Supplementary Materials

Table S1 Primer sequences of qRT-PCR (5'-3').

β-actin	F(Forward):	CTACCTCATGAAGATCCTGACC
	R(Reverse):	CACAGCTTCTCTTIGATGTCAC
Ym-1	F:	TGGAATTGGTGCCCCTACAA
	R:	GCATAGGGTACTTCCTGGGG
Arginase-1	F:	ACATTGGCTTGCGAGACGTA
	R:	ATCACCTTGCCAATCCCCAG
Fizz-1	F:	GGGATGACTGCTACTGGGTG
	R:	TCAACGAGTAAGCACAGGCA
Eotaxin	F:	CTGCTCACGGTCACTTCCTT
	R:	GGGGTCAGCACAGATCTCTT
α-SMA	F:	CCCAACTGGGACCACATGG
	R:	TACATGCGGGGGACATTGAAG

Table S2 Parameter results of RDA/CCA analysis.

	RDA1	RDA2	r^2	p value
IgE	0.9096	0.4154	0.4356	0.027
OVA-sIgE	0.9996	-0.0286	0.6089	0.004
IL-4	0.9768	0.2143	0.5798	0.007
IL-5	0.9941	0.1083	0.5973	0.006
IL-13	0.9988	-0.0482	0.436	0.028
IFN-γ	-0.9939	-0.1103	0.7498	0.001
Eotaxin	0.9857	-0.1684	0.5073	0.017
MCP-1	0.9892	-0.1463	0.5725	0.007

RDA column indicates the correlation between environmental factors and sorting axis; r^2 represents the determining coefficient between environmental factors and species distribution (ranges from 0 to 1); p value represents the significance test value of correlation, and $p < 0.05$ indicates that there is significant correlation.
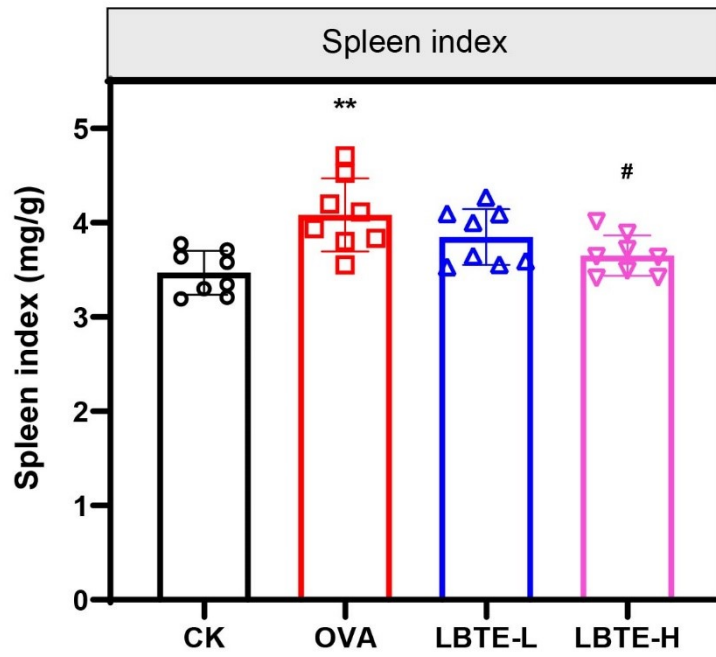
Fig. S1. The spleen Index, $n = 8$. The data are shown as mean ± SEM. (* $p < 0.05$, ** $p < 0.01$ vs CK group; # $p < 0.05$, ## $p < 0.01$ vs OVA group).
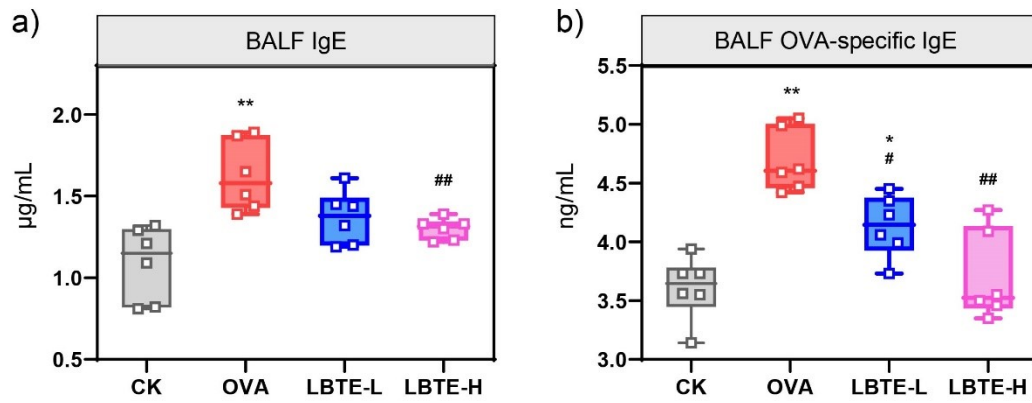
Fig. S2. Levels of IgE (a) and OVA-specific IgE (b) in BALF detected by ELISA, *n* = 6. The data are shown as mean ± SEM. (* p < 0.05, ** p < 0.01 vs CK group; # p < 0.05, ## p < 0.01 vs OVA group).
