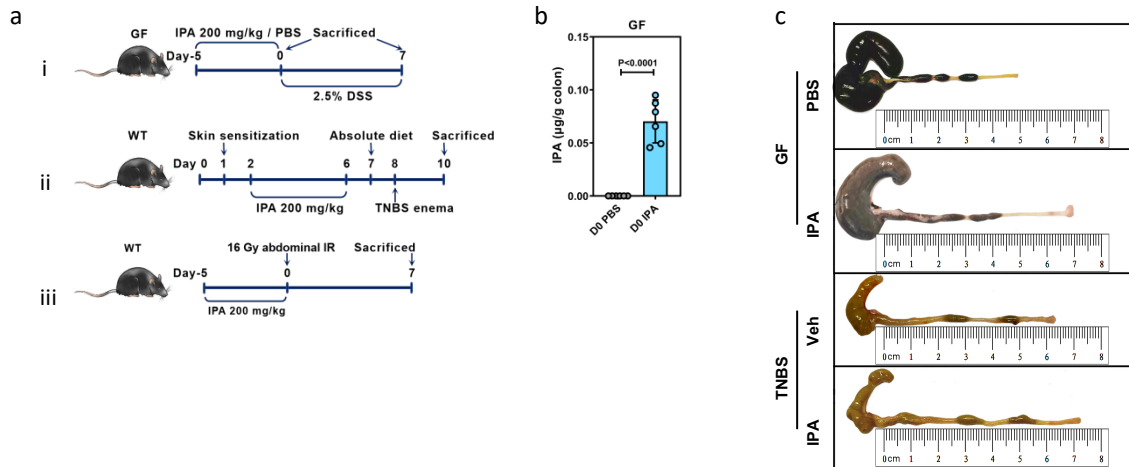


Supplementary information for

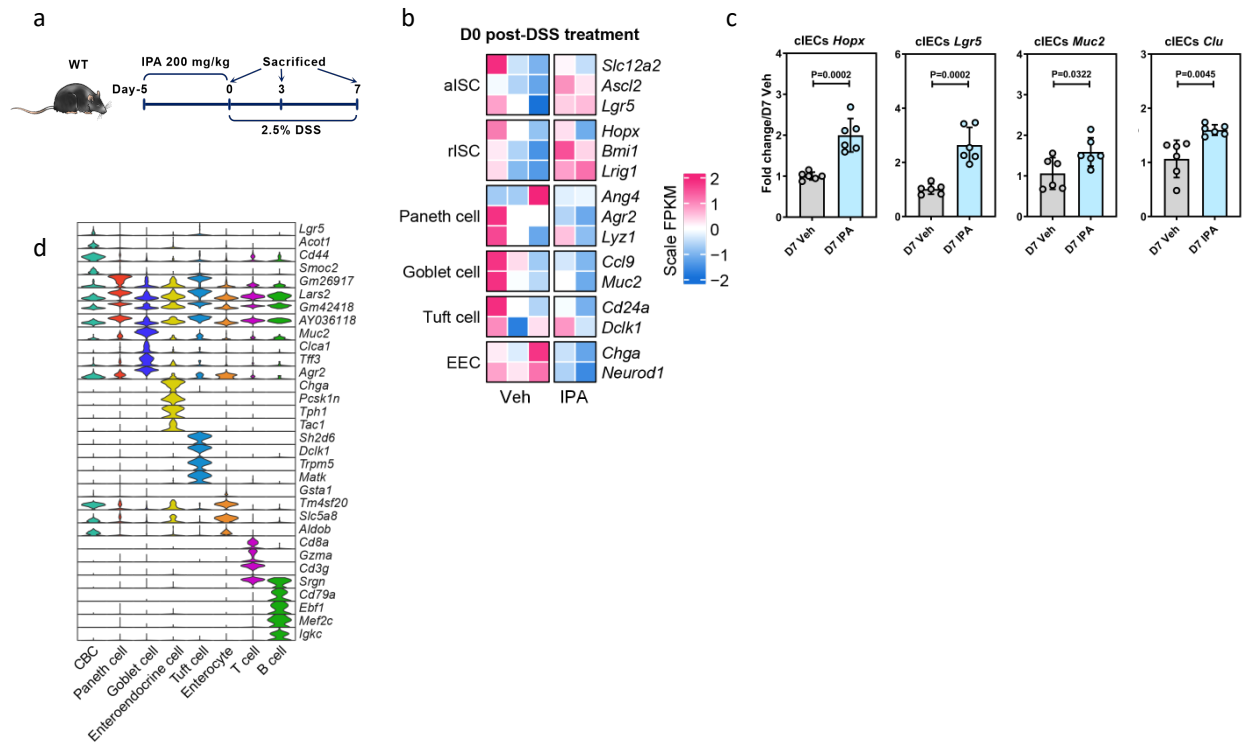
**Microbiota-derived IPA protects against colitis by regulating intestinal
HMGCS2-mediated ketogenesis to facilitate mucosal healing**

