Supplementary Information

Table S1. The ingredients and energy of the normal chow diet and high-fat diet.

Ingredient	Normal chow diet (gm) （#D10012G）	High-fat diet (gm) （#D12109C）
Casein	200	200
L-Cystine	3	3
Con Starch	397	212
Maltodextrin 10	132	71
Sucrose	100	113
Cellulose,BW200	50	50
SoybeanOil	70	25
t-Butylhydroquinone	0.014	0
Mineral Mix S10022G	35	0
Vitamin Mix V10037	10	0
Choline Bitartrate	2.5	2
Cocoa Butter	0	155
Mineral Mix S10021	0	10
Dicalcium Phosphate	0	13
Calcium Carbonate	0	5.5
Potassium Citrate	0	16.5
Vitamin Mix V10001	0	10
Cholesterol	0	11.25
Sodium Cholate	0	4.5
Calorie sources (kcal %)	Normal chow diet（kcal%）	High-fat diet（kcal%）
Protein	20.3	20
Carbohydrate	63.9	40
Fat	15.8	40
kcal/gm	3.9	4.5

Table S2. The procedures and instrument parameters of fecal metabolomics analysis based on UHPLC-Triple TOF

Item	Information and parameters
Chromatographic column	ACQUITY UPLC HSS T3 column (100 mm × 2.1 mm i.d., 1.8 μm)
Mobile phase	A: 95% water + 5% acetonitrile (containing 0.1% formic acid) B: 47.5% acetonitrile + 47.5% isopropanol + 5% water (containing 0.1% formic acid)
UPLC	Injection volume, 10 μL; column temperature, 45℃; flow rate, 0.4 mL/min
MS condition	Electrospray ionization (ESI); Positive and negative ion scanning modes
MS parameter	Scan type 50-1200m/z; Ion Source Gas1 50psi; Ion Source Gas2 50psi; Curtain Gas 35psi; Source Temperature 500℃; IonSpray Voltage Floating (+) 5500V; IonSpray Voltage Floating（-）-4500V; Declustering Potential 80V; Collision Energy 40±20eV

Table S3. Detailed information of intestinal differential metabolites between HC and NC groups

Retention time	Metabolite	M/Z	Adducts	Formula	VIP	FC	Trend	P	HMDB number	Score
6.79	Diosgenin	437.3037406	M+Na	C27 H42 O3	2.6849	0.048	↓	***	HMDB0242671	44.8
8.11	Ceanothenic Acid	455.3136384	M+H	C29 H42 O4	2.6391	0.1791	↓	***	HMDB0036850	44.7
4.33	Cimifugin	311.091276	M+Na-H2O	C16 H18 O6	2.6458	0.0098	↓	***	HMDB0250254	45.6
8.08	Pi(Pgf1Alpha/18:0)	919.561419	M-H2O-H	C47 H87 O16 P	2.616	0.1592	↓	***	HMDB0276437	43.8
4.82	Obtustyrene	285.1138309	M+FA-H	C16 H16 O2	2.5839	0.0613	↓	***	HMDB0030672	46.5
6.79	Coenzyme Q4	455.313222	M+H	C29 H42 O4	2.5471	0.2657	↓	***	LMPR02010003	45.1
7.62	Ginkgolic Acid	347.2569101	M+H	C22 H34 O3	2.584	7.1926	↑	***	HMDB0033897	47.2
4.82	Acetylshikonin	331.1177911	M+H	C18 H18O6	2.5509	0.0834	↓	***	HMDB0247936	45.9
4.82	Pongamol	295.095814	M+H	C18 H14 O4	2.531	0.284	↓	***	HMDB0253968;LMPK12120373;LMPK12120614	48.3
4.82	Pteroic Acid	313.1069644	M+H	C14 H12 N6 O3	2.5114	0.3566	↓	***	HMDB0256914	46.5
4.49	Seneciphylline	334.1636662	M+H	C18 H23 N O5	2.4739	0.0369	↓	***	HMDB0258231	47.5
7.96	Limaprost	361.2352309	M-H2O-H	C22 H36 O5	2.4637	0.0004	↓	***	HMDB0254093	45.1
10.16	Dg(20:4(8Z,11Z,14Z,17Z)/15:0/0:0)	603.4922824	M+H	C38 H66 O5	2.3878	2.6283	↑	***	HMDB0007532	44
3.75	Dihydroconiferyl Alcohol	241.1087515	M+Hac-H	C10 H14 O3	2.3957	0.0685	↓	***	HMDB0303757	45.9
4.80	Cyclokievitone	355.116506	M+H	C20 H18 O6	2.3567	10.5615	↑	***	HMDB0033983	46
8.66	Pe(22:6(4Z,7Z,11E,13Z,15E,19Z)-2Oh(10S,17)/22:1(13Z))	910.6131987	M+CH3OH+H	C49 H84 N O10 P	2.3135	3.0837	↑	***	HMDB0283903	42.2
4.37	Coclaurine	286.1436408	M+H	C17 H19 N O3	2.2612	4.0769	↑	***	HMDB0303359	45.4
3.98	4-Ethylphenol	121.0658421	M-H	C8 H10 O	2.2817	10.3382	↑	***	HMDB0029306	50.6
9.06	Pc(22:0/16:0)	856.6116884	M+K	C46 H92 N O8 P	2.2468	2.9736	↑	***	HMDB0008528	40.9
9.81	1-Eicosanoyl-Sn-Glycero-3-Phosphocholine	552.3989407	M+H	C28 H58 N O7 P	2.2598	2.7717	↑	***	LMGP01050045	41.7
3.73	Walleminone	235.1695997	M+H-H2O	C15 H24 O3	2.1805	0.2376	↓	***	-	47.9
9.25	Phosphatidylcholine Lyso 18:0	1047.733119	2M+H	C26 H54 N O7 P	2.1921	2.1801	↑	***	-	46.2
7.00	2-Hydroxy-6,7-Dimethoxy-1,1-Dimethyl-2,9,10,10A-Tetrahydrophenanthren-3-One	303.1608825	M+H	C18 H22 O4	2.2029	0.3057	↓	***	-	43.1
4.47	Zolazepam	304.1590426	M+NH4	C15 H15 F N4 O	2.1785	0.231	↓	***	HMDB0260040	43.5
3.98	3-(3-Hydroxyphenyl)Propanoic Acid	165.0560907	M-H	C9 H10 O3	2.1912	3.2857	↑	***	HMDB0000375	55.1
4.81	Caffeic Acid Ester	329.1035833	M+FA-H	C17 H16 O4	2.1621	0.4384	↓	***	HMDB0302344	47.2
7.30	Pe-Nme(22:2(13Z,16Z)/20:5(5Z,8Z,11Z,14Z,17Z))	832.5860425	M+H	C48 H82 N O8 P	2.1536	3.1089	↑	***	HMDB0113582	47.4