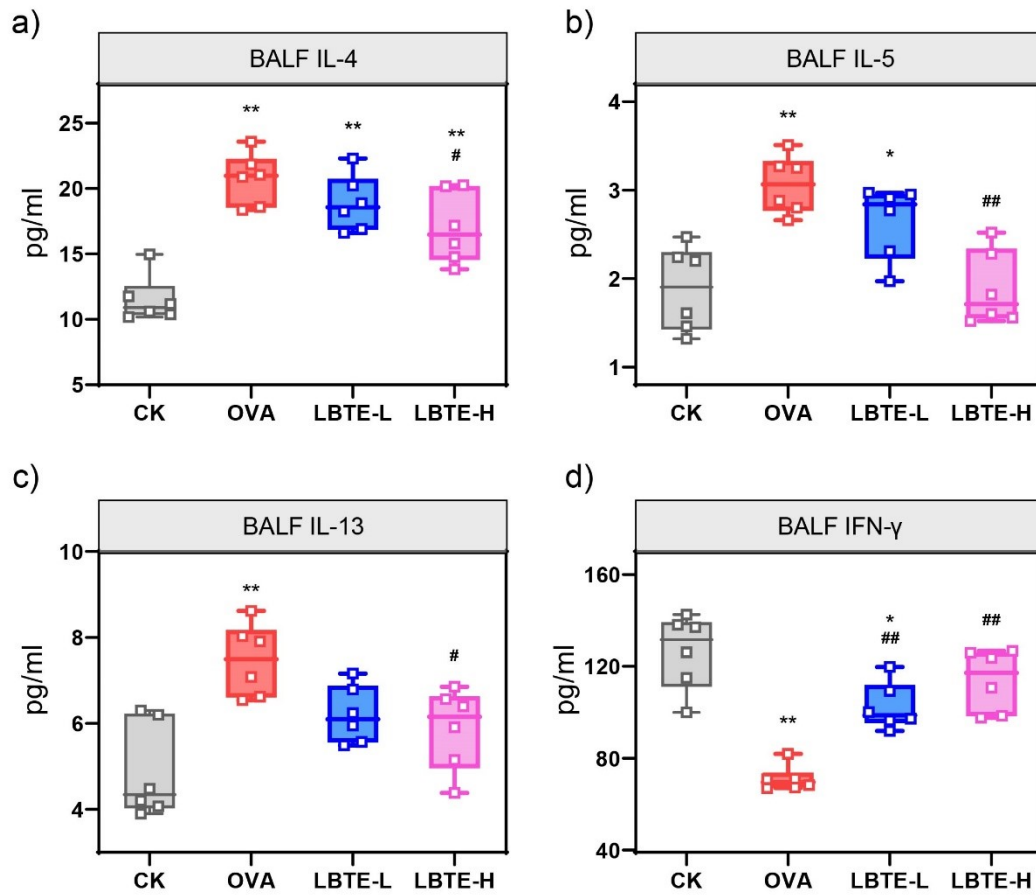
Fig. S3. Levels of inflammatory cytokines in BALF detected by ELISA, *n* = 6. (a) IL-4, (b) IL-5, (c) IL-13 and (d) IFN-γ. The data are shown as mean ± SEM. (* p < 0.05, ** p < 0.01 vs CK group; # p < 0.05, ## p < 0.01 vs OVA group).