**Yanan Zhang, Shuyu Tu, Xian Shao, Jinxin Meng, Zhuobiao Zhang, Wei Wei, Xuping
Jing, Zhewen Qin, Jianan Wu, Weili Xu, Bofei Dong, Jinsong Gao, Aijuan Qu, Shuxian
Chen, Li Zhang, Peng Gong, Bo Shan, Hui Shi and Shu Jeffrey Zhu**

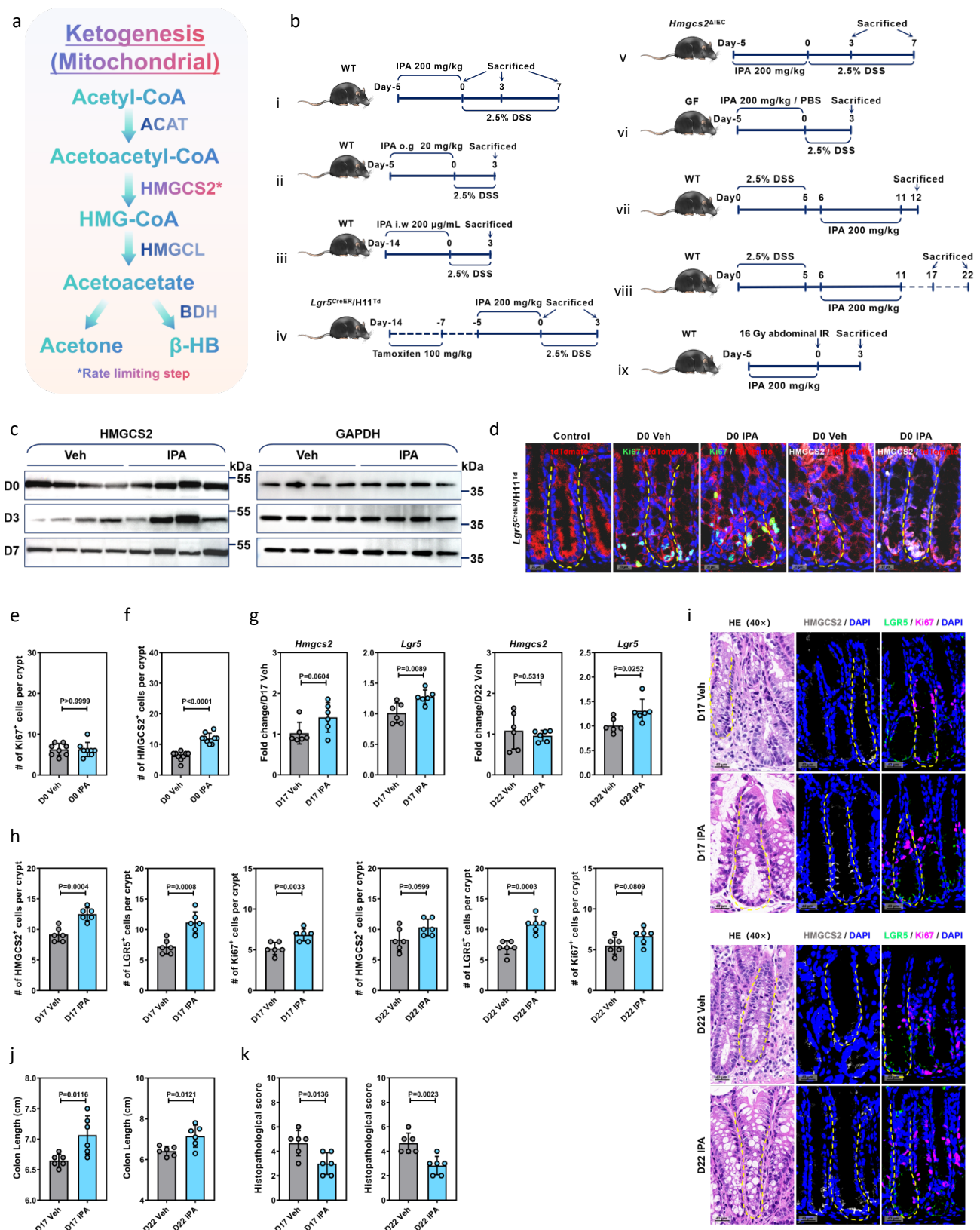
b, Representative LC-MS/MS analysis of IPA: retention time, MS/MS spectra, and proposed fragmentation pathway. **c**, IPA standard curve. **d**, Overlay chromatograms of IPA and sample retention times. **e**, Experimental schematics: (i) DSS treatment in WT mice; (ii-iv) IPA and DSS administration in WT mice. **f**, Colon lengths in WT mice post-IPA and DSS. **g**, Western blot of IL-1 β , IL-6, TNF- α (n=3). **h**, Gating strategy for immune cells (macrophages, DCs, neutrophils, CD4⁺/CD8⁺ T cells) in cLPMCs. **i**, Immune cell profiling in DSS-treated colonic lamina propria (n=6). Data represent mean $\pm$ SD from ≥ 2 independent experiments. Statistical significance determined by two-sided Student's t-test. Source data are provided as a Source Data file.



