

Supplementary materials

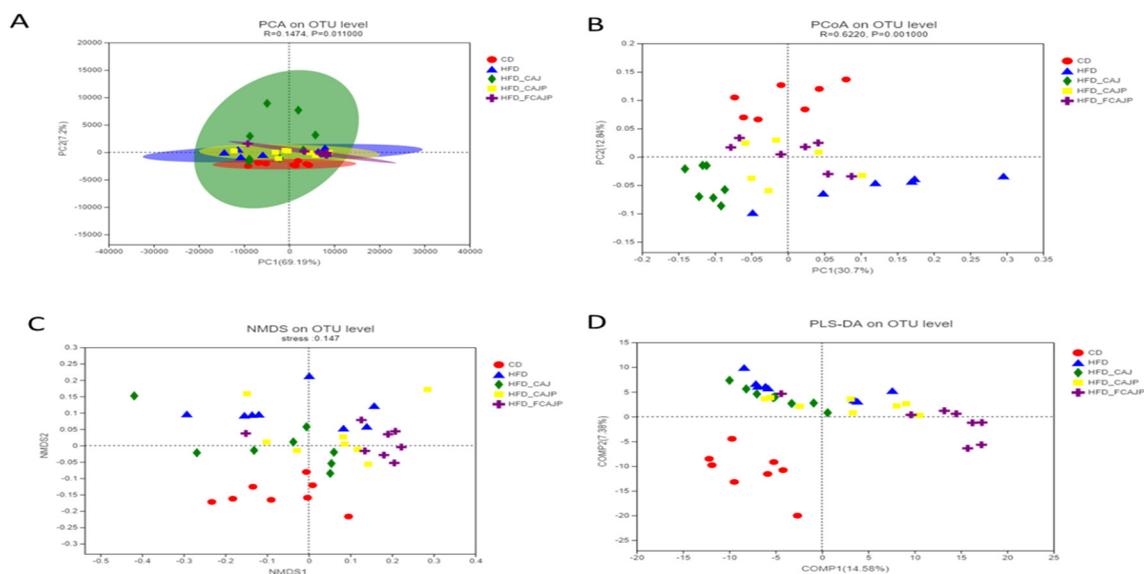
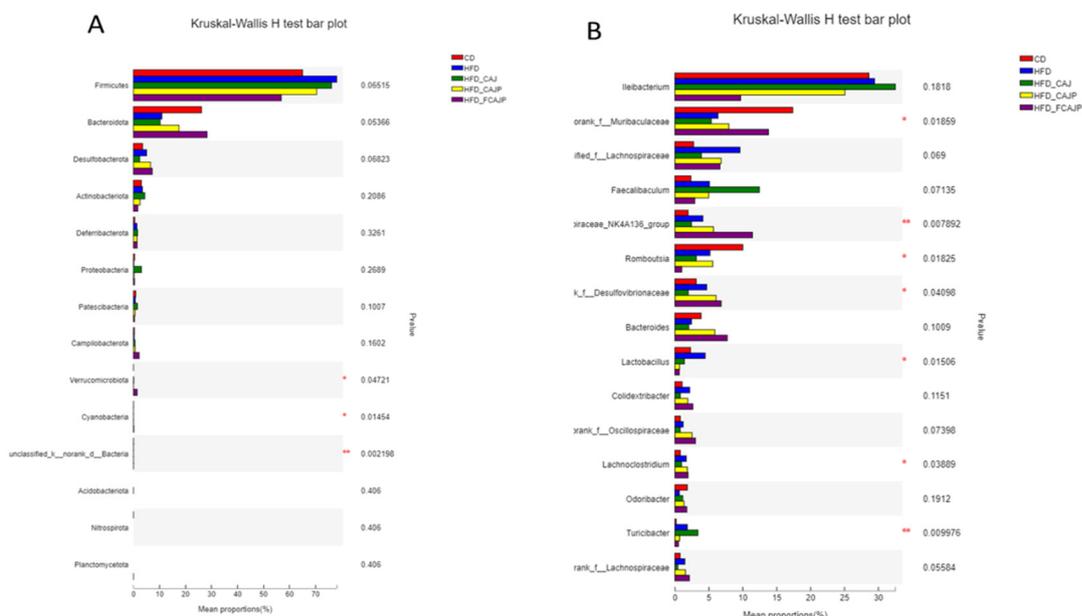


