

### Supplementary Information



**Fig. S1** Schematic diagram of animal treatment

**Table S1** Primer sequences for qPCR amplification

<b>Gene</b>	<b>Forward</b>	<b>Reverse</b>
Reg-3 $\gamma$	TTCCTGTCCTCCATGATCAAAA	CATCCACCTCTGTTGGGTCA
Lysozyme	GAGACCGAAGCACCGACTATG	CGGTTTTGACATTGTGTCGC
Cryptdin-4	GACCCAGAAGGATCTGCTCT	GCATATCAGATCTCTCGACGATTTTC

**Table S2** Primer sequences for fecal microbiota analysis

<b>Gene</b>	<b>Forward</b>	<b>Reverse</b>
16s	ACTCCTACGGGAGGCAGCAG	ATTACCGCGGCTGCTGG
<i>Prevotella spp.</i>	GGTGTCGGCTTAAGTGCCAT	CGGA(C/T)GTAAGGGCCGTGC
<i>Bifidobacteria</i>	GGGATGCTGGTGTGGAAGAGA	TGCTCGCGTCCACTATCCAGT
<i>Roseburia spp.</i>	GCGGTRCGGCAAGTCTGA	CCTCCGACACTCTAGTMCGAC
<i>Lactobacillus</i>	CACCGCTACACATGGAG	AGCAGTAGGGAATTCTTCCA
<i>Clostridium coccoides</i>	CGGTGACTAATACCGCATAACGG	CCTTGCCGCTACTCTCC
<i>Enterococcus spp.</i>	CCCTTATTGTTAGTTGCCATCATT	ACTCGTTGTACTIONTCCCATTGT
<i>Enterobacteriaceae spp.</i>	GTGCCAGCMGCCGCGGTAA	GCCTCAAGGGCACAACCTCCAAG

**Table S3** Immune organ indexes. Data were mean  $\pm$  SEM (n = 10). Significance was accepted at # p < 0.05, ## p < 0.01, ### p < 0.001 vs. the normal group; \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001 vs. the model group.

<b>Group</b>	<b>N</b>	<b>M</b>	<b>C</b>	<b>AL</b>	<b>AM</b>	<b>AH</b>
<b>(mg/10 g b.w.)</b>						
Spleen index	21.59 $\pm$ 3.04	13.46 $\pm$ 2.17###	12.29 $\pm$ 2.28	14.06 $\pm$ 3.39	13.01 $\pm$ .27	14.34 $\pm$ 2.95
Thymus index	16.23 $\pm$ 3.27	4.68 $\pm$ 1.96###	5.78 $\pm$ 2.39	5.17 $\pm$ 1.72	5.08 $\pm$ 1.97	5.69 $\pm$ 2.06