Supplementary Fig. 2 IPA exerts barrier protection in GF DSS mouse model and conventional TNBS mouse model. **a**, Experimental schematics: (i) IPA and DSS administration in GF mice; (ii) TNBS schedule in IPA-treated WT mice; (iii) IPA and irradiation (IR) in WT mice for radiation enteritis (RE). **b**, Colon tissue IPA levels in PBS- or IPA-treated GF mice at D0 post-DSS (n=6). **c**, Colon lengths in WT/GF mice post-IPA and DSS/TNBS. Data represent mean $\pm$ SD from ≥ 2 independent experiments. Statistical significance determined by two-sided Student's t-test. Source data are provided as a Source Data file.

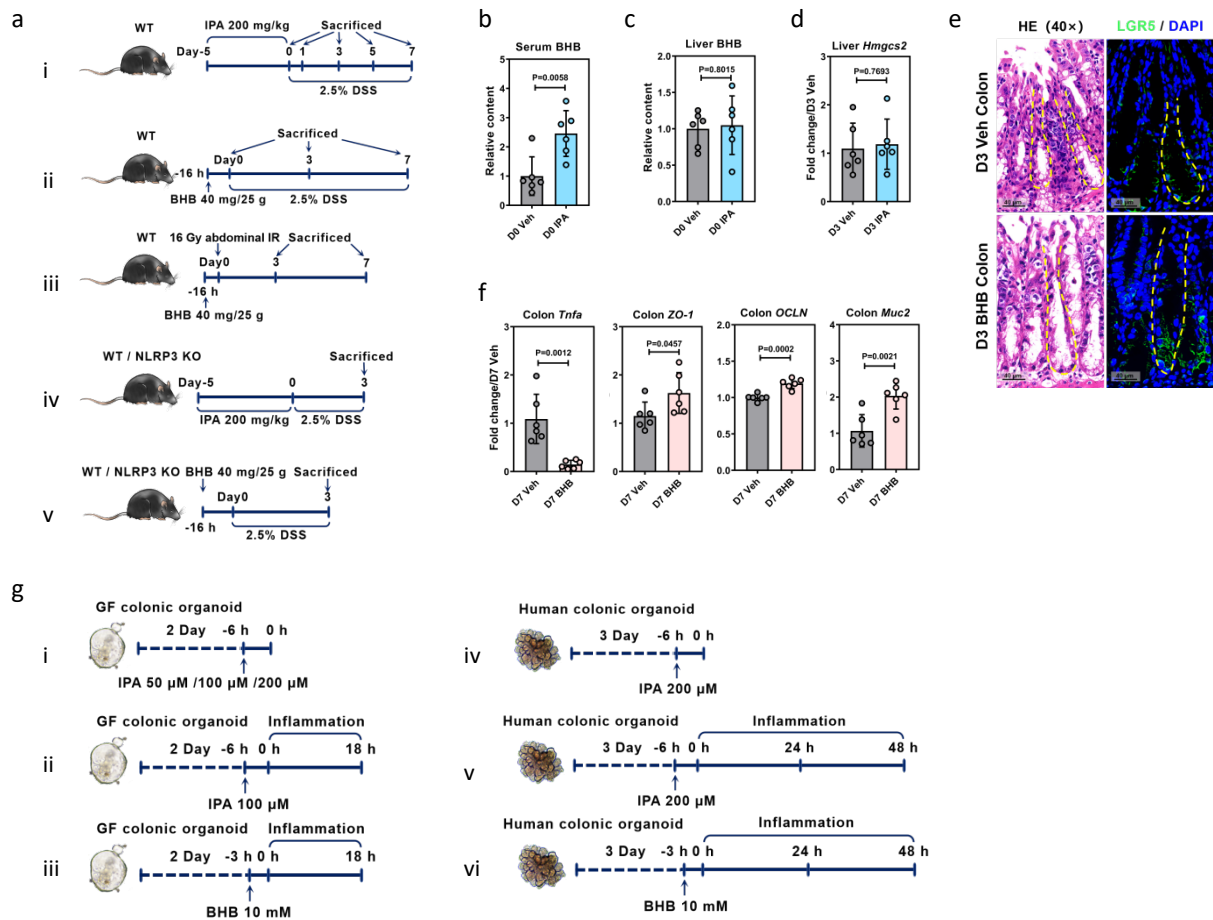


Supplementary Fig. 3 IPA restores intestinal stem cell populations in DSS-induced colitis. a, Experimental schematics: IPA and DSS administration in WT mice. **b,** Heatmaps of cell-specific marker genes in cIECs from IPA- (200 mg/kg, n=2) vs vehicle-treated (Veh, n=3) mice at D0 post-DSS. **c,** qRT-PCR of *Hopx*, *Lgr5*, *Muc2*, and *Clu* in cIECs (n=6) at D7 post-DSS. **d,** Violin plots of crypt subtype markers. Data represent mean $\pm$ SD from ≥ 2 independent experiments. Statistical significance determined by two-sided Student's t-test. Source data are provided as a Source Data file.

