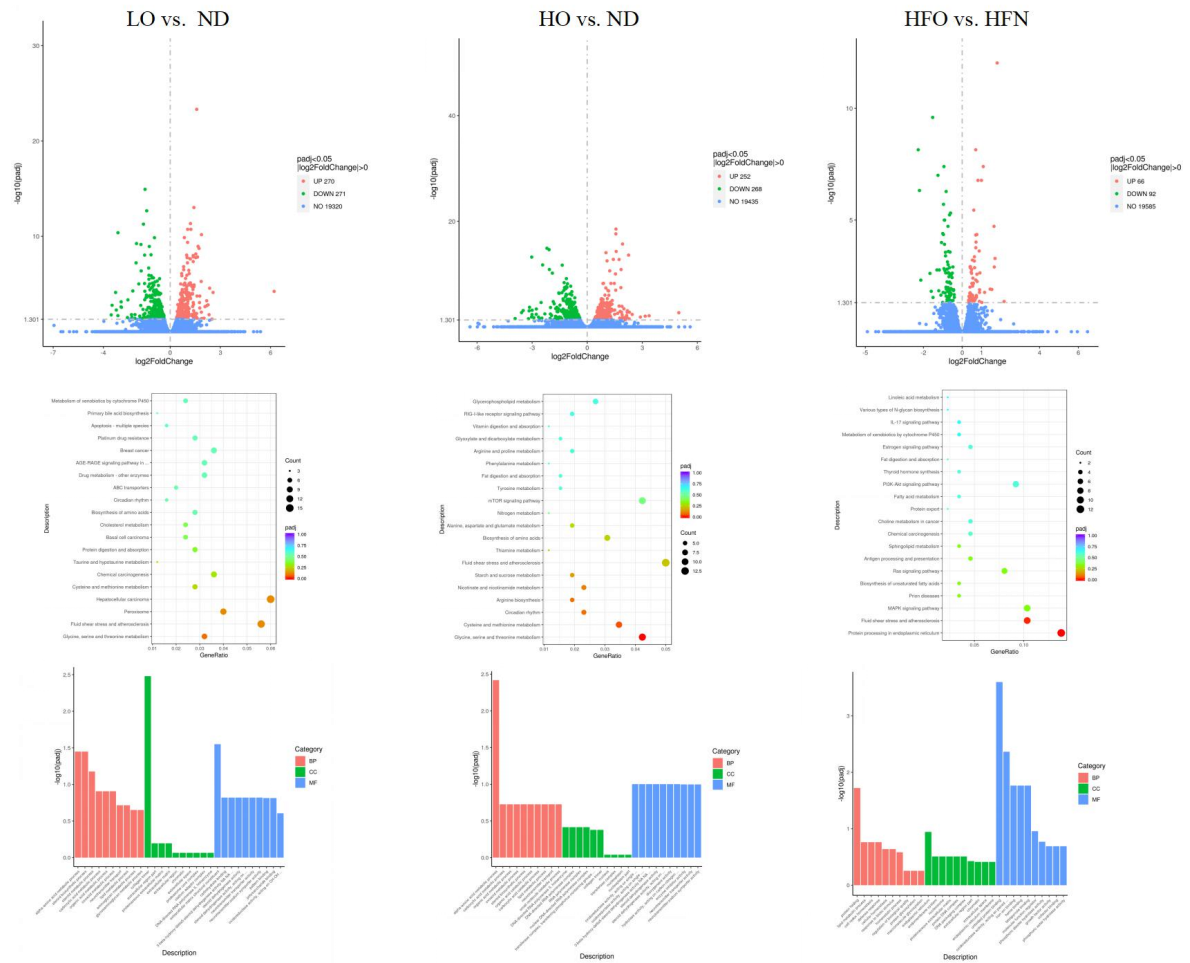
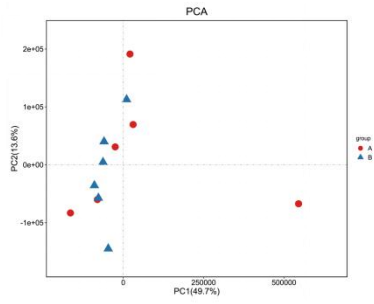


# Supplemental figures

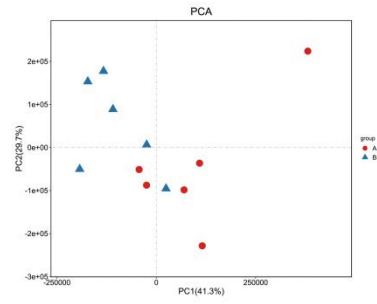


**Fig. S1.** Alterations of gene expression in TMO treated liver. (a) Volcano plot showing the changes of liver genes (fold change  $\geq 2$ ),  $n=4$  for each group; (b) KEGG pathway enrichment analysis of the differentially expressed genes,  $n=4$  for each group; (c) GO enrichment analysis of the differentially expressed genes,  $n=4$  for each group.

