Supplementary Materials

Materials and Methods:

Assessment of the disease activity index (DAI) in mice

In our mouse model of colitis, we administrated DSS for various durations of days and thereafter, we assessed the DAI for the grade and extent of intestinal inflammation as stool consistency and bloody stool. Each of these parameters was scored as followings: diarrhea (0, normal; 2, loose stools; 4, watery diarrhea) and bloody stool (0, normal; 2, slight bleeding; 4, gross bleeding). The numbers were then added together to form the DAI score, ranging between 0 and 8. The higher DAI numbers indicated the severity of colitis.

Enzyme-linked immunosorbent assay (ELISA)

Plasma levels of interleukin-1β (IL-1β), IL-6, IL-10, IL-17α, IL-22, monocyte chemotactic protein 1 (MCP-1), and tumor necrosis factor-α (TNFα) were measured by using commercial ELISA kits from R&D Systems (Minneapolis, MN, USA) according to the manufacturer's protocols. The kits utilized the biotin-conjugated secondary antibodies and followed by streptavidin-conjugated horseradish peroxidase (HRP) from Amersham Biosciences (Arlington Heights, IL, USA) and then the OPD substrate system from Sigma Chemicals (St. Louis, MO, USA), the optical density of the colorimetric reaction was measured by using an automated ELISA microplate reader (Versamax, Molecular Devices, Silicon Valley, CA, USA) at 492 nm.

Preparation of mouse peritoneal macrophages

Eighteen C57BL/6 mice were euthanized by CO_2 exposure and cervical dislocation and soaked in 70% ethanol for 10 min and then injected with 10 mL of Dulbecco's modified Eagle's medium (DMEM) into their peritoneal cavity and the peritoneum was massaged for 5 min. Next, the fluid from each mouse was collected from the peritoneum cavity using a 5 mL syringe and pooled together and then washed with DMEM through centrifugation for 5 min at 800 rpm and re-suspended in DMEM. The macrophage concentration was then adjusted to 1×10^6 cells/mL and seeded into a 12-well plate and cultured in a humidified incubator with 5% CO_2 at 37°C for 3 h to enable macrophage adhere. After removed the suspending cells, the adhered cells were grown overnight in DMEM supplemented with 10% fetal bovine serum (FBS) and in DMEM supplemented with 10% FBS and SH (200 μg/mL) or 5HIAA (200 μmol/L) for 4 h. After washed twice with PBS, total cellular mRNA was isolated and analyzed for gene expression (see qRT-PCR section).

Statistics

Data are presented as the means ± s.e.m. SPSS 17.0 software was used for the statistical analysis. The significance of group differences for normally distributed data was assessed by one-way ANOVA followed by *Dunnett's post hoc* tests. $P < 0.05$ was considered statistically significant.