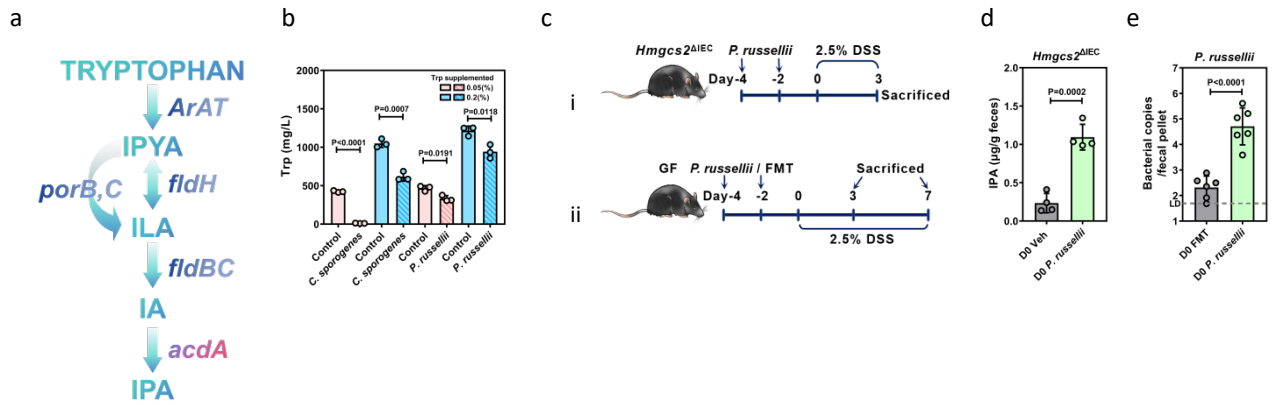


Supplementary Fig. 4 IPA restores LGR5⁺ ISCs by activating HMGCS2-mediated ketogenesis in IECs . a, Mitochondrial ketogenesis pathway. b, Experimental schematics: (i-iii) IPA and DSS

administration in WT mice; IPA studies in *Lgr5*^{CreER}/H11^{Td} (iv) and *Hmgcs2*^{ΔIEC} (v) mice; (vi) GF mice treated with IPA (200 mg/kg) plus DSS (3 d); (vii, viii) IPA studies in the therapeutic colitis models; (ix) IPA (200 mg/kg) and IR in WT mice (RE model). **c**, Western blot of colonic HMGCS2 in Veh- and IPA-treated animals prior to and at D3/D7 post-DSS (n=4). **d-f**, Lineage tracing in *Lgr5*^{CreER}/H11^{Td} mice: (d) Co-staining for Ki67/HMGCS2; (e, f) Quantification of Ki67⁺ and HMGCS2⁺ cells/crypt (IFA). **g-k**, WT B6 mice were treated with IPA (200 mg/kg for 5 d) or Veh after DSS withdrawal (n=6). Analyses were performed up to day 17 and 22 (late recovery) post-treatment: (g) *Hmgcs2* and *Lgr5* expression (qRT-PCR); (h, i) Regenerative crypt markers (Ki67/LGR5/HMGCS2) post-DSS recovery; (j, k) Colon length and histopathology. Data represent mean ± SD from ≥2 independent experiments. Statistical significance determined by two-sided Student's t-test. Source data are provided as a Source Data file.



Supplementary Fig. 5 IPA-driven BHB promotes LGR5⁺ ISC proliferation both *in vivo* and colonic organoids post injury. **a**, Experimental schematics: (i) IPA/DSS in WT mice; (ii) BHB (40 mg/25 g)/DSS in WT mice; (iii) BHB with IR (RE model); (iv, v) IPA/BHB in WT and *Nlrp3*^{-/-} mice with DSS. **b**, **c**, Serum (b) and liver (c) BHB levels in IPA- or Veh-treated mice (n=6, no DSS). **d**, *Hmgcs2* expression in liver at D3 post-DSS. **e**, HE staining and LGR5 (IFA) in colon at D3 post-IR (16 Gy). **f**, *Tnfa*, *ZO-1*, *OCLN*, *Muc2* in colon at D7 post-IR (16 Gy, n=6). **g**, Experimental schematics: (i, iv) IPA treatment in GF mice and human colonic organoids (6 h); (ii, iii) GF-derived colonic organoids pretreated with IPA (100 μ M) or BHB (10 mM) before IFN γ /TNF α injury; (v, vi) Human colonic organoids pretreated with IPA (200 μ M) or BHB (10 mM) before IFN γ /TNF α injury. Data represent mean $\pm$ SD from ≥ 2 independent experiments. Statistical significance determined by two-sided Student's t-test.