6.88	Porrigenin A	471.3080604	M+Na	C27 H44 O5	2.1195	0.3527	↓	***	HMDB0032783	46.4
4.51	(6S,8Z)-6-Hydroxy-3-Oxotetradecenoic Acid	301.1657485	M+FA-H	C14 H24 O4	2.1469	0.2235	↓	***	HMDB0062364	48
7.23	Fa(18:1+2O)	315.251994	M+H	C18 H34 O4	2.1088	0.274	↓	***	-	50.3
6.05	Frequentin	253.1433197	M+H	C14 H20 O4	2.1211	0.1737	↓	***	-	46.8
9.30	Pc(20:1/0:0)	550.3832921	M+H	C28 H56 N O7 P	2.1152	2.2849	↑	***	LMGP01050047	46.8
6.60	17-Aag	568.3010983	M+H-H2O	C31 H43 N3 O8	2.1072	0.2198	↓	***	HMDB0244762	45
7.45	Asperagenin	471.3095933	M+Na	C27 H44 O5	2.1054	0.4715	↓	***	HMDB0034293	47.9
3.72	2-Methylbenzoic Acid	195.0667325	M+Hac-H	C8 H8 O2	2.104	5.2268	↑	***	HMDB0002340	48.7
7.16	Curcumenol	235.1689615	M+H	C15 H22 O2	2.1019	0.2518	↓	***	HMDB0033960	51
8.59	Lysopc(20:3(5Z,8Z,11Z)/0:0)	590.3427957	M+FA-H	C28 H52 N O7 P	2.0824	6.0307	↑	***	HMDB0010393	46.6
1.33	6-Benzoyl-2-Methylbenzo[De]Isoquinoline-1,3-Dione	316.0995543	M+H	C20 H13 N O3	2.0786	0.2851	↓	***	-	43.7
10.12	6-Isobutyl-4-Hydroxy-2-Pyrone	333.1333737	2M-H	C9 H11 O3-	2.0721	10.728	↑	***	HMDB0304229	47
7.34	Pi(34:0)	837.5501788	M-H	C43 H83 O13 P	2.0603	3.0459	↑	***	HMDB0009781	42.2
8.72	5-Hexyltetrahydro-2-Furanoctanoic Acid	299.2570493	M+H	C18 H34 O3	2.0651	0.3074	↓	***	HMDB0031127	47.4
8.67	Pc(20:0/Txb2)	902.6101633	M-H	C48 H90 N O12 P	2.0464	10.2953	↑	***	HMDB0286972	41.8
8.73	Palmitoleic Acid Ethyl Ester	247.2413411	M+H-2H2O	C18 H34 O2	2.0463	0.2807	↓	***	-	45.1
8.56	3Beta,7Alpha-Dihydroxy-5-Cholestenoate	433.328006	M+H	C27 H44 O4	2.038	0.464	↓	***	HMDB0012454	47.6
6.61	Eremopetasinorol	209.1528152	M+H	C13 H20 O2	2.039	0.1273	↓	***	HMDB0029668	48.3
9.84	Cis-4,10,13,16-Docosatetraenoic Acid	663.5324733	2M-H	C22 H36 O2	2.0124	0.175	↓	***	-	52
7.60	N-Eicosapentaenoyl Arginine	459.3359458	M+H	C26 H42 N4 O3	2.0168	0.4611	↓	***	HMDB0242065	45.4
7.44	25-Hydroxyvitamin D3 3-Sulfate Ester	498.3216884	M+NH4	C27 H44 O5 S	2.0016	2.6924	↑	***	HMDB0245688	47.2