Supplementary Figure and table legends

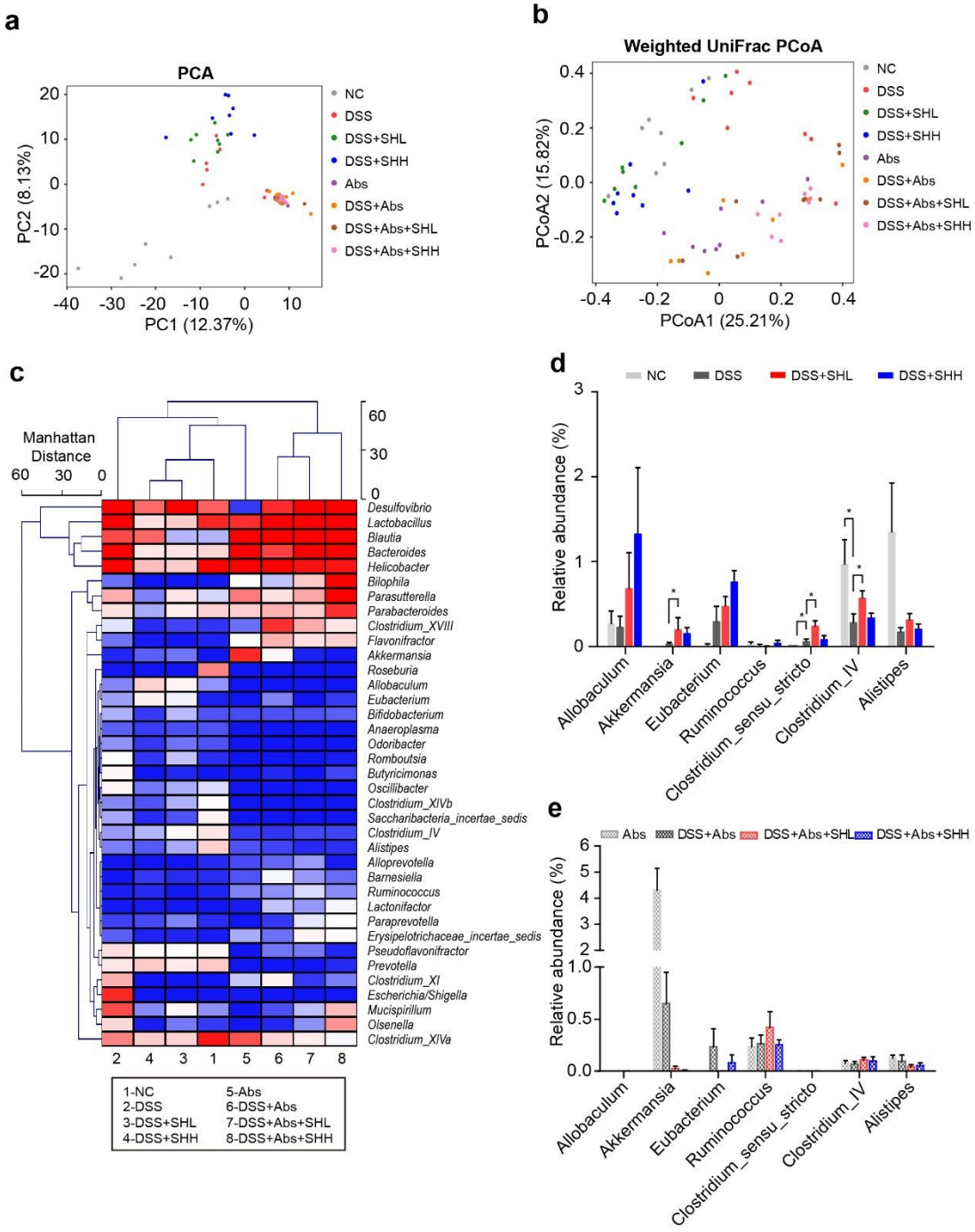
Supplementary Fig. 1 *Phellinus gilvus* extract (SH) change in the total gut microbiota. a, The principal component analysis (PCA). **b**, The weighted unifract principal coordinate analysis (PCoA). **c**, Hierarchical cluster based on the Manhattan distance. **d** and **e**, The main genera induced by SH treatment in the conventional (**d**) and pseudo-germ-free mice (**e**). The data are the mean ± sem (n=10). **P*<0.05, ***P*<0.01, and ****P*<0.001 using one-way ANOVA with Dunnett's test as a post hoc test.

Supplementary Fig. 2 The strain of *Alistipes onderdonkii* as adverse in DSS-induced mouse colitis. a, the mouse body weight curve. **b**, Change in mouse body weight during experiment. **c**, The DAI score curve. **d**, The area under the curve (AUC) of the DAI score. The data are mean ± sem (n=10). **P*<0.05 and ***P*<0.01 using one-way ANOVA with Dunnett's test as a post hoc test.

Supplementary Fig. 3 HPLC analysis of 5HIAA level in *Alistipes onderdonkii*-conditioned culture medium. a, HPLC chromatograph of *A. onderdonkii*-conditioned culture medium. **b**, HPLC chromatograph of the standard 5HIAA level.

