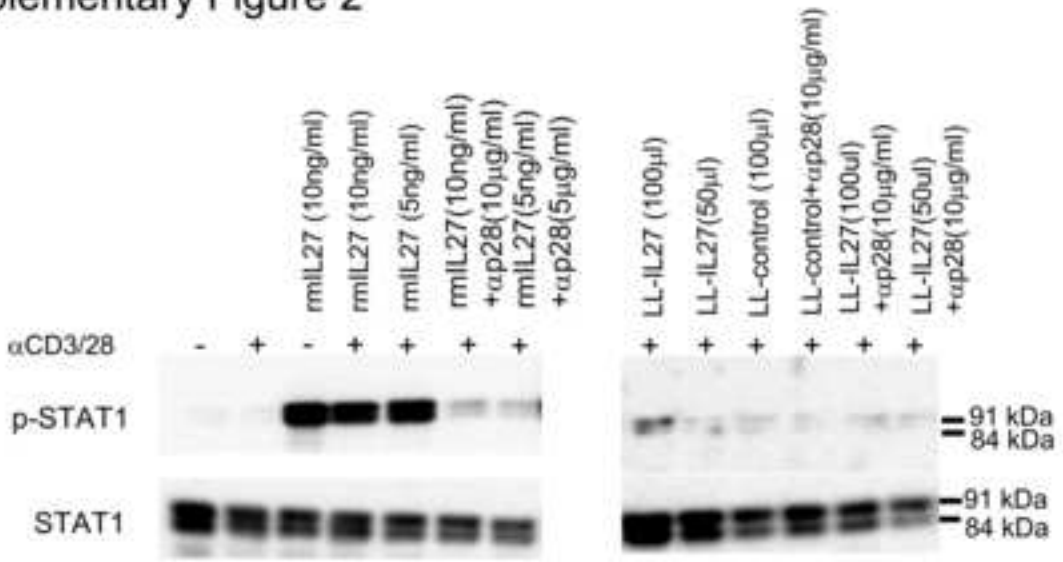
Supplementary Figure 1

MKKKIISAILMSTVILSAAAPLSGVYAGYTETALVALSQPRVQCHASRYPVAVDC
SWTPLQAPNSTRSTSFIATYRLGVATQQQSQPCLQRSPQASRCTIPDVHLFSTV
PYMLNVTAVHPGGASSSLLAFVAERIIKPDPPEGVRLRTAGQRLQVLWHPPAS
WPFPDIFSLKYRLRYRRRGASHFRQVGPIEATTFTLRNSKPHAKYCIQVSAQDL
TDYGKPSDWSLPGQVESAPHKPSRGSGSGGSGGSGSGKLPTDPLSLQELRR
EFTVSLYLARKLLSEVQGYVHSFAESRLPGVNLDLLPLGYHLPNVSLTFQAWHH
LSDSERLCFLATTLRPFPAMLGGLGTQGTWTSSEREQLWAMRLDLRDLHRHL
RFQVLAAGFKCSKEEEDKEEEEEEEEEEKKLPLGALGGPNQVSSQVSWPQLLY
TYQLLHSLELVLSRAVRDLLLLSLPRRPGSAWDS

