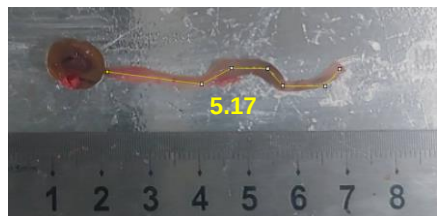
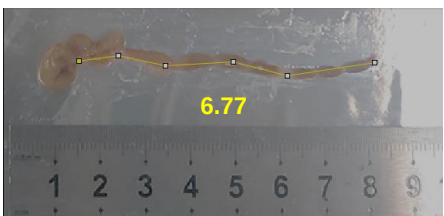
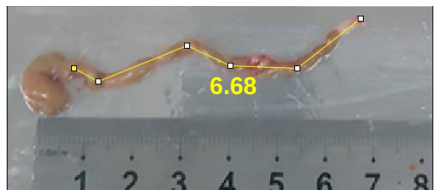
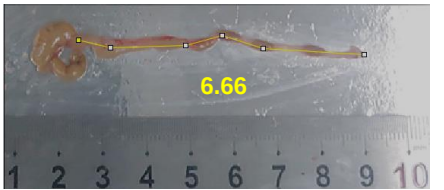
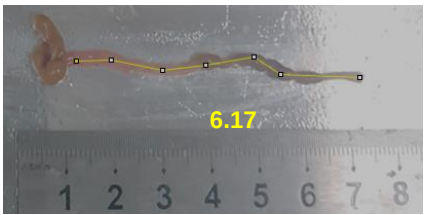
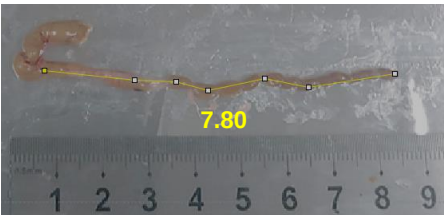
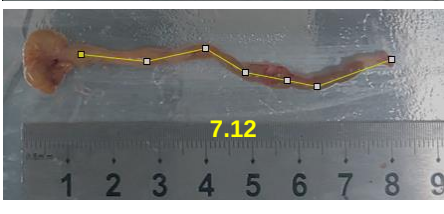
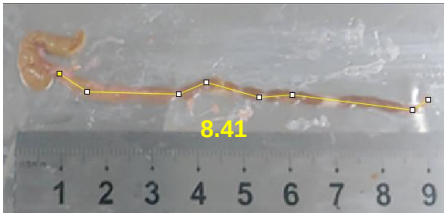
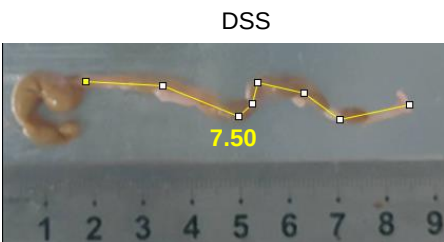
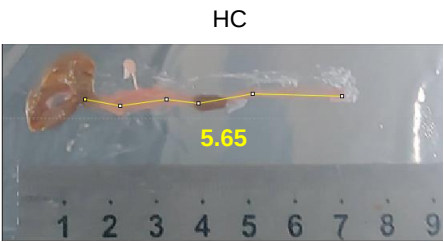
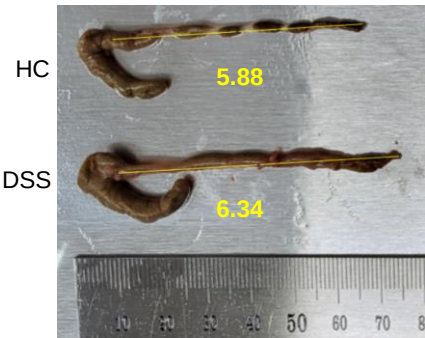
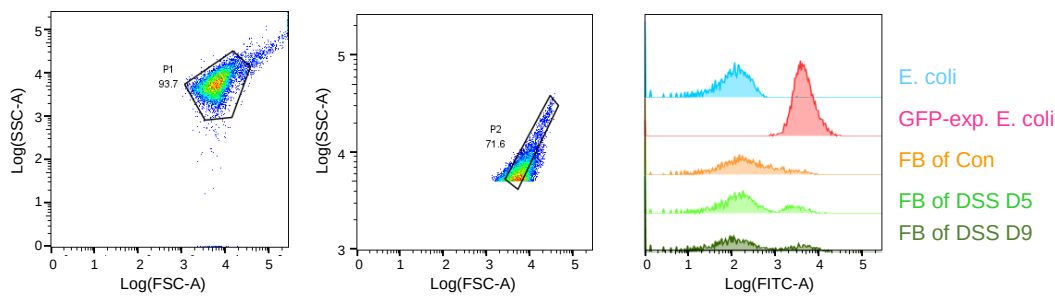