Supplementary Fig. 4 Effect of *Phellinus gilvus* extract (SH) and 5HIAA on increase in transcription of AhR downstream genes in abdominal macrophages. a, SH. **b**, 5HIAA.

Supplementary Table 1. qPCR primers



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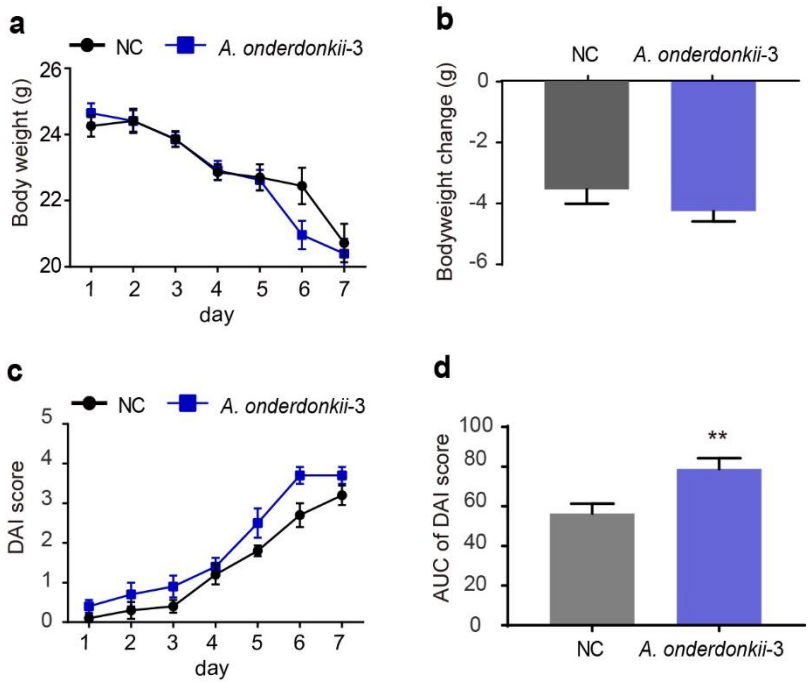