Figure.S1. Responses of the diversity, richness, and structure of the gut microbiota (n=8). **(A)** Principal Component Analysis (PCA) score plot **(B)** PCoA score plot analysis based on Unweighted-unifrac-full-tree; **(C)** Nonmetric multidimensional scaling (NMDS) score plot based on Spearman approx.; **(D)** Partial Least Squares Discriminant Analysis (PLS-DA) score plot. Note: CD: basal diet & Saline; HFD: 45% high-fat diet & Saline; HFD+CAJ: 45% high-fat diet & CAJ; HFD+CAJP: 45% high-fat diet & CAJP; HFD+FCAJP: 45% high-fat diet & FCAJP.

Figure.S2. Five groups comparison chart based on the community abundance at the phylum



level and genus level (n=8). Note: CD: basal diet & Saline; HFD: 45% high-fat diet & Saline; HFD+CAJ: 45% high-fat diet & CAJ; HFD+CAJP: 45% high-fat diet & CAJP; HFD+FCAJP: 45% high-fat diet & FCAJP. Differences were assessed by Kruskal-Wallis H test and denoted as follows: *p < 0.05 and **p < 0.01 in a comparison between the two groups.

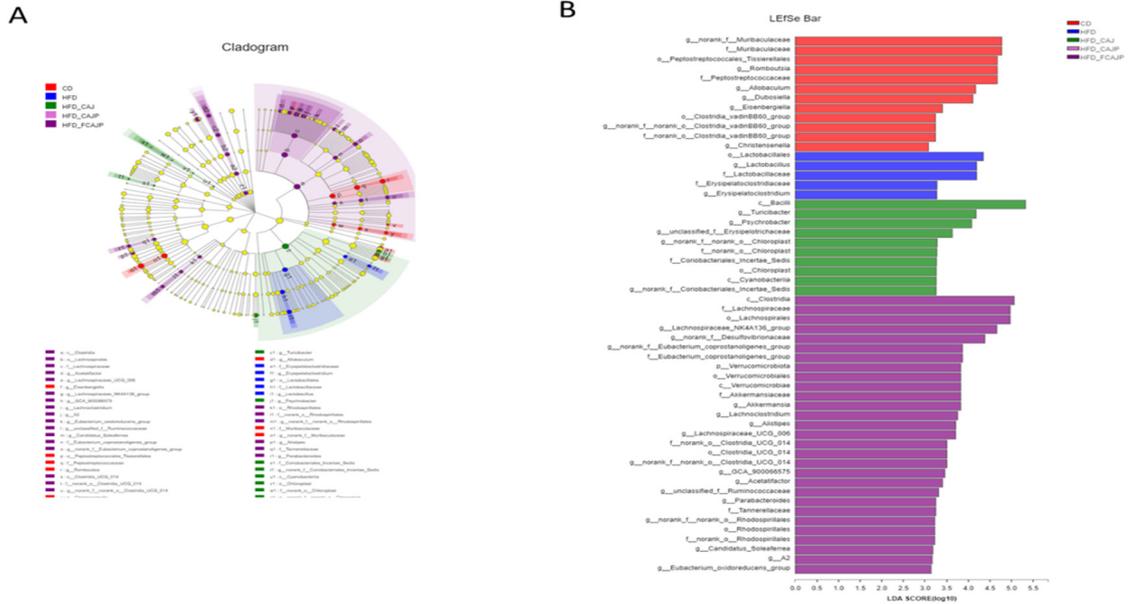


Figure.S3. LEfSe comparison of gut microbiota on groups (n=8). (A) LEfSe multi-level tree map. (B). Distribution histograms of five groups (LDA=3). Note: CD: basal diet & Saline; HFD: 45% high-fat diet & Saline; HFD+CAJ: 45% high-fat diet & CAJ; HFD+CAJP: 45% high-fat diet & CAJP; HFD+FCAJP: 45% high-fat diet & FCAJP.

