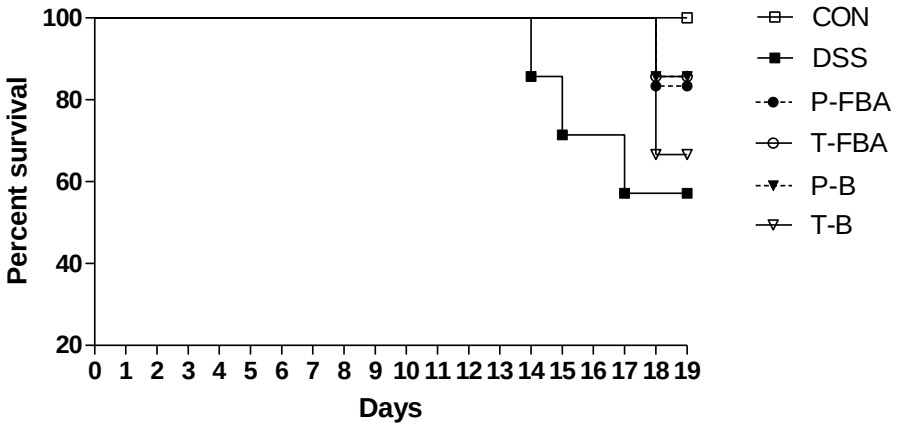
Supporting Information

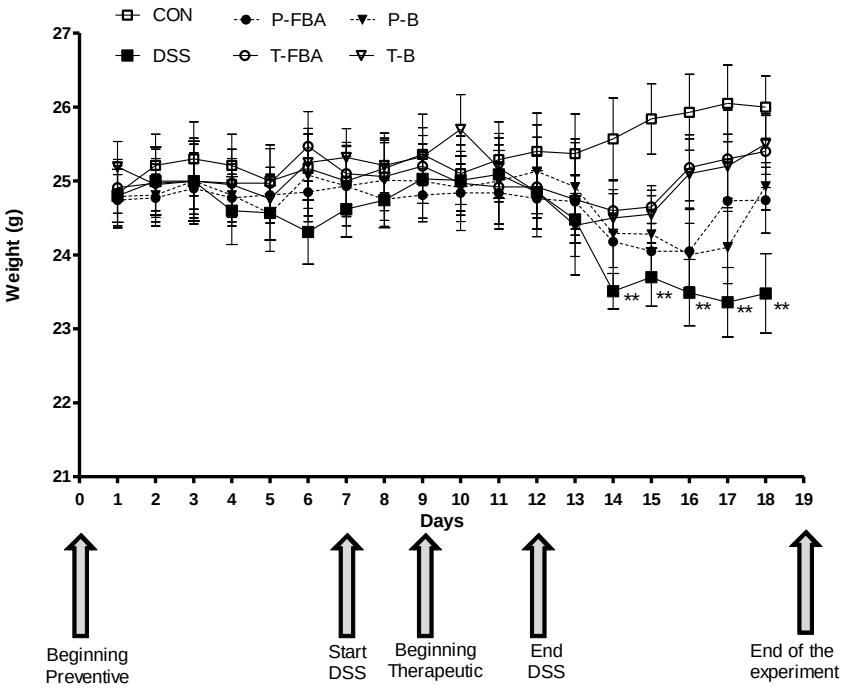
Real-time PCR. The primer sequences for target gene *Ffar2, Hdac9, Il10, IL6, Tgfb, Tnf, Ocln* and *Tjp1* were purchased by Eurofins MWG Operon (Huntsville, AL, USA) and are reported in **Supplemental Tab.1**. For Annexin A1 (*Anxa1*), *Ccl2, Fpr1, Fpr2, Gapdh, and Ly6g* we used QuantiTect® Primer Assays for SYBR Green by Qiagen (Manchester, UK).
The PCR conditions were 15 min at 95°C followed by 40 cycles of three-step PCR denaturation at 94°C for 15 s, annealing at 60°C for 30 s and extension at 72°C for 30 s. Each sample contained 40-100 ng cDNA in 2X Power SYBRGreen PCR Master Mix (Applied Biosystem) and 200 nmol/L of each primer in a final volume of 25 μL. The relative amount of each studied mRNA was normalized to Gapdh as housekeeping gene, and the data were analyzed according to the 2-ΔΔCT method**.**

Supplemental Table 1. Real-time PCR primer sequences

Target gene	**Forward primer (5'→3')**	**Reverse primer (3'→5')**	**Accession Number**
Ffar2	TTCTTACTGGGCTCCCTGCC	TACCAGCGGAAGTTGGATGC	NM_146187
Hdac9	GCGGTCCAGGTTAAAACAGAA	GCCACCTCAAACACTCGCTT	NM_001271386.1
Il10	GGTTGCCAAGCCTTATCGGA	ACCTGCTCCACTGCCTTGCT	NM_010548.2
Il6	ACAAGTGGGAGGCTTAATTACACAT	TTGCCATTGCACAACTCTTTTC	NM_031168.1
Ocln	ATGTCCGGCCGATGCTCTCTC	CTTTGGCTGCTCTTGGGTCTGTAT	NM_008756.2
Pparg	CTGCTCAAGTATGGTGTCCATGA	ATGAGGACTCCATCTTTATTCA	NM_001127330.1
Slc16a1	GAGCGCGCGAAGCTGCATTTGCT	TGCTCCCAGGCCCGCTTTACA	NM_009196.3
Tgfb	GAAGCCATCCGTGGCCAGAT	TGACGTCAAAAGACAGCCACT	NM_021578.2
Tnf	CATCTTCTCAAAACTCGAGTGACAA	TGGGAGTAGATAAGGTACAGCCC	NM_012675.3
Tjp1	ACCCGAAACTGATGCTGTGGATAGA	AAATGGCCGGGCAGAACTTGTGTA	NM_001163574.1