Supplementary Fig. 6 *P. russellii*-driven IPA promotes HMGCS2-mediated ketogenesis in IECs

a, Schematic of microbial tryptophan (Trp) metabolic pathways. **b**, Trp concentrations in CMC medium (control) vs *P. russellii* culture supernatants with 0.05% or 0.2% Trp supplementation (n=3). *C. sporogenes* in MRS medium served as positive control. **c**, Experimental schematics: (i) *Hmgcs2*^{ΔIEC} mice colonized with *P. russellii* (10⁹ CFU) and treated with DSS; (ii) GF mice receiving FMT from WT mice or *P. russellii* colonization (10⁶ CFU) plus DSS. **d**, Fecal IPA levels in *P. russellii*-colonized *Hmgcs2*^{ΔIEC} mice pre-DSS (n=4). **e**, *P. russellii* genomic copies in feces from FMT- vs *P. russellii*-colonized GF mice pre-DSS (n=6). Data represent mean ± SD from ≥2 independent experiments. Statistical significance determined by two-sided Student's t-test. Source data are provided as a Source Data file.

Supplementary Table 1

Supplementary Table 1. List of antibody, critical commercial assays, chemicals and Reagent, cytokine, Flow cytometry related and oligonucleotides primers information.

REAGENT or RESOURCE	SOURCE	IDENTIFIER
Antibodies		
Anti-mouse CD3 (Flow cytometry) (Rat, Clone 17A2), FITC conjugated	eBioscience	Cat# 11-0032-82; RRID: AB_2572431
Anti-mouse CD4 (Flow cytometry) (Rat, Clone GK1.5), eFluor™ 450 conjugated	eBioscience	Cat# 48-0041-82; RRID: AB_10718983
Anti-mouse CD8a (Flow cytometry) (Rat, Clone 53-6.7), APC conjugated	Tonbo Biosciences	Cat# 20-0081
Anti-human/mouse CD11b (Flow cytometry) (Rat, Clone M1/70), PerCP-Cy5.5 conjugated	MultiSciences	Cat# F41011b04
Anti-mouse F4/80 (Flow cytometry) (Rat, Clone BM8.1), PE conjugated	MultiSciences	Cat# F21480A02
Anti-mouse CD11c (Flow cytometry) (Armenian Hamster, Clone N418), APC conjugated	Biolegend	Cat# 117309; RRID: AB_313778
Anti-mouse Ly-6G (Flow cytometry) (Rat, Clone 1A8), FITC conjugated	eBioscience	Cat# 11-9668-80; RRID: AB_2572531
TruStain FcX™ (anti-mouse CD16/32) Antibody (Fc block) (Rat, clone 93)	BioLegend	Cat# 101320; RRID: AB_1574975
PPARα Mouse mAb (ChIP)	Santa Cruz Biotechnology	Cat# sc-398394
IL-6 Rabbit pAb (Immunofluorescence)	Proteintech	Cat# 21865-1-AP; RRID: AB_11142677
Occludin Rabbit pAb (Immunofluorescence)	Proteintech	Cat# 13409-1-AP; RRID: AB_2156308
MUC2 Rabbit pAb (Immunofluorescence)	Proteintech	Cat# 27675-1-AP; RRID: AB_2880943