Table S4. Detailed information of intestinal differential metabolites between CA and HC groups

Retention time	Metabolite	M/Z	Adducts	Formula	VIP	FC	Trend	P	HMDB number	Score
8.73	3-Hydroxyoctadecanoic Acid	301.2723023	M+H	C18 H36 O3	3.4053	23.5446	↑	***	-	44.6
8.72	5-Hexyltetrahydro-2-Furanoctanoic Acid	299.2570493	M+H	C18 H34 O3	3.1689	4.5833	↑	***	HMDB0031127	47.4
8.74	(R)-2-Hydroxystearic Acid	599.5234668	2M-H	C18 H36 O3	3.1862	6.1632	↑	***	-	54.8
8.73	Palmitoleic Acid Ethyl Ester	247.2413411	M+H-2H2O	C18 H34 O2	3.0722	5.0879	↑	***	-	45.1
8.72	Dg(15:0/Pgf1Alpha/0:0)	619.4867905	M+H-2H2O	C38 H70 O8	3.0081	11.0369	↑	***	HMDB0295383	42.1
9.21	Methyl Oleate	297.2771285	M+H	C19 H36 O2	3.0223	4.3516	↑	***	HMDB0034451;LMFA07010965	49.8
4.82	Obtustyrene	285.1138309	M+FA-H	C16 H16 O2	2.7669	12.1561	↑	***	HMDB0030672	46.5
8.31	Pgp(20:1(11Z)/18:2(9Z,12Z))	898.5648326	M+NH4	C44 H82 O13 P2	2.5943	3.3062	↑	***	HMDB0116451	45.1
8.75	(+/-)-Menthyl Acetate	199.1673921	M+H	C12 H22 O2	2.5893	5.3855	↑	***	HMDB0041264	46.4
3.49	Cyclamate	178.0543737	M-H	C6 H13 N O3 S	2.6595	0.1786	↓	***	-;HMDB0031340	47.5
4.49	Seneciphylline	334.1636662	M+H	C18 H23 N O5	2.4656	22.9155	↑	***	HMDB0258231	47.5
3.47	2-Phenoxypropanoic Acid	165.0557228	M-H	C9 H10 O3	2.4357	0.1619	↓	***	-	48.8
5.12	Calendasaponin B	977.4680191	M+Na-H2O	C48 H76 O20	2.382	2.5526	↑	***	HMDB0039009	41.2
8.73	Pa(18:0/18:1(12Z)-2Oh(9,10))	752.5372455	M+NH4	C39 H75 O10 P	2.29	4.0464	↑	***	HMDB0263631	42.7
4.82	Pongamol	295.095814	M+H	C18 H14 O4	2.2605	2.6316	↑	***	HMDB0253968;LMPK12120373; LMPK12120614	48.3
4.80	Cyclokievitone	355.116506	M+H	C20 H18 O6	2.2519	0.3084	↓	***	HMDB0033983	46
3.75	Dihydroconiferyl Alcohol	241.1087515	M+Hac-H	C10 H14 O3	2.3178	9.0703	↑	***	HMDB0303757	45.9
3.72	2-Methylbenzoic Acid	195.0667325	M+Hac-H	C8 H8 O2	2.3681	0.358	↓	***	HMDB0002340	48.7
4.49	N-Dihydroferuloyltyramine	316.1539339	M+H	C18 H21 N O4	2.2828	0.4255	↓	***	HMDB0033028	46.2
9.20	Tg(15:0/14:1(9Z)/22:4(7Z,10Z,13Z,16Z))	859.6832457	M+Na-2H	C54 H94 O6	2.2354	2.9229	↑	***	HMDB0043183	40
5.99	Nb-P-Coumaroyltryptamine	307.1444093	M+H	C19 H18 N2 O2	2.228	0.3343	↓	***	HMDB0041518	45.9
8.98	Pe(P-18:1(11Z)/16:1(9Z))	717.5587431	M+NH4	C39 H74 N O7 P	2.1428	0.3966	↓	***	HMDB0011405	43.3
7.00	2-Hydroxy-6,7-Dimethoxy-1,1-Dimethyl-2,9,10,10A-Tetrahydrophenanthren-3-One	303.1608825	M+H	C18 H22 O4	2.1301	2.7158	↑	***	-	43.1
7.24	Pi(18:2(9Z,12Z)/Pgf1Alpha)	989.5587363	M+CH3OH+Na	C47 H83 O16 P	2.1892	3.7918	↑	***	HMDB0276747	44.1
5.01	1-(1-(Tert-Butoxycarbonyl)Piperidin-4-Yl)Azetidine-3-Carboxylic Acid	339.1895733	M+CH3OH+Na	C14 H24 N2 O4	2.1662	3.6687	↑	***	HMDB0247560	46.3
6.09	Pa(18:1(12Z)-2Oh(9,10)/8:0)	617.3420624	M+Na	C29 H55 O10 P	2.1816	3.2093	↑	***	HMDB0266642	47.2
5.76	4-(8-Amino-1,2,3,4-Tetrahydro-2-Methyl-4-Isoquinolinyl)-2-Methoxyphenol	339.169951	M+CH3OH+Na	C17 H20 N2 O2	2.1654	0.4431	↓	***	HMDB0246296	47.1
5.03	N-Trans-Feruloyltyramine	312.1231953	M-H	C18 H19 N O4	2.1717	0.1643	↓	***	HMDB0029365	49

