

Figure S1. The protein expressing level of TLR4, ZO-1 and occludin in colon tissue were assessed using Western blot.

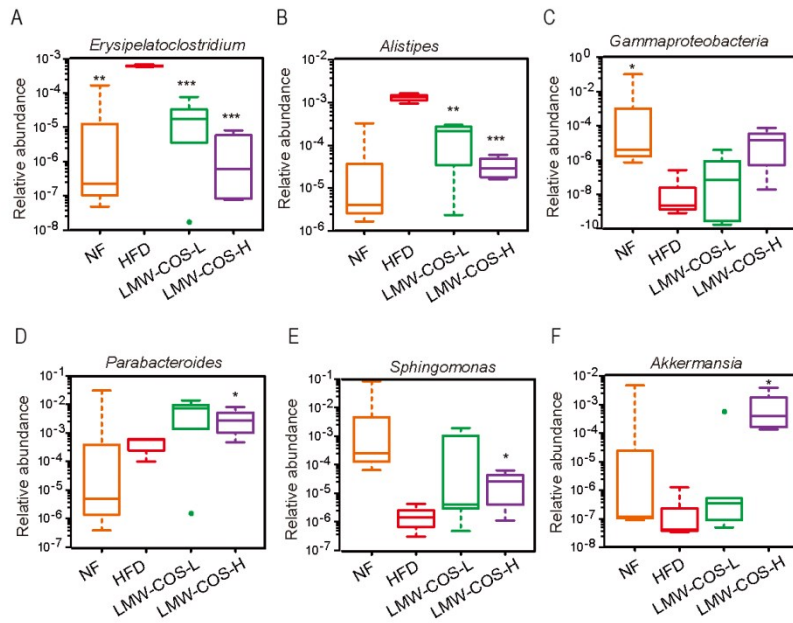


Figure S2. Effects of LMW-COSs on the relative abundance of gut microbial community at genus level in HFD-fed mice, including (A) *Akkermansia*, (B) *Sphingomonas*, (C) *Gammaproteobacteria* (D) *Parabacteroides*, (E) *Erysipelatoclostridium*, (F) *Alistipes*. * $P < 0.05$, ** $P < 0.01$, * $P < 0.001$ compared to the HFD group.**

Table S1. The primers sequences used for PCR reaction.

Gene name	Primers sequences
TNF- α	Forward: 5'-TAGCCAGGAGGGAGAACAGA-3' Reverse: 5'-TTTTCTGGAGGGAGATGTGG-3'
IL-1 β	Forward: 5'-TTGAAGAAGAGCCCATCCTC -3' Reverse: 5'-CAGCTCATATGGGTCCGAC -3'
IL-6	Forward: 5'-CCGGAGAGGAGACTTCAC-3' Reverse: 5'-TCCACGATTTCCAGAGA-3'
IL-10	Forward: 5'-GCTCTTACTGACTGGCATGAG -3' Reverse: 5'-CGCAGCTCTAGGAGCATGTG-3'
ZO-1	Forward: 5'- GCCGCTAAGAGCACAGCAA-3' Reverse: 5'- TCCCCACTCTGAAAATGAGGA-3'
GAPDH	Forward: 5'- AGGTCGGTGTGAACGGATTTG-3' Reverse: 5'- TGTAGACCATGTAGTTGAGGTCA-3'

Table S2. Serum lipid concentrations of mice fed normal fat (NF) diets, high fat (HFD), orlistat, LMW-COS-L and LMW-COS-H.

Groups	NF	HFD	ORL	LMW-COS-L	LMW-COS-H
TG (mM)	1.02 ± 0.06 *	1.39 ± 0.12	0.91 ± 0.06 ***	0.93 ± 0.12 **	0.74 ± 0.08 ***
TC (mM)	7.96 ± 0.96 **	11.26 ± 0.77	8.23 ± 1.16 **	9.69 ± 0.45*	8.40 ± 0.44 **
HDL-c (mM)	4.47 ± 0.46**	7.44 ± 0.98	5.86 ± 0.42 *	5.87 ± 0.27*	5.38 ± 0.76 *
LDL-c (mM)	0.64 ± 0.08**	1.33 ± 0.27	0.89 ± 0.08 *	0.97 ± 0.10	0.88 ± 0.10 *
FFA (mM)	0.59 ± 0.13 *	0.86 ± 0.16	0.59 ± 0.06 **	0.66 ± 0.20	0.54 ± 0.10 *

Results are expressed as mean ± SD (n = 6), * $P < 0.05$ versus HFD group; ** $P < 0.01$ versus HFD group.