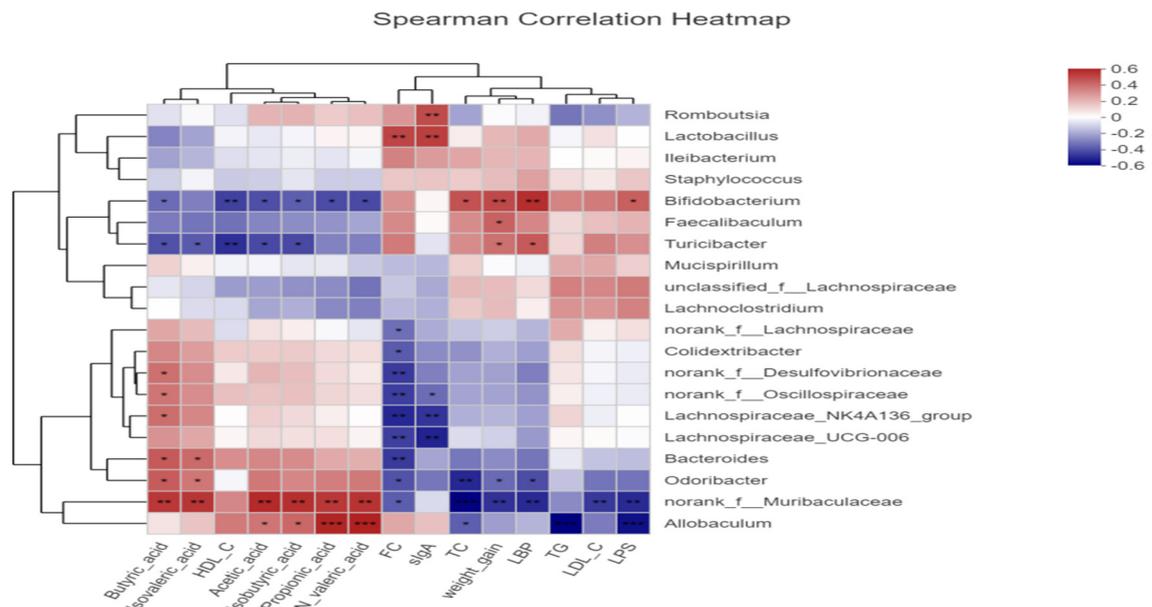


Figure.S4 Spearman's correlation between the relative abundance of gut microbiota and other levels (n=8) *p < 0.05 **p < 0.01 and ***p < 0.001