Anti-Ki67 Rabbit mAb (Immunofluorescence)	Abcam	Cat# ab16667
LGR5 Rabbit pAb (Immunofluorescence)	Affinity	Cat# DF2816; RRID: AB_2840022
HMGCS2 Rabbit pAb (Immunofluorescence)	ABclonal	Cat# A14244; RRID: AB_2761104
PPAR alpha Rabbit pAb (western blot)	Affinity	Cat# AF5301; RRID: AB_2837786
Beta Actin Mouse mAb (western blot)	Proteintech	Cat# 66009-1; RRID: AB_2687938
GAPDH Mouse mAb (western blot)	Proteintech	Cat# 60004-1; RRID: AB_2107436
IL-6 Rabbit pAb (western blot)	Servicebio	Cat# GB11117-100
IL-1 beta Rabbit pAb (western blot)	Servicebio	Cat# GB11113-100
TNF alpha Rabbit pAb (western blot)	Elabscience	Cat# E-AB-33121
Bacterial and virus strains		
<i>Peptostreptococcus russellii</i>	DSM	Cat# 23041
<i>Clostridium sporogenes</i>	ATCC	Cat# 11437
<i>E.coli</i> DH5α	Yeasen	Cat# 11802ES80
Biological samples		
Feces from healthy individuals and patients with Crohn's disease	Sir Run Run Shaw Hospital, School of Medicine, Zhejiang University	N/A
Human colonic biopsies	The First Affiliated Hospital of Guangdong Pharmaceutical University	N/A
Chemicals, peptides, and recombinant proteins		
Dextran Sulfate Sodium Salt (DSS)	Yeasen	Cat# 60316ES76
TNBS	Meilunbio	Cat# MB5523
Indolepropionic acid (IPA)	Bidepharm	Cat# BD13027
Beta-hydroxybutyrate (BHB)	Bidepharm	Cat# BD87324
L-tryptophan	D&B	Cat# K756495
Indole-3-methyl acetate	Bidepharm	Cat# BD13029
Dimethyl sulfoxide	MCE	Cat# HY-Y0320
D-Biotin	Beyotime	Cat# ST2051
IPA-Biotin	Ruixibio	N/A
Corn oil	MedChemExpress	Cat# HY-Y1888
WY14643	Bidepharm	Cat# BD156612
MK886	Bidepharm	Cat# BD267012
Tamoxifen	MilliporeSigma	Cat# T5648
Agar	MilliporeSigma	Cat# A7921
DAPI (4',6-Diamidino-2-Phenylindole, Dihydrochloride)	Thermo Scientific	Cat# D1306
PVDF	Bio-Rad	Cat# 1620184
Lipofectamine 3000 Reagent	Invitrogen	Cat# L3000150
EDTA	UltraPure	Cat# 15575-038
Dithiothreitol (DTT)	Solarbio	Cat# D1070
Collagenases	Worthington	Cat# LS004189
Dnase I	Solarbio	Cat# D8071
4% paraformaldehyde	Biosharp	Cat# BL539A
RIPA Lysis Buffer	Beyotime	Cat# P0013B
FreeZol reagent	Vazyme	Cat# R711
Matrigel matrix	ABW	Cat# 082703
Percoll	Yeasen	Cat# 40501ES60
PBS, 1×(Phosphate Buffered Saline)	Servicebio	Cat# G4202
Hank's Balanced Salt Solution	Servicebio	Cat# G4203
Fetal Bovine Serum	Gibco	Cat# A5669701
Dulbecco's Modified Eagle Medium	Meilunbio	Cat# MA0212
Penicillin streptomycin solution	Meilunbio	Cat# MA0110