L. lactis usp45 secretion signal
Mouse EBI3 aa 18-228linkerMouse p28 aa 30-234

Supplementary Figure 2

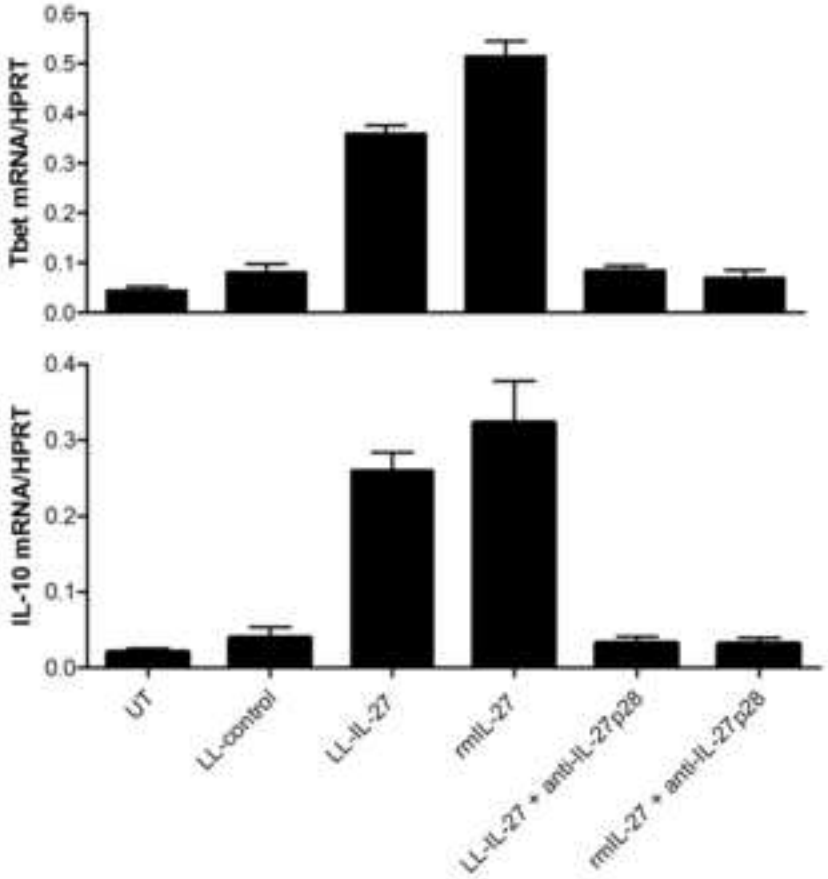
A



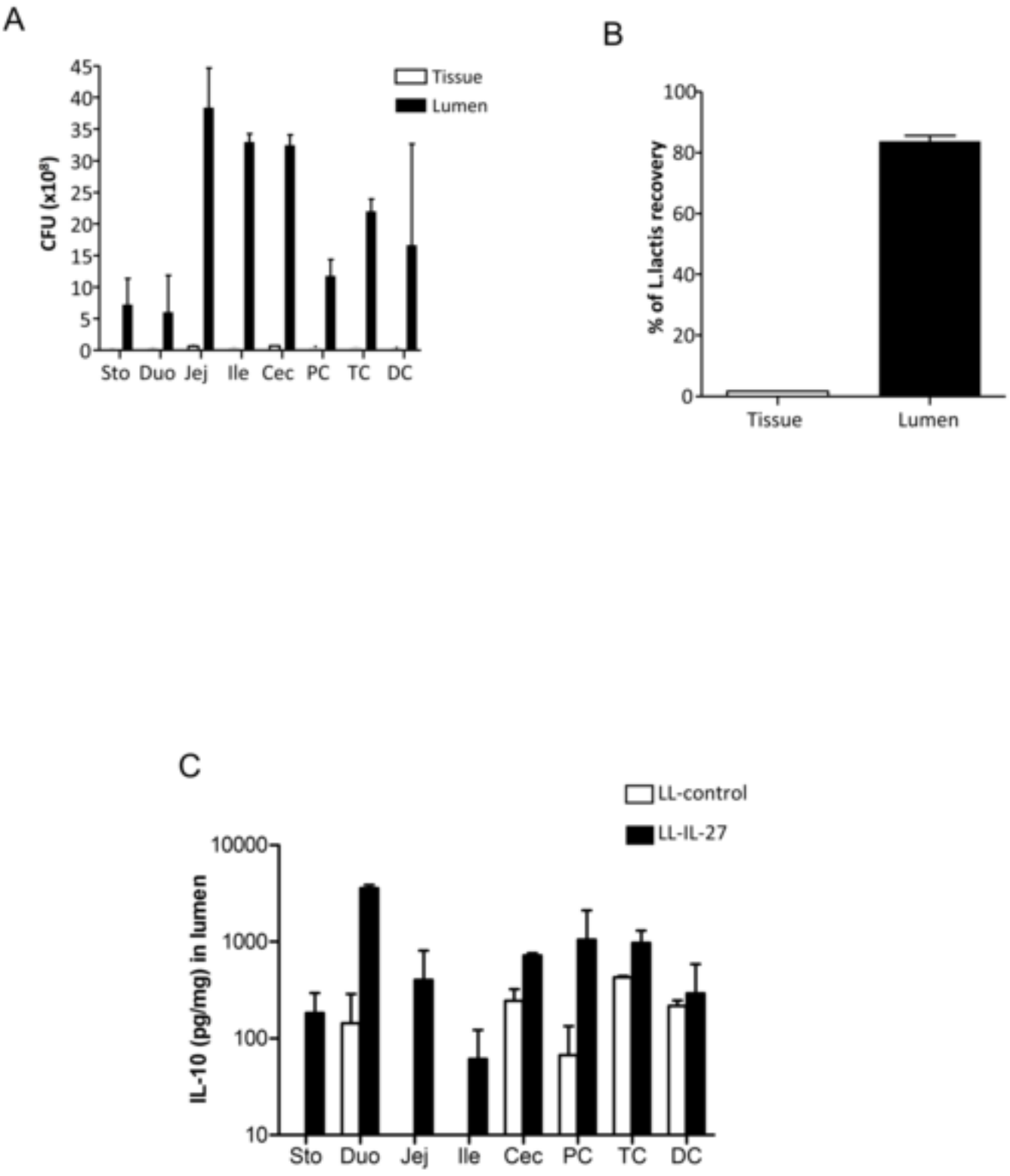
B

Percent Reduction in IL-10 Levels	%
αCD3/28 + rmIL-27 (10 ng/ml) + αp28 (10 μg/ml)	5.94
αCD3/28 + rmIL-27 (10 ng/ml) + αEbi3 (10 μg/ml)	70.92
αCD3/28 + rmIL-27(5 ng/ml) + αp28(5 μg/ml)	19.15
αCD3/28 + rmIL-27(5 ng/ml) + αEbi3(5 μg/ml)	65.38
αCD3/28 + rmIL-27 (5 ng/ml) + αEbi3(5 μg/ml) + αp28 (5 μg/ml)	57.12
αCD3/28 + LL-IL-27 (100 μl) + αp28 (10 μg/ml)	20.31
αCD3/28 + LL-IL-27 (100 μl) + αEbi3 (10 μg/ml)	33.91
αCD3/28 + LL-IL-27 (100 μl) + αEbi3 (10 μg/ml) + αp28 (10 μg/ml)	64.33