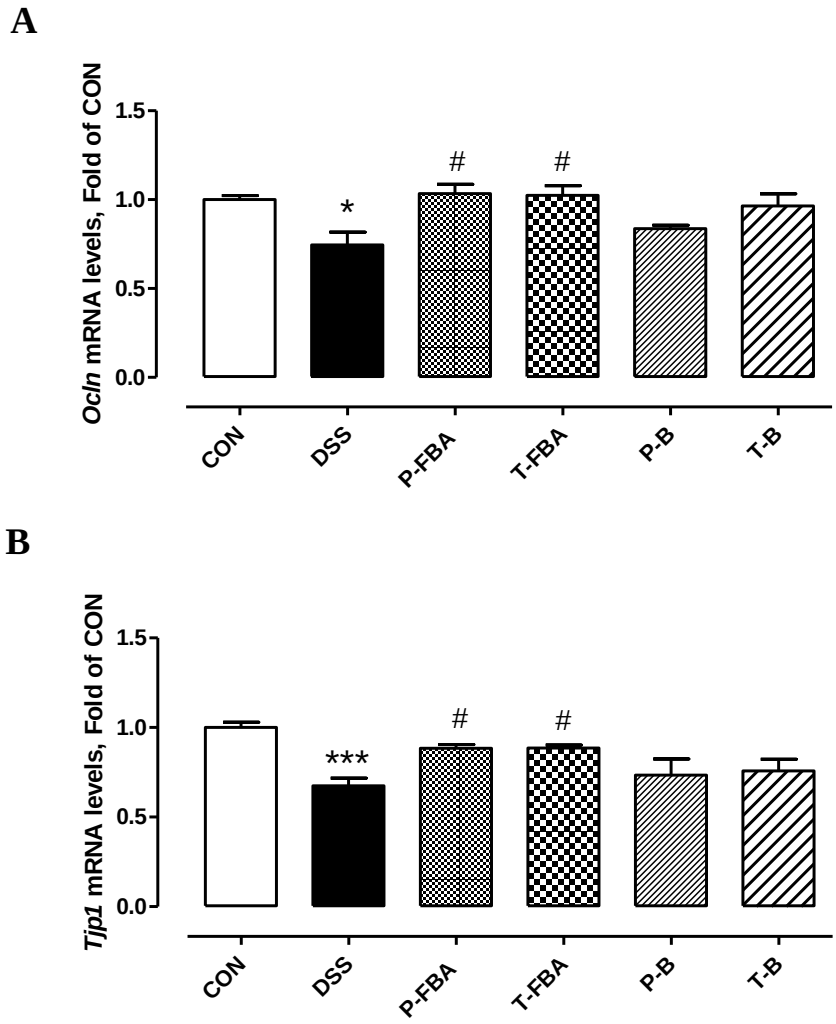


Supplemental Figure 1. Preventive and therapeutic treatments with FBA increase survival rate in DSS-fed mice. Data are presented as percent survival rate ± SEMs, *n*=10. CON, control group; DSS, dextran sodium sulphate group; P-B, DSS-fed mice receiving preventive butyrate treatment; P-FBA, DSS-fed mice receiving preventive FBA treatment; T-B, DSS-fed mice receiving sodium butyrate as therapeutic treatment; T-FBA, DSS-fed mice receiving therapeutic FBA treatment. As depicted, in DSS group the survival rate at day 19 reached 57.1% compared to 100% shown in CON group. Both FBA-based treatments displayed a comparable efficacy to P-B at the end of the experimental protocol, with a mean survival time of 18 d. The same effect was not observed in DSS-fed mice treated with sodium butyrate as therapeutic protocol.



Supplemental Figure 2. Modification of body weight in CON and DSS mice that were untreated or administered FBA and butyrate as preventive or therapeutic protocol. Data are means ± SEMs, *n*=8 (**P<0.01 *Vs* CON). DSS, dextran sodium sulphate group; P-B, DSS-fed mice receiving preventive butyrate treatment; P-FBA, DSS-fed mice receiving preventive FBA

treatment; T-B, DSS-fed mice receiving sodium butyrate as therapeutic treatment; T-FBA, DSS-fed mice receiving therapeutic FBA treatment.



Supplemental Figure 3. FBA limits the impairment of tight- junction transcriptional levels in colonic mucosa. Transcriptional levels of *Ocln* (which encode for occludin) and *Tjp1* (tight junction protein 1, gene encoding for ZO-1) were assessed in colon tissue. As shown, DSS challenge significantly reduced the mRNA levels of *Ocln* and *Tjp1* compared to those revealed in control animals. Among treatments, preventive and therapeutic FBA were more effective than butyrate schemes in limiting tight-junctions impairment.
Data are presented as means ± SEMs, *n*=8 (*P<0.05 and ***P<0.01 *Vs* CON; #P<0.05 *Vs* DSS). CON, control group; DSS, dextran sodium sulphate group; P-B, DSS-fed mice receiving preventive butyrate treatment; P-FBA, DSS-fed mice receiving preventive FBA treatment; T-B, DSS-fed mice receiving sodium butyrate as therapeutic treatment; T-FBA, DSS-fed mice receiving therapeutic FBA treatment.