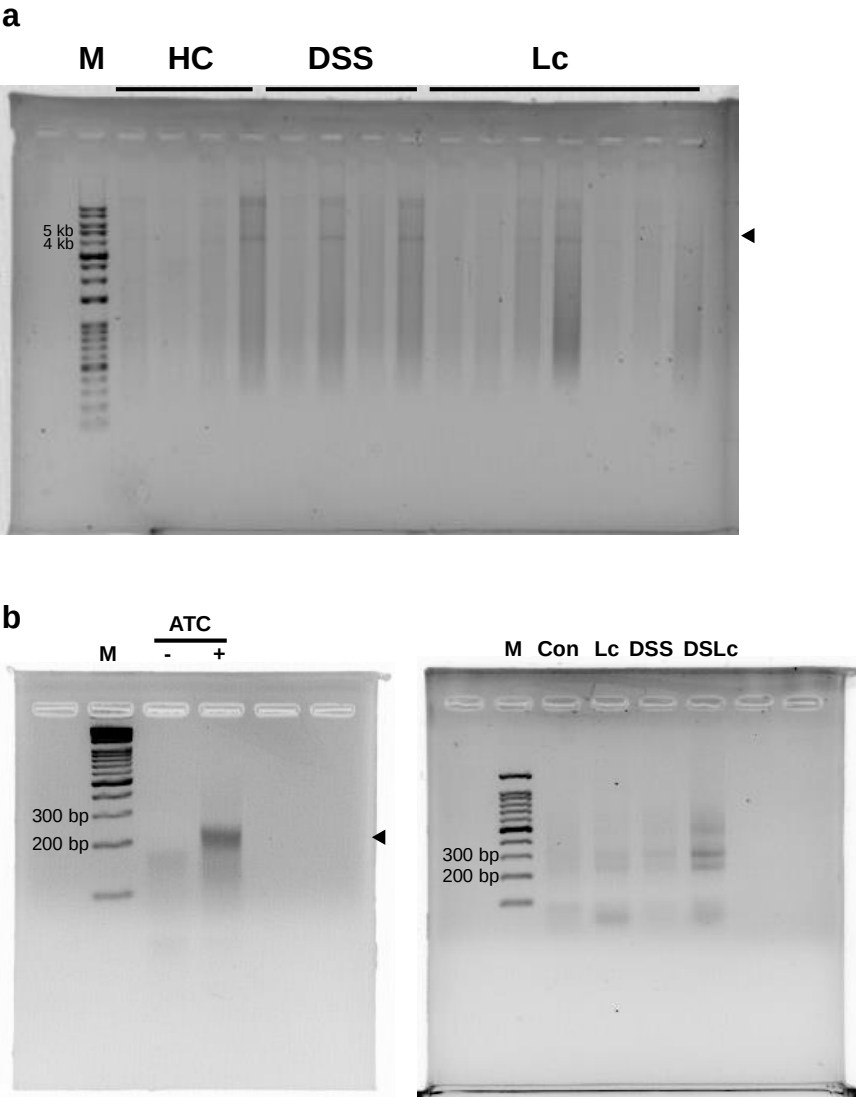
Supple. Fig. 1 Images of colons from healthy control and DSS-treated mice on D15