Opti-MEM	Gibco	Cat# 31985070
MRS Broth	LAND BRIDGE	Cat# CM187
Chopped Meat Carbohydrate Broth	TOPBIO	Cat# M5640
Dried Meat Particle	Hopebio	Cat# HB0260
Brain heart infusion medium (BHI)	OXOID	Cat# CM1135B
DPNI	NEB	Cat# R0176
2×Phanta Max Master Mix	Vazyme	Cat# P515
180 kDa Plus Prestained Protein Marker	Vazyme	Cat# MP201-02
Recombinant Human TNF-alpha Protein	Yeasen	Cat# 90601ES10
Recombinant Human IFN-gamma Protein	Yeasen	Cat# 91207ES60
Mouse IFN-gamma Protein	Huabio	Cat# HA210609
Mouse TNF-alpha Protein	Huabio	Cat# HA210527
Mouse colonic organoid kit	bioGenous	Cat# K2204-MC
Human colonic organoid kit	bioGenous	Cat# K2003-HC
Organoid Dissociation Solution	bioGenous	Cat# E238001
Critical commercial assays		
Pierce Magnetic ChIP Kit	Thermo	Cat# 26157
FastPure EndoFree Plasmid Maxi Kit	Vazyme	Cat# DC202
Dual Luciferase Reporter Gene Assay Kit	Beyotime	Cat# RG028
TIANamp Stool DNA Kit	TIANGEN	Cat# DP328-02
HiScript II One Step qRT-PCR SYBR Green Kit	Vazyme	Cat# Q221-01
β-Hydroxybutyric acid (BHB) Content Assay Kit	Solarbio	Cat# BC5085
BCA Protein Assay Kit	EpiZyme	Cat# ZJ101
Enhanced chemiluminescence kit	Vazyme	Cat# E423-01/02
Deposited data		
Mouse colonic intestinal epithelial RNA sequencing data	This paper	GSA: CRA025369
Mouse intestinal crypts single-cell RNA sequencing data	This paper	GSA: CRA024086
HeQ_2017 metagenomic sequencing data	He et al.	ENA: PRJEB15371
SchirmerM_2018 metagenomic sequencing data	Schirmer et al.	NCBI: PRJNA389280
LloydPriceJ_2019 metagenomic sequencing data	Lloyd-Price et al.	NCBI: PRJNA398089
YanQ_2023c public sequencing data	Yan et al.	ENA: PRJEB67456
<i>P. russellii</i> RT-10B genome (GCF_003012055.1)	NCBI	https://ftp.ncbi.nlm.nih.gov/genomes/refseq
Experimental models: Cell lines		
Human: 293T cells	ATCC	Cat# CRL-3216
Experimental models: Organisms/strains		
Mouse: C57BL/6J	Model Animal Research Center of Nanjing University	N/A
Mouse: Germ-Free: C57BL/6J	Shenzhen Gnotobio Biotechnology Co., Ltd	Strain NO. JT-001
Mouse: <i>Nlrp3</i> ^{-/-} : C57BL/6JCya- <i>Nlrp3</i> ^{em1} /Cya	Cyagen Biosciences Inc.	Strain NO. S-KO-05211
Mouse: <i>Ahr</i> -floxed: C57BL/6NCya- <i>Ahr</i> ^{em1lox} /Cya	Cyagen Biosciences Inc.	Strain NO. S-CKO-01108
Mouse: <i>Vil1</i> -Cre: C57BL/6JCya- <i>Vil1</i> -Cre	Cyagen Biosciences Inc.	Strain NO. C001243
Mouse: <i>Ppara</i> -floxed: C57BL/6JCya- <i>Ppara</i> ^{em1lox} /Cya	Capital Medical University	N/A
Mouse: <i>Hmgcs2</i> -floxed: C57BL/6NCya- <i>Hmgcs2</i> ^{em1lox} /Cya	Sun Yat-sen University	N/A
Mouse: <i>Pxr</i> ^{-/-} : C57BL/6NCya- <i>Nr1h2</i> ^{em1} /Cya	Hunan Agricultural University	N/A
Mouse: <i>Lgr5</i> -CreERT2: C57BL/6JGpt- <i>Lgr5</i> ^{em1Cin(CreERT2)} /Gpt	GemPharmatech Co., Ltd.	Strain NO. T003768
Mouse: <i>H11</i> -CAG-LSL-tdTomato: C57BL/6JGpt- <i>H11</i> ^{em1Cin(CAG-LSL-tdTomato)} /Gpt	GemPharmatech Co., Ltd.	Strain NO. T058417
Oligonucleotides		
Mouse <i>Il6</i> forward: TAGTCCTCTCTACCCCAATTCC	Sense primer	Antisense primer
Mouse <i>Il6</i> reverse: TTGGTCCTTAGCCACTCCTTC	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse <i>Il1b</i> forward: AAAAAAGCCTCGTGCTGTCG	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse <i>Il1b</i> reverse: GTCGTTGCTTGTTCTCCTTG	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse <i>Tnfr</i> forward: AGGCACCCCCAAAAGAT	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse <i>Tnfr</i> reverse: CAGTAGACAGAAGAGCGTGGTG	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse ZO-1 forward: GCTGCCTCGAACCTCTACTC	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse ZO-1 reverse: TTGCTCATAACTTCGCGGGT	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse OCLN forward: TCACCTTTCTGCGGTGACT	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse OCLN reverse: GGGAACGTGCGCCATATAATG	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse <i>Muc2</i> forward: ATGCCACCTCCTCAAGAC	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse <i>Muc2</i> reverse: GTAGTTTCCGTGGAACAGTGAA	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse <i>Hmgcs2</i> forward: GAAGAGAGCGATGCAGGAAAC	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse <i>Hmgcs2</i> reverse: GTCCACATATTGGCTGGAAA	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse <i>Hmgcs2</i> promoter forward: AATGTGGAGGCAGTAAGGA	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse <i>Hmgcs2</i> promoter reverse: GAACTCGCACTCAAGGA	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse <i>Hopx</i> forward: TCTCATCCTTAGTCAGACGC	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse <i>Hopx</i> reverse: GGGTGCTTGTTGACCTTGTT	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse <i>Ppara</i> forward: AGAGCCCCATCTGTCTCTC	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse <i>Ppara</i> reverse: ACTGGTAGTCTGCAAAACCAAA	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse <i>Pparg</i> forward: TCGCTGATGCACTGCCTATG	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse <i>Pparg</i> reverse: GAGAGGTCACAGAGCTGATT	Zhejiang Youkang Biotechnology Co., Ltd	N/A