8.08	Pi(Pgf1Alpha/18:0)	919.561419	M-H2O-H	C47 H87 O16 P	2.0416	3.4358	↑	**	HMDB0276437	43.8
5.99	2-Phenyl-3-(3,4,5-Trimethoxyphenyl)Acrylonitrile	337.1543992	M+ACN+H	C18 H17 N O3	2.0647	0.4318	↓	***	-	45.5
6.05	Frequentin	253.1433197	M+H	C14 H20 O4	2.0249	4.4889	↑	***	-	46.8
4.82	Pteroic Acid	313.1069644	M+H	C14 H12 N6 O3	2.0661	2.0442	↑	***	HMDB0256914	46.5
4.51	(6S,8Z)-6-Hydroxy-3-Oxotetradecenoic Acid	301.1657485	M+FA-H	C14 H24 O4	2.2079	3.3916	↑	***	HMDB0062364	48
5.24	4-Tert-Butylphenyl Salicylate	315.1243731	M+FA-H	C17 H18 O3	2.0183	2.5305	↑	***	HMDB0041314	46.1
9.01	Lysopc(P-18:1(9Z)/0:0)	550.346638	M+FA-H	C26 H52 N O6 P	2.0255	0.2255	↓	***	HMDB0010408	45
3.39	3-(3-Sulfooxyphenyl)Propanoic Acid	245.0124429	M-H	C9 H10 O6 S	2.041	0.2031	↓	***	-	51.5
6.90	Pregnanediol 3-O-Glucuronide	495.2947114	M-H	C27 H44 O8	2.0036	0.3416	↓	***	HMDB0010318	45.7
3.98	4-Ethylphenol	121.0658421	M-H	C8 H10 O	1.9212	0.4627	↓	**	HMDB0029306	50.6

Table S5. Detailed information of intestinal differential metabolites between CM and HC groups

Retention time	Metabolite	M/Z	Adducts	Formula	VIP	FC	Trend	P	Library ID	Score
8.73	3-Hydroxyoctadecanoic Acid	301.27230	M+H	C18 H36 O3	3.1379	23.8378	↑	***	-	44.6
8.72	5-Hexyltetrahydro-2-Furanoctanoic Acid	299.25705	M+H	C18 H34 O3	3.0459	4.9608	↑	***	HMDB0031127	47.4
8.72	Dg(15:0/Pgf1Alpha/0:0)	619.48679	M+H-2H2O	C38 H70 O8	3.0258	13.0524	↑	***	HMDB0295383	42.1
8.74	(R)-2-Hydroxystearic Acid	599.52347	2M-H	C18 H36 O3	2.8352	6.1839	↑	***	-	54.8
8.73	Palmitoleic Acid Ethyl Ester	247.24134	M+H-2H2O	C18 H34 O2	2.8103	5.094	↑	***	-	45.1
9.21	Methyl Oleate	297.27713	M+H	C19 H36 O2	2.7644	4.3039	↑	***	HMDB0034451;LMFA07010965	49.8
7.34	Pi(34:0)	837.55018	M-H	C43 H83 O13 P	2.5819	0.2405	↓	***	HMDB0009781	42.2
3.72	2-Methylbenzoic Acid	195.06673	M+Hac-H	C8 H8 O2	2.5794	0.1023	↓	***	HMDB0002340	48.7
5.76	4-(8-Amino-1,2,3,4-Tetrahydro-2-Methyl-4-Isoquinolinyl)-2-Methoxyphenol	339.16995	M+CH3OH+Na	C17 H20 N2 O2	2.4335	0.2295	↓	***	HMDB0246296	47.1
8.59	Lysopc(20:3(5Z,8Z,11Z)/0:0)	590.34280	M+FA-H	C28 H52 N O7 P	2.4024	0.1339	↓	***	HMDB0010393	46.6
8.31	Pgp(20:1(11Z)/18:2(9Z,12Z))	898.56483	M+NH4	C44 H82 O13 P2	2.3687	3.3127	↑	***	HMDB0116451	45.1
8.73	Pa(18:0/18:1(12Z)-2Oh(9,10))	752.53725	M+NH4	C39 H75 O10 P	2.3222	4.6348	↑	***	HMDB0263631	42.7
4.49	N-Dihydroferuloyltyramine	316.15393	M+H	C18 H21 N O4	2.3548	0.3276	↓	***	HMDB0033028	46.2
3.49	Cyclamate	178.05437	M-H	C6 H13 N O3 S	2.3532	0.1722	↓	***	-;HMDB0031340	47.5
8.75	(+/-)-Menthyl Acetate	199.16739	M+H	C12 H22 O2	2.3214	5.1825	↑	***	HMDB0041264	46.4
9.25	Phosphatidylcholine Lyso 18:0	1047.73312	2M+H	C26 H54 N O7 P	2.3034	0.4676	↓	***	-	46.2
6.09	Pa(18:1(12Z)-2Oh(9,10)/8:0)	617.34206	M+Na	C29 H55 O10 P	2.2795	3.8534	↑	***	HMDB0266642	47.2
3.47	2-Phenoxypropanoic Acid	165.05572	M-H	C9 H10 O3	2.2757	0.0946	↓	***	-	48.8
8.67	Pc(20:0/Txb2)	902.61016	M-H	C48 H90 N O12 P	2.2692	0.1355	↓	***	HMDB0286972	41.8
8.08	Pi(Pgf1Alpha/18:0)	919.56142	M-H2O-H	C47 H87 O16 P	2.2567	4.3375	↑	***	HMDB0276437	43.8
3.98	4-Ethylphenol	121.06584	M-H	C8 H10 O	2.238	0.2539	↓	***	HMDB0029306	50.6
8.28	Lysopc(22:6(4Z,7Z,10Z,13Z,16Z,19Z)/0:0)	612.32852	M+FA-H	C30 H50 N O7 P	2.2318	0.1644	↓	***	HMDB0010404	48.6
5.12	Calendasaponin B	977.46802	M+Na-H2O	C48 H76 O20	2.2155	2.6074	↑	***	HMDB0039009	41.2
4.80	Cyclokievitone	355.11651	M+H	C20 H18 O6	2.1803	0.2123	↓	***	HMDB0033983	46
5.99	Nb-P-Coumaroyltryptamine	307.14441	M+H	C19 H18 N2 O2	2.2124	0.242	↓	***	HMDB0041518	45.9
9.30	Lysopc(20:1(11Z)/0:0)	594.37389	M+FA-H	C28H56NO7P	2.1992	0.2882	↓	***	HMDB0010391	47.6
5.01	1-(1-(Tert-Butoxycarbonyl)Piperidin-4-Yl)Azetidine-3-Carboxylic Acid	339.18957	M+CH3OH+Na	C14 H24 N2 O4	2.1857	4.2421	↑	***	HMDB0247560	46.3
3.98	3-(3-Hydroxyphenyl)Propanoic Acid	165.05609	M-H	C9 H10 O3	2.1623	0.4148	↓	***	HMDB0000375	55.1
9.81	1-Eicosanoyl-Sn-Glycero-3-Phosphocholine	552.39894	M+H	C28 H58 NO 7P	2.1644	0.4428	↓	***	LMGP01050045	41.7
8.90	Cholylcitrulline	548.36679	M+H-H2O	C30 H51 N3 O7	2.1626	0.3117	↓	***	HMDB0242383	44
5.94	Pa(8:0/18:1(12Z)-2Oh(9,10))	617.34200	M+Na	C29H55O10P	2.1752	3.5113	↑	***	HMDB0266641	46.6