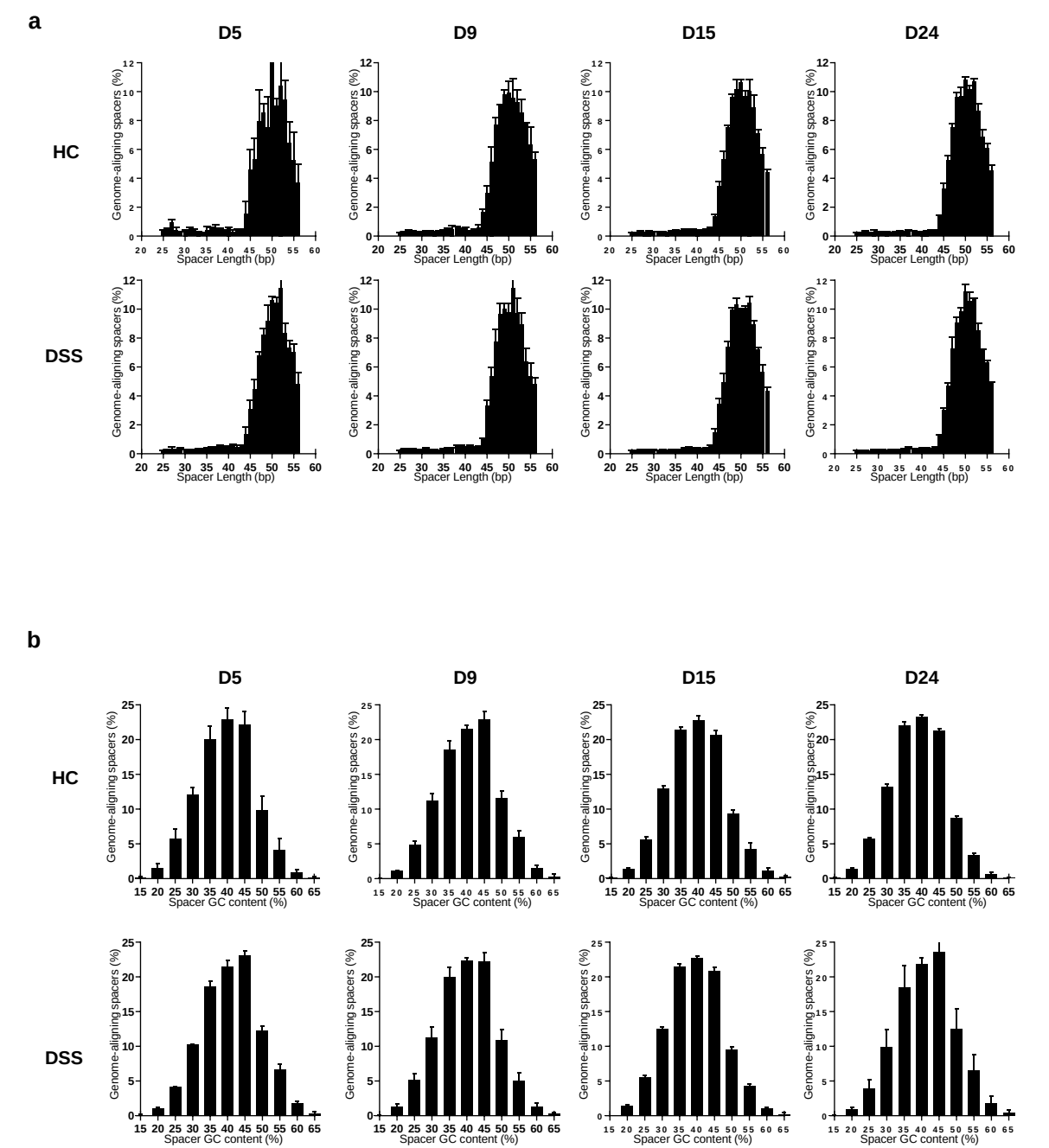
Supple. Fig. 2 Representative dot plots and histograms showing the frequency of GFP-expressing *E. coli* in fecal bacteria harvested from mice eight hours after oral gavage with *E. coli*.



