-0.42355	-0.51966	-0.11766	0.701179	0.39399	0.491181	0.484062	0.647789	0.612197	-0.2883	-0.74389
Enterococ	-0.73527	0.126899	-0.7502	0.264995	-0.89949	-0.83231	-0.22994	0.824845	0.605697	0.899492	0.705411	0.843507	0.783789	-0.41429	-0.66062
Lactobacil	-0.67133	0.006993	-0.7972	0.258741	-0.48252	-0.48252	-0.36427	0.573427	0.469353	0.48951	0.272727	0.587413	0.496503	-0.02797	-0.6014
Lactococc	-0.60045	0.280728	-0.62384	0.483476	-0.81879	-0.81099	-0.04296	0.717416	0.390583	0.686224	0.733012	0.647234	0.85778	-0.3899	-0.53026
Clostridia_	0.293706	-0.23776	0.223776	-0.42657	0.636364	0.685315	-0.31524	-0.40559	-0.2627	-0.4965	-0.65035	-0.36364	-0.69231	0.377622	0.223776
Clostridiur	-0.84218	-0.28853	-0.7876	0.101374	-0.68622	-0.51467	-0.06249	0.569254	0.742108	0.655032	0.436688	0.600446	0.58485	-0.53806	-0.59265
Faecalibac	-0.48677	0.653192	-0.47845	0.27043	-0.61159	-0.79049	0.297994	0.628229	0.554311	0.524218	0.81545	0.432688	0.678155	-0.52006	-0.18306
Dialister	-0.76513	0.201546	-0.74273	0.070914	-0.80245	-0.81738	-0.08786	0.757663	0.777686	0.824845	0.757663	0.694214	0.67182	-0.57851	-0.56358
Haliangiur	0.354388	0.031579	0.424564	-0.10176	0.249124	0.375441	0.442883	-0.46667	-0.2232	-0.44562	0.077193	-0.74737	-0.09123	-0.18597	0.217545
Sphingom	0.392295	0.021016	0.479861	-0.06305	0.206655	0.413311	0.477193	-0.5359	-0.10877	-0.40631	-0.03853	-0.73555	-0.23468	-0.06305	0.325745
Delftia	-0.78162	0.048617	-0.76292	0.396418	-0.91625	-0.79284	-0.01873	0.732998	0.640625	0.800315	0.70308	0.718039	0.848932	-0.50113	-0.6208
Escherichi	-0.73962	0.449571	-0.71786	0.094265	-0.70336	-0.84838	-0.09806	0.870137	0.56658	0.717863	0.913643	0.667105	0.82663	-0.73962	-0.47132
Akkerman	-0.53846	0.160839	-0.48951	-0.01399	-0.44056	-0.65035	-0.32224	0.587413	0.283713	0.615385	0.776224	0.482517	0.818182	-0.55245	-0.39161