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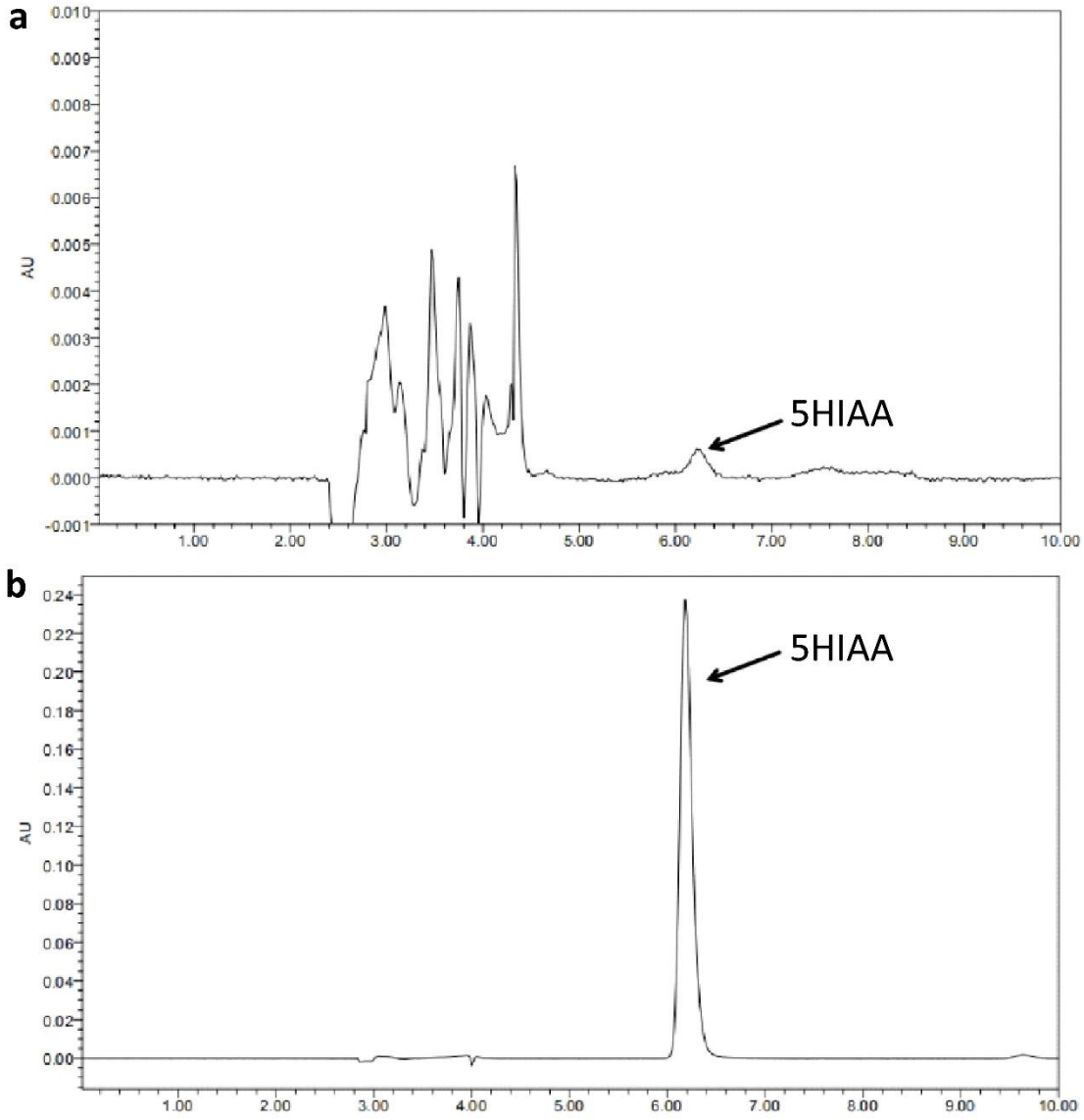

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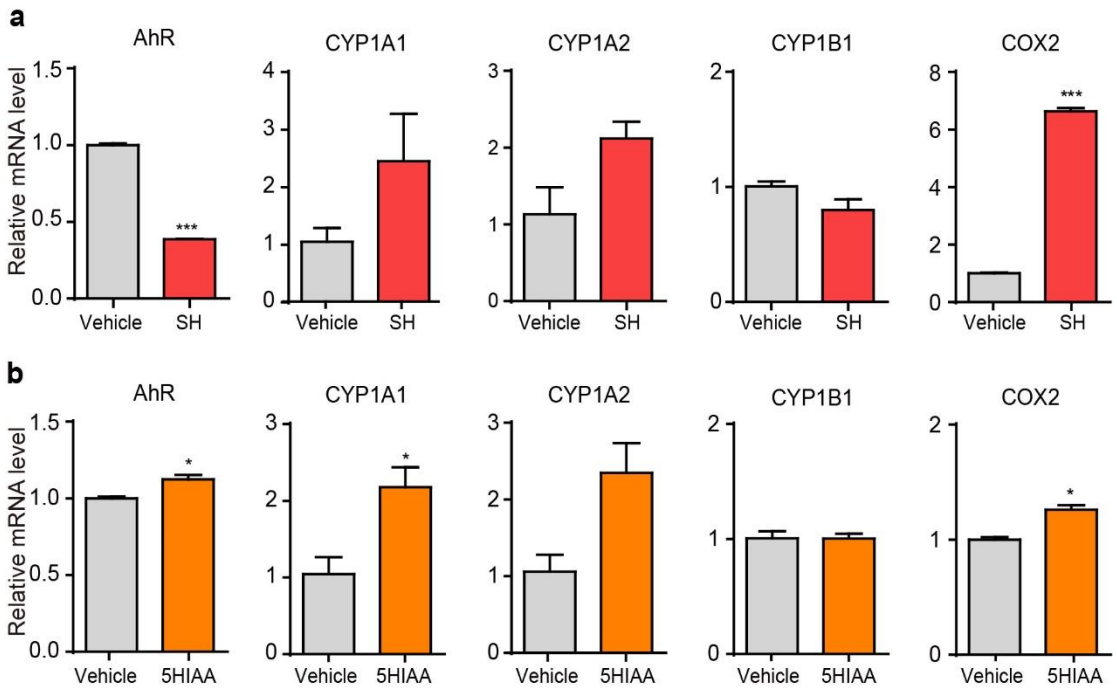