8.98	Pe(P-18:1(11Z)/16:1(9Z))	717.55874	M+NH4	C39 H74 NO 7P	2.1202	0.3003	↓	***	HMDB0011405	43.3
5.72	2-(1-{2-[3-(Methylthio)Anilino]-2-Oxoethyl}Cyclopentyl)Acetic Acid	308.13387	M+H	C16 H21 N O 3S	2.1202	4.5719	↑	***	-	43
9.47	20-Hydroxy-6Z,15Z-Eicosadienoic Acid	323.25756	M-H	C20 H36 O3	2.1266	5.2415	↑	***	HMDB0245564	46.9
5.99	2-Phenyl-3-(3,4,5-Trimethoxyphenyl)Acrylonitrile	337.15440	M+ACN+H	C18 H17 N O3	2.1259	0.3389	↓	***	-	45.5
9.06	Pc(22:0/16:0)	856.61169	M+K	C46 H92 N O8 P	2.078	0.4521	↓	***	HMDB0008528	40.9
9.01	Lysopc(P-18:1(9Z)/0:0)	550.34664	M+FA-H	C26 H52 N O6 P	2.0807	0.0588	↓	***	HMDB0010408	45
7.94	Myristoyllysophosphatidylcholine	468.30891	M+H	C22 H46 N O7 P	2.0688	0.0935	↓	***	-	42.3
6.05	Frequentin	253.14332	M+H	C14 H20 O4	2.0356	4.9415	↑	***	-	46.8
9.46	8Alpha-13(16),14-Labdadien-8-Ol	349.27225	M+Hac-H	C20 H34 O	2.0562	4.6801	↑	***	HMDB0035276	48.9
6.79	Diterpene Alkaloid	464.30013	M+Hac-H	C24 H39 N O4	2.0504	0.2429	↓	***	HMDB0251489	43
7.00	2-Hydroxy-6,7-Dimethoxy-1,1-Dimethyl-2,9,10,10A-Tetrahydrophenanthren-3-One	303.16088	M+H	C18 H22 O4	2.0319	2.821	↑	***	-	43.1
4.49	Seneciphylline	334.16367	M+H	C18 H23 N O5	1.984	19.0034	↑	***	HMDB0258231	47.5
9.20	Tg(15:0/14:1(9Z)/22:4(7Z,10Z,13Z,16Z))	859.68325	M+Na-2H	C54 H94 O6	2.0402	3.0401	↑	***	HMDB0043183	40
9.27	Docosahexaenoic Acid	655.46991	2M-H	C22 H32 O2	2.0115	0.3423	↓	***	HMDB0002183;PW_C001472	53.7
5.03	N-Trans-Feruloyltyramine	312.12320	M-H	C18 H19 N O4	1.9852	0.1218	↓	***	HMDB0029365	49