Mouse <i>Ppard</i> forward: TCCATCGTCAACAAAGACGGG	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse <i>Ppard</i> reverse: ACTTGGGCTCAATGATGTACAC	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse <i>Clu</i> forward: AGCAGGAGGTCTCTGACAATG	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse <i>Clu</i> reverse: GGCTTCTCTAAACTTTGAGC	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse <i>Lgr5</i> forward: CCTACTCGAAGACTTACCCAGT	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse <i>Lgr5</i> reverse: GCATTGGGGTGAATGATAGCA	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse <i>Gapdh</i> forward: GCCTTCCGTGTTCTCTACCC	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse <i>Gapdh</i> reverse: CCCTCAGATGCCTGCTTCAC	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Human <i>IL1B</i> forward: AATCTGTACCTGTCTCGGTGTT	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Human <i>IL1B</i> reverse: TGGGTAATTTTTGGGATCTACACT	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Human <i>TNFA</i> forward: GGAGAAGGGTGACCGACTCA	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Human <i>TNFA</i> reverse: CTGCCCAGATCGGCAA	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Human <i>HMGCS2</i> forward: CAGTCCAAGAGGACATCAACTC	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Human <i>HMGCS2</i> reverse: CAGTGCCTACTCCAGCCTG	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Human <i>IL8</i> forward: AGTTTTTGAGAGGGGCTGAGA	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Human <i>IL8</i> reverse: TGCTTGAAGTTTCACTGGCATC	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Human <i>HES1</i> forward: CCGTGTACCCCGTCTACAC	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Human <i>HES1</i> reverse: CACATGGAGTCCGCCGTAA	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Human <i>LGR5</i> forward: GAGTTACGTCTTGGGGAAAC	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Human <i>LGR5</i> reverse: TGGGTACGTGCTTACGTGATTA	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Human <i>LYZ</i> forward: GGCCAAATGGGAGAGTGTTA	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Human <i>LYZ</i> reverse: CCAGTAGCGGCTATTGATCTGAA	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Human <i>MUC2</i> forward: GAGGGCAGAACCCGAAACC	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Human <i>MUC2</i> reverse: GGCGAAGTTGTAGTCGACAG	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Human <i>CTNNB1</i> forward: CATCTACACAGTTTGATGCTGCT	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Human <i>CTNNB1</i> reverse: GCAGTTTTGTCACTTCAGGGA	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Human <i>GAPDH</i> forward: GGAGCGAGATCCCTCCAAAT	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Human <i>GAPDH</i> reverse: GGCTGTTGTCATACTTCTCATGG	Zhejiang Youkang Biotechnology Co., Ltd	N/A
<i>Peptostreptococcus russellii</i> forward: GATGAAGCGGACAAATGTGAT	Zhejiang Youkang Biotechnology Co., Ltd	N/A
<i>Peptostreptococcus russellii</i> reverse: TGCAATGTGGCGATGAAC	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse PPARα-S280A forward: GTGCATGGCCGTGGAGACCGTCACGGAGCTCA	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse PPARα-S280A reverse: TCTCCACGGCCATGCACCTGGCAGCAGTGGAAAG	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse PPARα-F318A forward: TATGAAGCCATCGCCACGATGCTGTCTCCTTGATGA	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse PPARα-F318A reverse: GTGGCGATGGCTTCATACACACCGTACTTTAG	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse PPARα-I354A forward: TCTGTACGCCATGGAACCCAAGTTTGACTTCG	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse PPARα-I354A reverse: TTCCATGGCGTCACAGAACGGCTTCCTCAGGT	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse PPARα-M355A forward: TCTGTGACATCGCGGAACCCAAGTTTGACTTCGCTATG	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse PPARα-M355A reverse: TTCCGCGATGTCACAGAACGGCTTCCTCAGGT	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse PPARα-H440A forward: AGGCTGCGCAGCTCGTACAGGTATCAAGAAG	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse PPARα-H440A reverse: TACGAGCTGCGCAGCCTCCGTGACCAGCTGCCG	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse PPARα-Y314A forward: TGTGGCTGAAGCCATCTTCACGATGCTGTCCT	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse PPARα-Y314A reverse: AGATGGCTTCAGCCACACCGTACTTTAGCAAGGTGAC	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse PPARα-Y314F forward: TGTGCTGAAGCCATCTTCACGATGCTGTCCT	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse PPARα-Y314F reverse: AGATGGCTTCAGCCACACCGTACTTTAGCAAGGTGAC	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse PPARα-Y314V forward: GGTGTGGTTGAAGCCATCTTCACGATGCTGTC	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse PPARα-Y314V reverse: ATGGCTTCAACCACACCGTACTTTAGCAAGGTGAC	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse PPARα-I317A forward: TATGAAGCCGCTTCACGATGCTGCTCCTCTG	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse PPARα-I317A reverse: GTGAAGCGGCTTCATACACACCGTACTTTAGC	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse PPARα-I317L forward: TGAAGCCCTCTTCACGATGCTGCTCCTCTGA	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse PPARα-I317L reverse: TCGTGAAGAGGGCTTCATACACACCGTACTTTAGC	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse PPARα-I317D forward: TGAAGCCGACTTCACGATGCTGCTCCTCTGA	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Mouse PPARα-I317D reverse: TCGTGAAGTCGGCTTCATACACACCGTACTTTAGC	Zhejiang Youkang Biotechnology Co., Ltd	N/A
Software and algorithms		
GraphPad Prism software 9.0	GraphPad Software, Inc.	https://graphpad.com/scientificsoftware/prism/
FlowJo-10.4	Tree Star Inc.	https://www.flowjo.com/solutions/flowjo
Caseview 2.3	Caseviewer Software, Inc	https://caseview.com.au/
Image J	ImageJ Software Inc.	https://imagej.nih.gov/ij/index.html
K-Viewer	KFBIO Inc.	https://www.kfbio.cn/k-viewer/
Other		
70 μm cell strainer	biosharp	Cat# BS-70-XBS