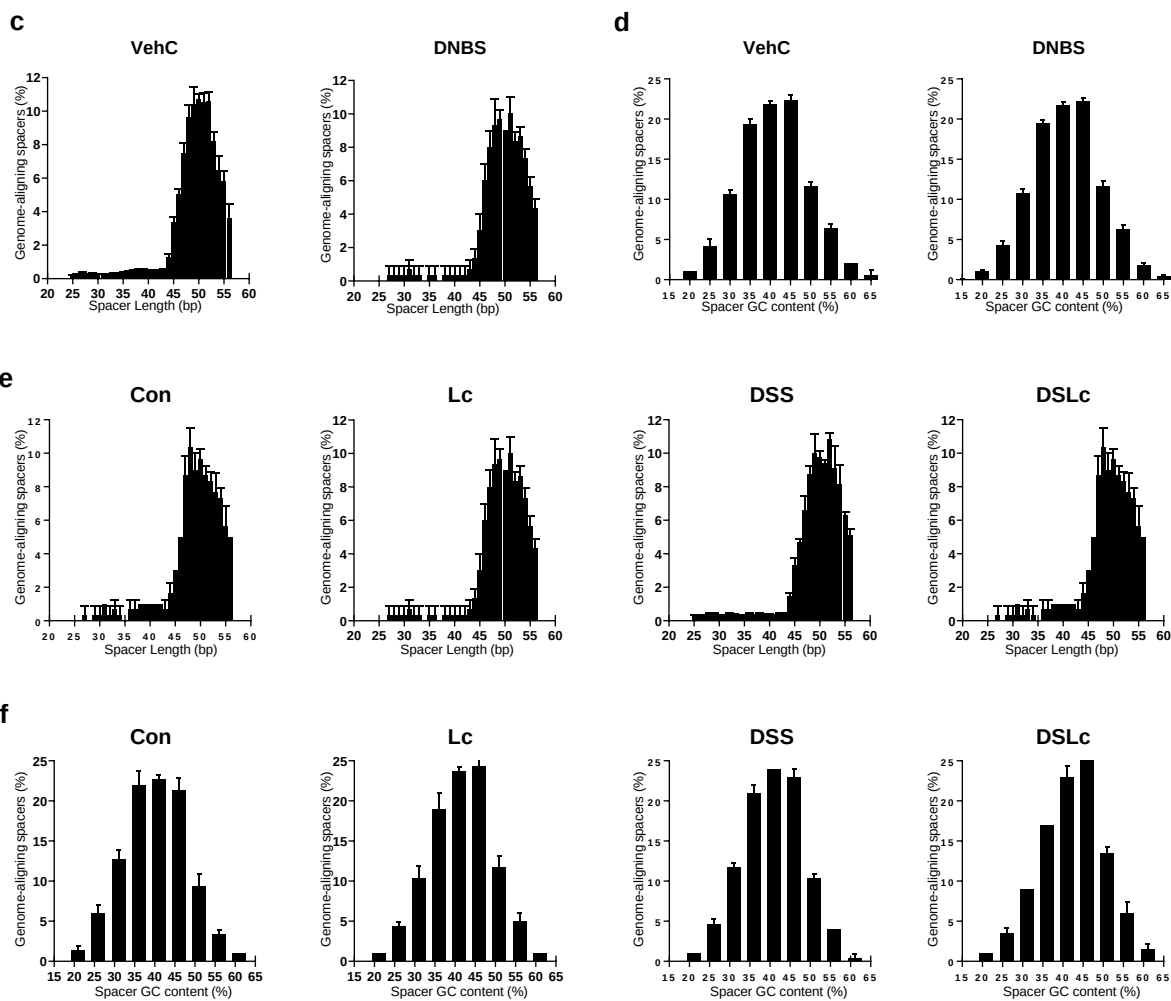
Supple. Fig. 3 Purification of plasmids and amplification of spacers in plasmids. a. Representative agarose gel image showing the plasmid purified from faeces collected 11 h after oral gavage of mice With reporter *E. coli* transformed with pFs0453_RT-Cas1_Cas2. HC: healthy control mice; DSS: dss-induced IBD mouse model. The arrowhead indicates a plasmid of the expected size. b. *In vitro* spacer acquisition (left). *E. coli* transformed with pFs0453_RT-Cas1_Cas2 were cultured in the presence of ATC or not, and then the spacers on the purified plasmid were amplified. Representative gel image showing the *in vivo* spacer acquisition (right). The spacers on pFs0453_RT-Cas1_Cas2, purified from the faeces of mice in the indicated groups, were amplified as described in the Methods section. PCR products of 210-240 bp and approximately 310 bp indicated the single and double acquisition of a spacer, respectively. Con, control group; Lc, group treated with *Lactobacillus crispatus*; DSS, group treated with dss; DSLc, group treated with dss and gavaged with *L. crispatus*.