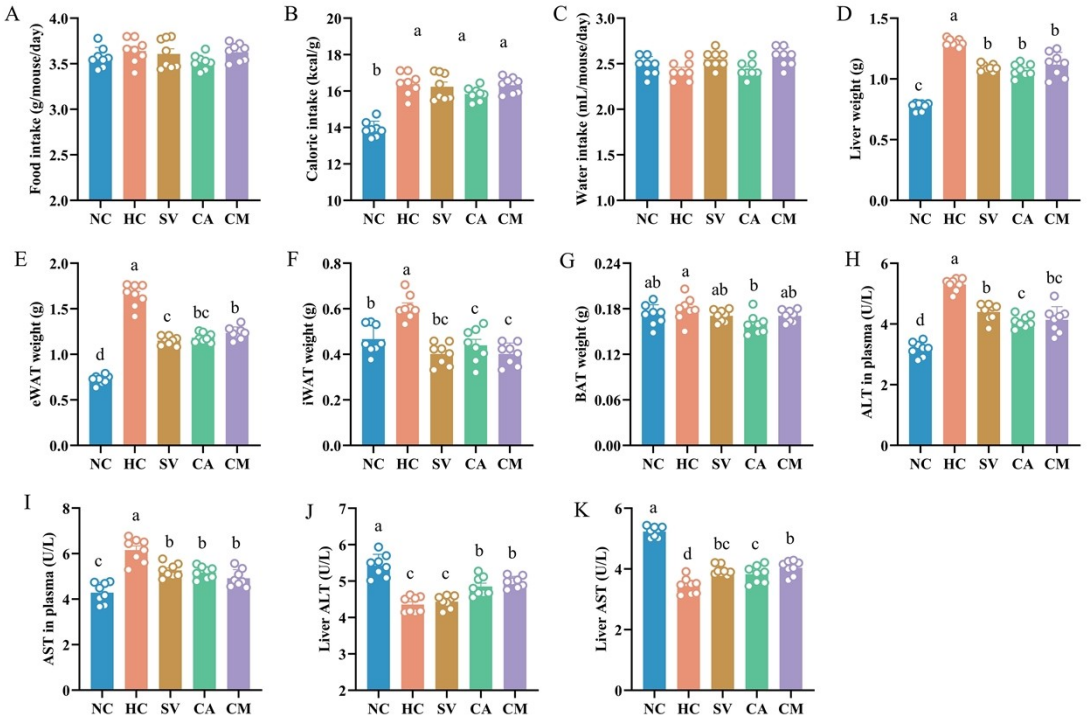

Fig. S1 Effect of CA and CM supplementation on HFD-induced hyperlipidemia in mice. (A) Food intake, (B) Caloric intake, (C) Water intake, (D) Liver, (E) Epididymal white adipose tissue (eWAT), (F) Inguinal white adipose tissue (iWAT), and (G) Brown adipose tissue (BAT) mass. (H) ALT and (I) AST levels in plasma; (J) ALT and (K) AST levels in Liver. Differences between groups were analysed using one-way ANOVA followed by Tukey's post hoc test. Statistical significance was set at $P<0.05$. Different letters indicate significant differences between groups. HFD, high-fat diet; NC, normal control group; HC, hyperlipidaemic group; SV, simvastatin control group (HFD and 30 mg/kg SV); CA, cinnamic acid group (HFD and 20 mg/kg CA); CM, cinnamaldehyde group (HFD and 20 mg/kg CM); ANOVA, analysis of variance.