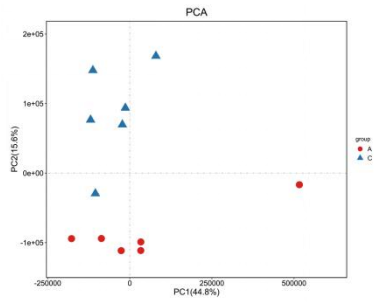
LO vs. ND (POS)



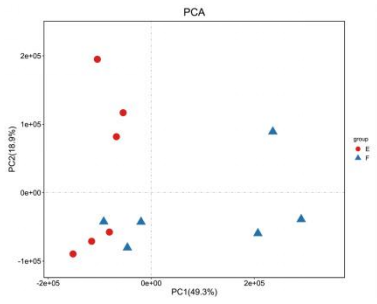
LO vs. ND (NEG)



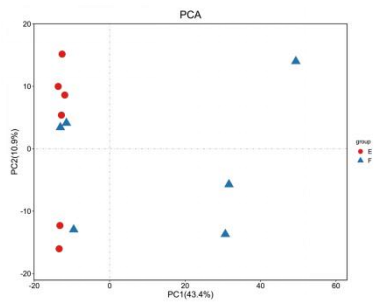
HO vs. ND (POS)



HO vs. ND (NEG)



HFO vs. HFN (POS)



HFO vs. HFN (NEG)

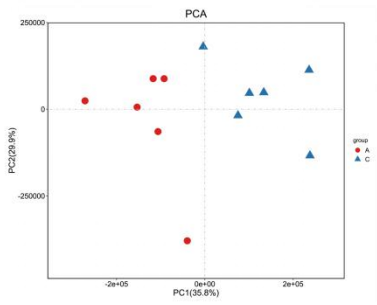


Fig. S2. Different groups of liver metabolites visualized using PCA score plots.