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Supplementary Table 1. qPCR primers

Gene name	Forward primer	Reverse primers
Occludin	5'-CTCTTTGGAGGAAGCCTAA-3'	5'-GAAGCGATGAAGCAGAAG-3'
Claudin-2	5'-AGTACCCTTTTAGGACTTCCTGC-3'	5'-CCCACCACAGAGATAATACAAGC-3'
Claudin-3	5'-ACCAACTGCGTACAAGACGAG-3'	5'-CGGGCACCAACGGGTTATAG-3'
Claudin-4	5'-GGAGGGCCTCTGGATGAACT-3'	5'-GATGCTGATGACCATAAGGGC-3'
ZO-1	5'-AGGACACCAAAGCATGTGAG-3'	5'-GGCATTCCTGCTGGTTACA-3'
IL-1β	5'-TCTTCTGGCTGTGAACACTGT-3'	5'-AGCAACCATAGGCGATTTCT-3'
IL-6	5'-CCTTCTTGATGTTAGGAGGCTT-3'	5'-ACCAGCACCGAGACTGAACT-3'
IL-17A	5'-TTTAACTCCCTTGGCGCAAAA-3'	5'-CTTTCCCTCCGCATTGACAC-3'
TNF-α	5'-GCAAGAAGGTGCTAACGAACA-3'	5'-GAGAAGGGCGGAAAACTGGAC-3'
IL-4	5'-GGTCTCAACCCCCAGCTAGT-3'	5'-GCCGATGATCTCTCTCAAGTGAT-3'
IL-10	5'-GGAGATGTTCACGGAATAGCC-3'	5'-GTTTCTTTGTGGACGGGGACT-3'
IL-22	5'-TCCAGAAGATGACAGACCTCA-3'	5'-GGTGGGACTTTCCTGCTAAT-3'
MCP1	5'-GTGGACAAAGATGGCAGCAGA-3'	5'-CAGAACAGCAGTGGGACAAGA-3'
CCL2	5'-TAAAAACCTGGATCGGAACCAAA-3'	5'-GCATTAGCTTCAGATTTACGGGT-3'
CXCL1	5'-ACTGCACCCAAACCGAAGTC-3'	5'-TGGGGACACCTTTTAGCATCTT-3'
AhR	5'-GGCCAAGAGCTTCTTTGATG-3'	5'-TGCCAGTCTCTGATTTGTGC-3'
CYP1A1	5'-GGAAGTGGAAGGGCATAGGCA-3'	5'-TCCAAGGCAGAATACGGTGAC-3'
CYP1A2	5'-GCTTCTCCATAGCCTCGGAC-3'	5'-CTGGCTGACTGGTTCGAAGT-3'
CYP1B1	5'-CTGGACAAGGACGGCTTCAT-3'	5'-ACAGTTCCTCACCGATGCAC-3'

COX2	5'-AGGTCATTGGTGGAGAGGTG-3'	5'-CCTGCTTGAGTATGTCGCAC-3'
β-actin	5'-CATGTACGTTGCTATCCAGGC-3'	5'-CTCCTTAATGTCACGCACGAT-3'