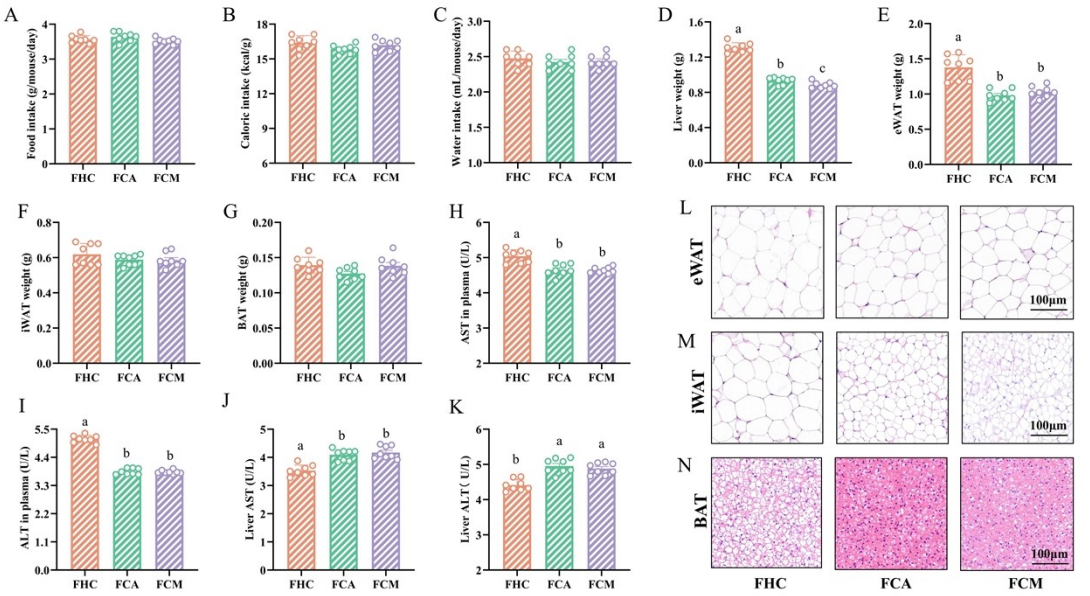

Fig. S2 FMT confirms the role of gut microbiota in CA and CM against hyperlipidemia. (A) Food intake, (B) Caloric intake, (C) Water intake, (D) Liver, (E) eWAT, (F) iWAT, and (G) BAT mass, (H) AST and (I) ALT levels in plasma; (J) AST and (K) ALT levels in Liver. Representative H&E staining of (L) eWAT, (M) iWAT, and (N) BAT from mice. Scale bar, 100 μm. Data are presented as the mean of biological replicates ± SEM (n = 8). Differences between groups were analyzed using one-way ANOVA followed by Tukey's post-hoc test. Statistical significance was set at $P<0.05$. Different letters indicate significant differences between groups. HFD, high-fat diet; FHC, fecal microbiota transplantation of the HC group; FCA, fecal microbiota transplantation of the CA group; FCM, fecal microbiota transplantation of the CM group. ANOVA, analysis of variance.