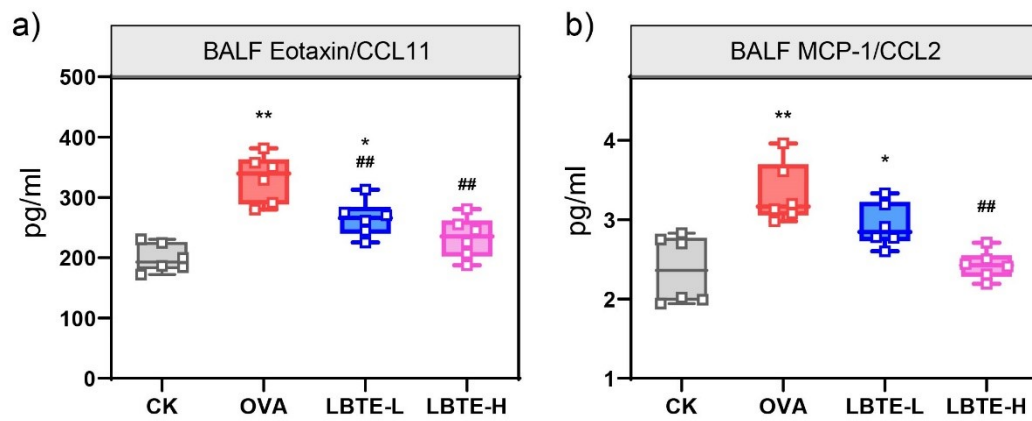
Fig. S4. Levels of inflammatory chemokines in BALF detected by ELISA, n = 6. (a) Eotaxin and (b) MCP-1. The data are shown as mean $\pm$ SEM. (* $p < 0.05$, ** $p < 0.01$ vs CK group; # $p < 0.05$, ## $p < 0.01$ vs OVA group).
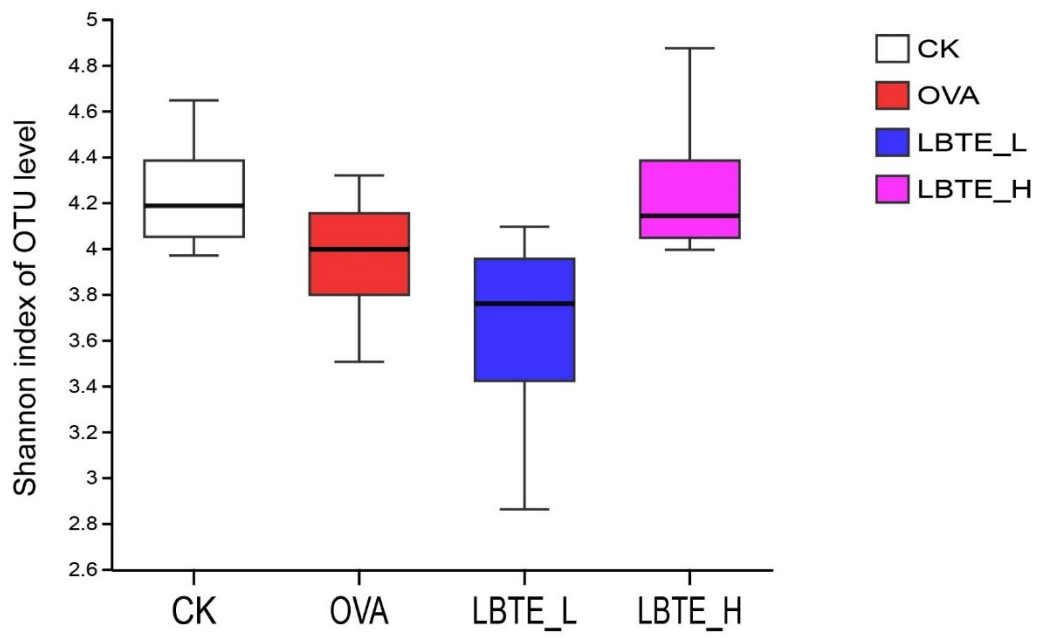
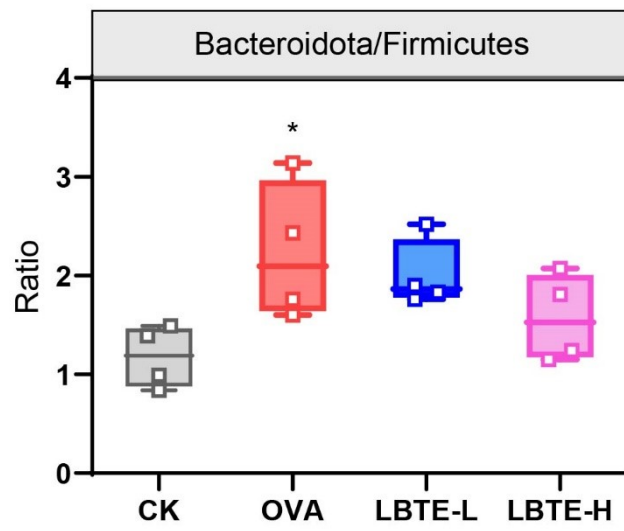**Fig. S5.** Shannon index of α-diversity of gut mircrobiota, *n* = 4.