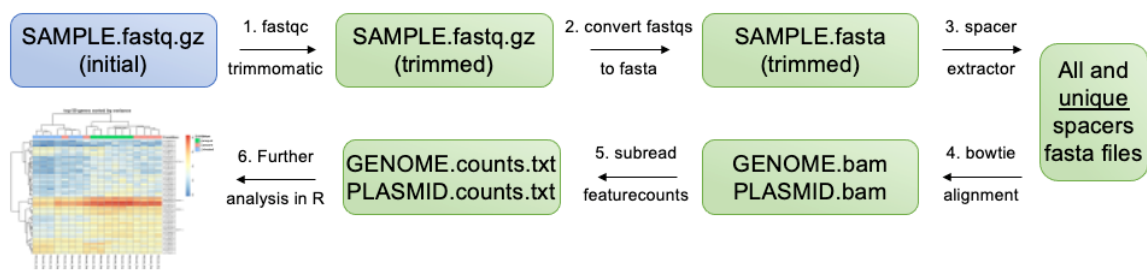
Supple. Fig. 4 Spacer length and GC content distribution. a, c, and e. Spacer length distributions in samples from the indicated mouse groups. b, d, and f. Distribution of spacer GC content in samples from the indicated mouse groups. Data represent mean $\pm$ standard deviation. HC, healthy control group; DSS, dss-treated group; VehC, vehicle-treated group; DNBS, dnbs-treated group; Con, control group; Lc, group treated with *L. crispatus*; DSS, group treated with dss; DSLc, group treated with dss and gavaged with *L. crispatus*.



Supple. Fig. 4



Supple. Fig. 5 Schematic workflow of the computational pipeline



Supplementary Table 3. Criteria of Disease activity Index (DAI)

Score	Weight loss (%)	Stool consistency	Blood in stool
0	None	Normal feces	No blood
1	1 – 5 %	Loose stool	-
2	5 – 10%	Watery diarrhea	Hemoccult(+)
3	10 - 15%	Slimy diarrhea	-
4	>15%	Severe watery diarrhea	Gross bleeding

DAI = (score of weight loss) + (score of stool consistency) + (score of blood in stool).

This is the combination of criteria used by Berberat et al., *Inflamm Bowel Dis.* 2005;11(4):350-359 and by Zhou et al. *World J Gastroenterol.* 2012;18(19):2344-2356.