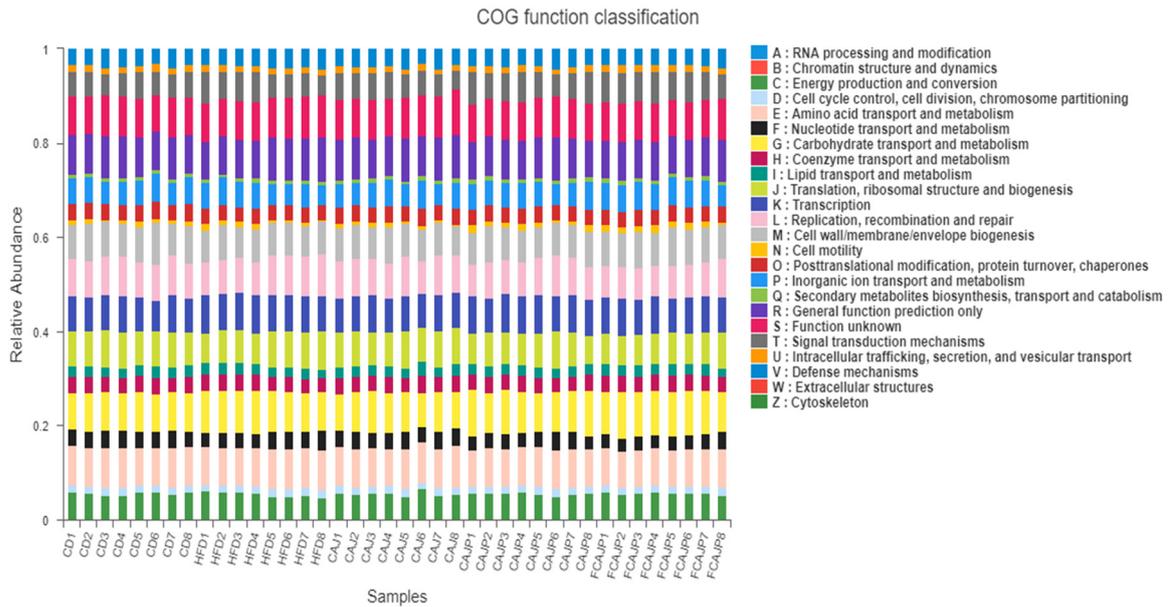


Figure.S5 The abundances of KEGG pathways in the functional prediction by PICRUSt (n=8).

Table S1 The composition of basal diet and 45% high-fat diet

Ingredients (g/kg of diet)	basal diet (g/kg of diet)	45% high-fat diet (g/kg of diet)
Casein	140	175
Corn Starch	465.7	132
Maltodextrin	155	125
Sucrose	100	202
Soybean Oil	40	30
Lard	—	196
Cellulose	50	62
Mineral Mix, M1021	35.0	61
Vitamin Mix, V1010	10	12
L-Cystine	1.8	2
Choline Bitartrate	—	3
TBHQ	0.036	0.045
Choline Chloride	2.5	—
Total	1000	1000

Note: "—" means no the substance

Table2 Daily intake of polyphenols of a mouse in five groups ($\mu\text{g}/25\text{g}$ weight of a mouse).

Polyphenols	CD	HFD	HFD+CAJ	HFD+CAJP	HFD+FCAJP
Gallic acid	—	—	0.383 \pm 0.007a	0.571 \pm 0.004b	1.668 \pm 0.013c
Isoferulic acid	—	—	0.060 \pm 0.002a	0.574 \pm 0.012b	0.749 \pm 0.014c
Ellagic acid	—	—	1.032 \pm 0.013a	0.935 \pm 0.011b	1.064 \pm 0.012a
P-hydroxybenzoic acid	—	—	0.039 \pm 0.001a	0.053 \pm 0.001a	0.089 \pm 0.004b
Ferulic acid	—	—	0.204 \pm 0.011a	0.164 \pm 0.003b	0.169 \pm 0.009b
Cinnamic acid	—	—	0.428 \pm 0.012a	3.690 \pm 0.013b	4.255 \pm 0.017c
Chlorogenic acid	—	—	53.996 \pm 1.014a	49.583 \pm 1.003b	51.840 \pm 1.109ab
Proanthocyanidin C1	—	—	0.414 \pm 0.021a	0.330 \pm 0.014a	0.922 \pm 0.005b
Catechins	—	—	0.844 \pm 0.015a	1.182 \pm 0.012b	1.607 \pm 0.005c
Rutin	—	—	0.047 \pm 0.002a	1.111 \pm 0.019b	0.590 \pm 0.002c

Cypridin	—	—	0.551±0.011a	2.210±0.101b	2.428±0.016b
Epicatechin	—	—	11.886±0.304a	12.510±0.207b	9.891±1.308c

Note: "—" means no the substance; in each column mean ± SD value (n = 3 represents the polyphenols in cloudy apple juices were determined in triplicate) bearing different letters differ significantly (p < 0.05) between different groups. Note: CD: basal diet & Saline; HFD: 45% high-fat diet & Saline; HFD+CAJ: 45% high-fat diet & CAJ; HFD+CAJP: 45% high-fat diet & CAJP; HFD+ FCAJP: 45% high-fat diet & FCAJP.