Fig. S6. Bacteroidota/Fimicutes ratio in mice faces, $n = 4$. (* $p < 0.05$)
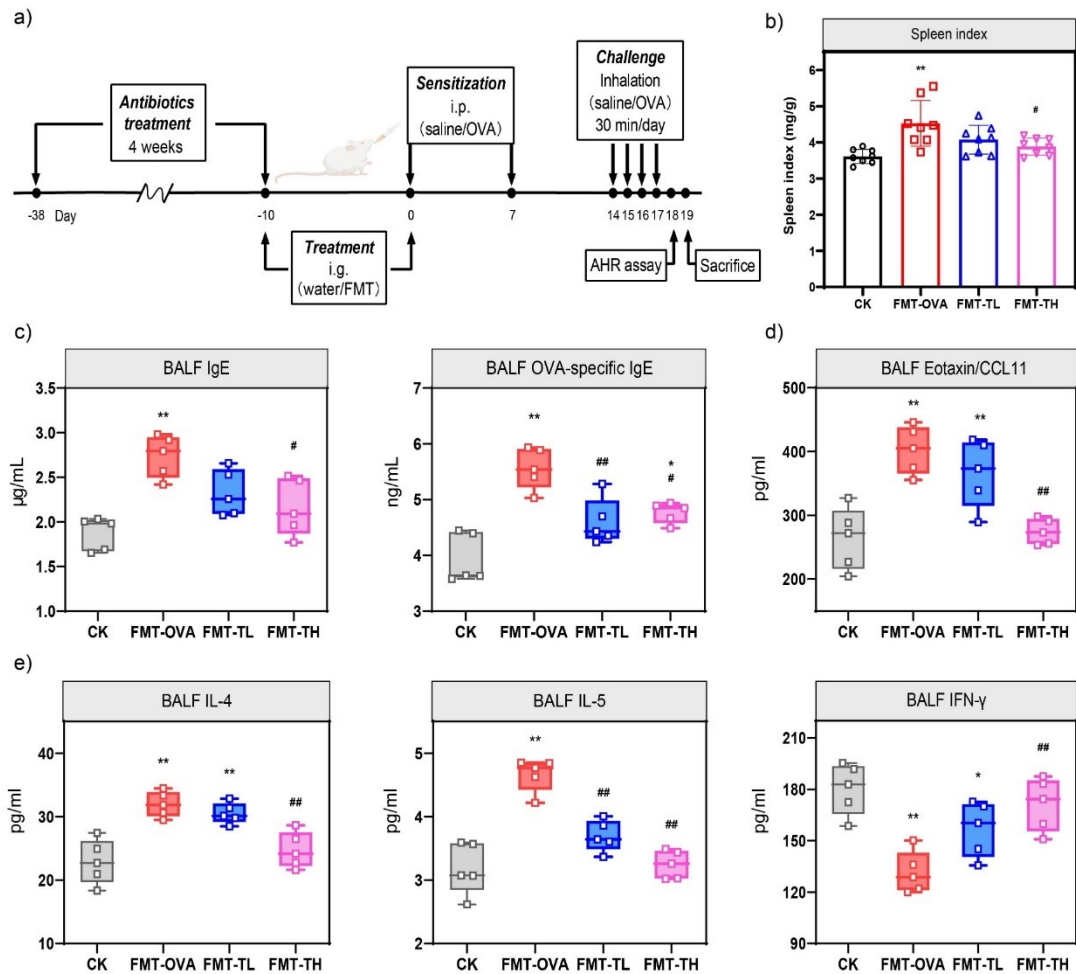
Fig. S7. (a) Schematic representation of the mice FMT experiment of LBTE protective effect against OVA-induced asthma. (b) The spleen Index, $n = 8$. (c) Levels of IgE and OVA-specific IgE in BALF detected by ELISA, $n = 5$. (d) Levels of Eotaxin in BALF detected by ELISA, $n = 5$. (e) Levels of IL-4, IL-5 and IFN-γ in BALF detected by ELISA, $n = 5$. The data are shown as mean ± SEM. (* $p < 0.05$, ** $p < 0.01$ vs CK group; # $p < 0.05$, ## $p < 0.01$ vs OVA group).