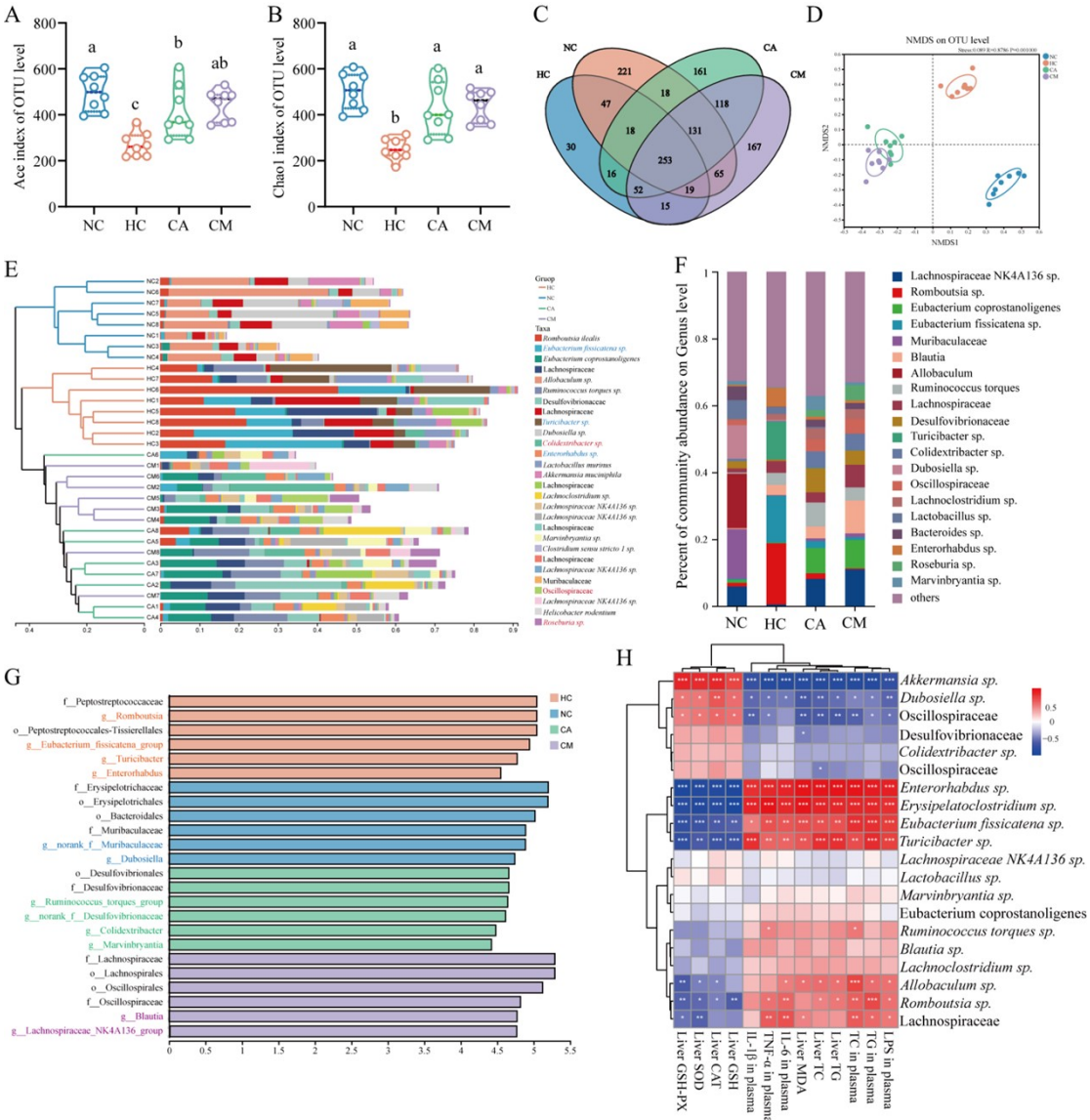

Fig. S3 Effect of CA and CM on the gut microbiota of HFD-induced mice. (A) The Ace index at the OTU level. (B) The Chao1 index at the OTU level. (C) The Venn diagram showed the number of differential OTUs. (D) The NMDS of gut microbiota. (E) Hierarchical clustering tree on OTU level of gut microbiota. (F) The composition profile of gut microbiota assessed at phylum level. (G) The histogram of LDA score based on LEfSe analysis (LDA score >4 was used as a threshold value of characteristic taxon, n = 8). (H) Spearman correlation between gut microbial genus and biochemical index. Data are presented as the mean of biological replicates±SEM (n = 8). Data are presented as the mean of biological replicates ± SEM (n = 8). Differences between groups were analyzed using one-way ANOVA followed by Tukey's post-hoc test. Statistical significance was set at $P<0.05$. Different letters indicate significant differences between groups. NC, normal control group; HC, hyperlipidemia group; CA, cinnamic acid group (HFD and 20 mg/kg CA); CM, cinnamaldehyde group (HFD and 20 mg/kg CM). ANOVA, analysis of variance.

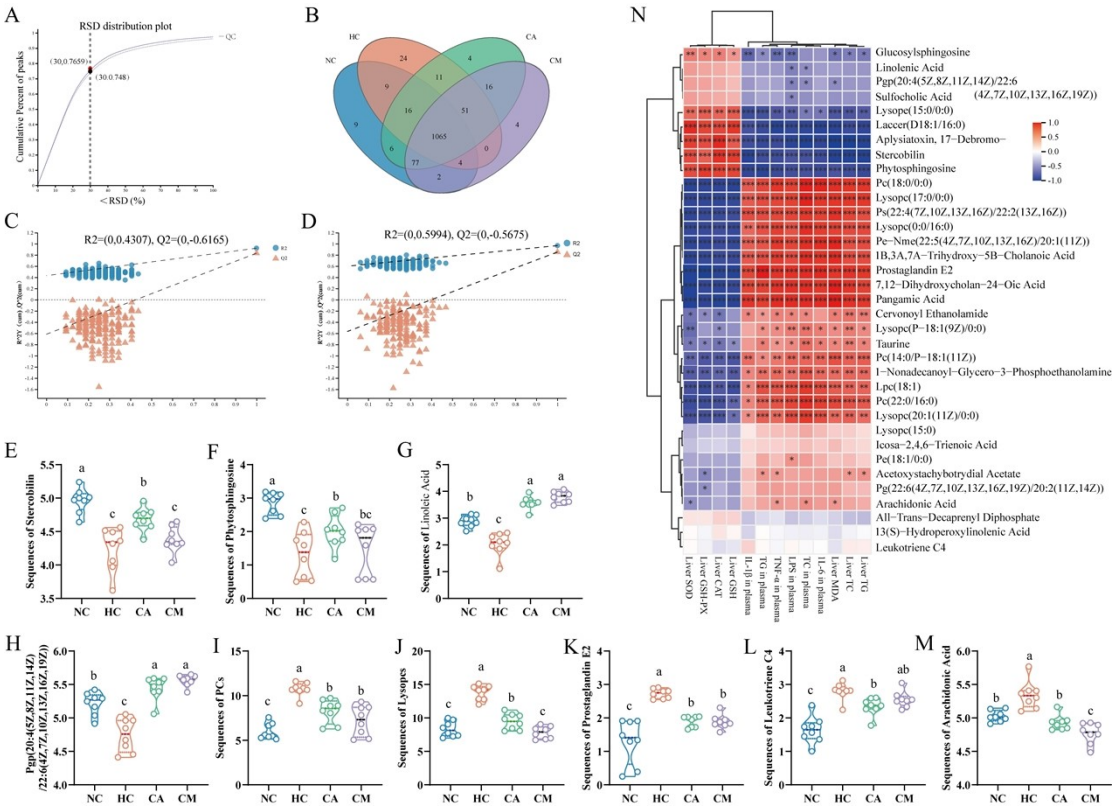

Fig. S4 Effect of CA and CM on the gut metabolite profiles of HFD-induced mice. (A) RSD distribution plot. (B) Venn diagram showed the number of differential metabolites. The permutation test (200 times) based on the OPLS-DA model between (C) CA and HC groups, (D) CM and HC groups. Sequences of (E) Stercobilin, (F) Phytosphingosine, (G) Linoleic Acid, (H) Pgp(20:4(5Z,8Z,11Z,14Z)/22:6(4Z,7Z,10Z,13Z,16Z,19Z)), (I) PCs, (J) Lysopcs, (K) Prostaglandin E2, (L) Leukotriene C4, (M) Arachidonic Acid. (N) Spearman correlation between metabolites and biochemical index.