S3

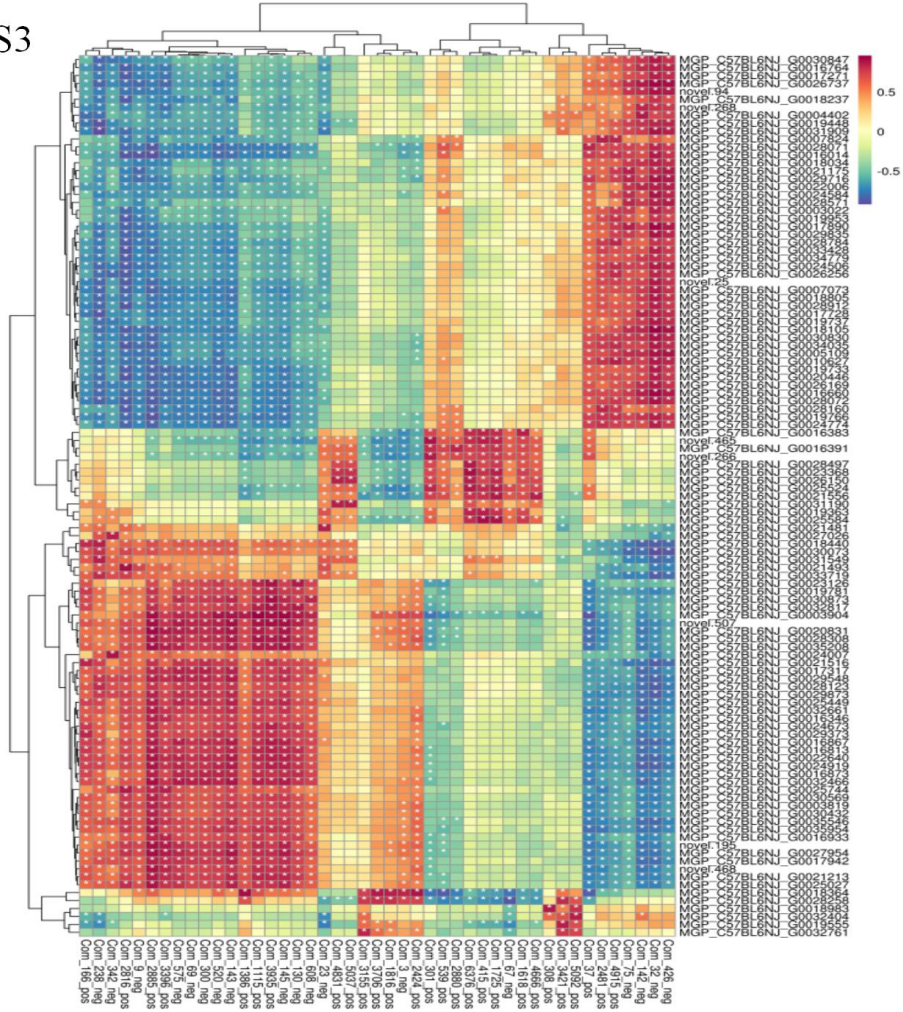


Fig. S3. Heat map of correlation between differential gene expression and abundance of differential metabolites.

## Supplementary Tables

Supplementary TABLE 1. Nutrient and energy supply levels of basal, high fat feed

Nutrient	Levels (g/100g)		Items	Levels (Kcal/Kg)	
	Basal feed	High fat feed		Basal feed	High fat feed
Crude protein	18.8	22.5	Total energy	3660	4608
Crude fat	5.2	24.2	Protein	752	900
Crude fiber	3.0	3.2	Fat	468	2174
Crude ash	5.4	5.6	Carbohydrate	2440	1534
Calcium	1.1	1.2			
Total phosphorus	0.7	0.8			

Supplementary TABLE 2. Percentage of liver lipid droplet area in each group

Group	Relative content (%)	Pixel area of lipid droplets	Proportion of positive area (%)
ND	1474560	185880.00±21114.09	12.61±1.43
LO	1474560	379703.00±43625.36	25.75±2.96 <sup>##</sup>
HO	1474560	50274.00±12485.43	3.41±0.85 <sup>##</sup>
HFN	1474560	857495.33±51797.85	58.15±3.51
HFO	1474560	808987.33±104562.93	56.62±5.27

Supplementary TABLE 3. Summary table of common pathways of different genes and different metabolites among groups.

Treat	Pathway ID	Pathway	DEGs	SCMs
	ko01100	Metabolic pathways	29	6
	ko05146	Amoebiasis	4	1
	ko01040	Biosynthesis of unsaturated fatty acids	2	4
	ko00590	Arachidonic acid metabolism	3	1
	ko00591	Linoleic acid metabolism	2	2
	ko04750	Inflammatory mediator regulation of TRP channels	3	1
	ko00592	Alpha-Linolenic acid metabolism	1	1
	ko04726	Serotonergic synapse	2	1
	ko04611	Platelet activation	2	1
	ko00230	Purine metabolism	2	1
LO vs. ND	ko04730	Long-term depression	1	1
	ko04913	Ovarian Steroidogenesis	1	1
	ko04664	Fc epsilon RI signaling pathway	1	1
	ko00480	Glutathione metabolism	1	1
	ko05140	Leishmaniasis	1	1
	ko04912	GnRH signaling pathway	1	1
	ko04666	Fc gamma R-mediated phagocytosis	1	1
	ko04925	Aldosterone synthesis and secretion	1	1
	ko04270	Vascular smooth muscle contraction	1	1
	ko04723	Retrograde endocannabinoid signaling	1	1
	ko01200	Carbon metabolism	1	1
	ko04921	Oxytocin signaling pathway	1	1
	ko01100	Metabolic pathways	40	6
	ko01040	Biosynthesis of unsaturated fatty acids	3	3
	ko01230	Biosynthesis of amino acids	5	1
HO vs. ND	ko00250	Alanine, aspartate and glutamate metabolism	2	1
	ko00360	Phenylalanine metabolism	1	1
	ko00591	Linoleic acid metabolism	1	1
	ko00310	Lysine degradation	1	1
	ko00230	Purine metabolism	2	3
	ko04976	Bile secretion	1	1
HFO vs. HFN	ko00591	Metabolic pathways	3	12
	ko04742	Taste transduction	1	1

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ko04974	Protein digestion and absorption	1	1
ko01100	Linoleic acid metabolism	1	1

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