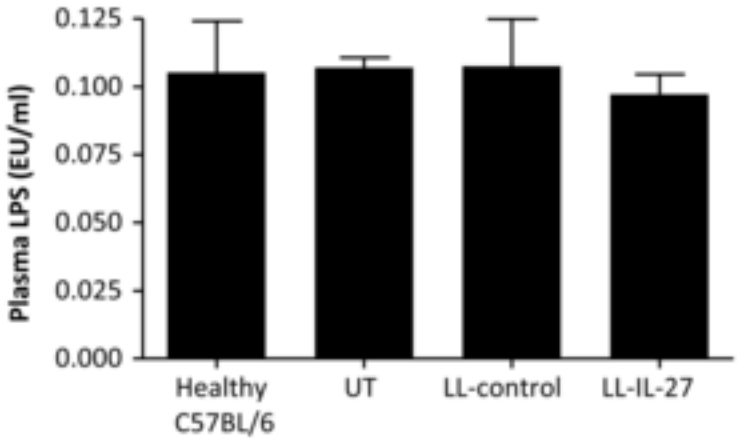
C



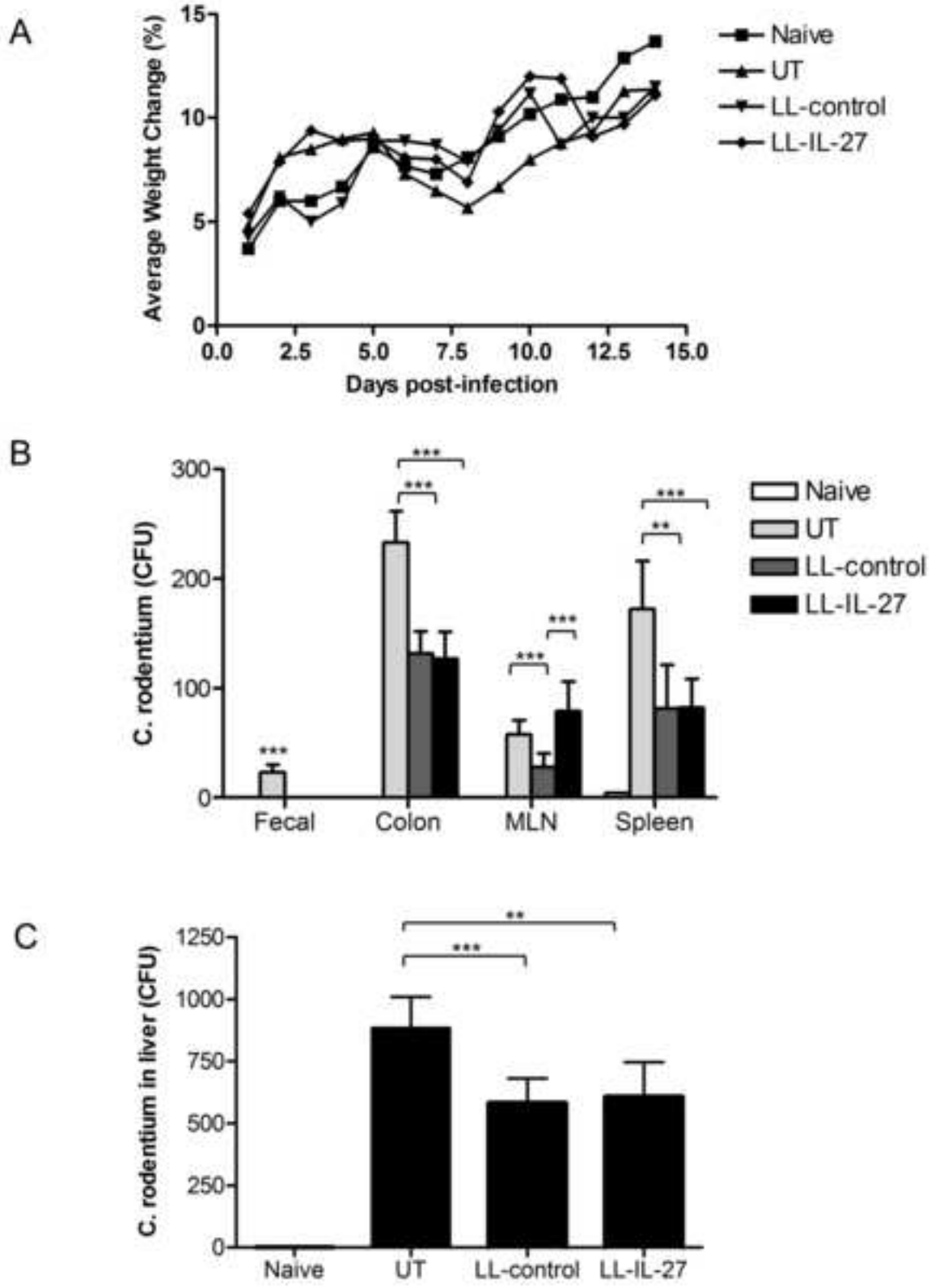
Supplementary Figure 3



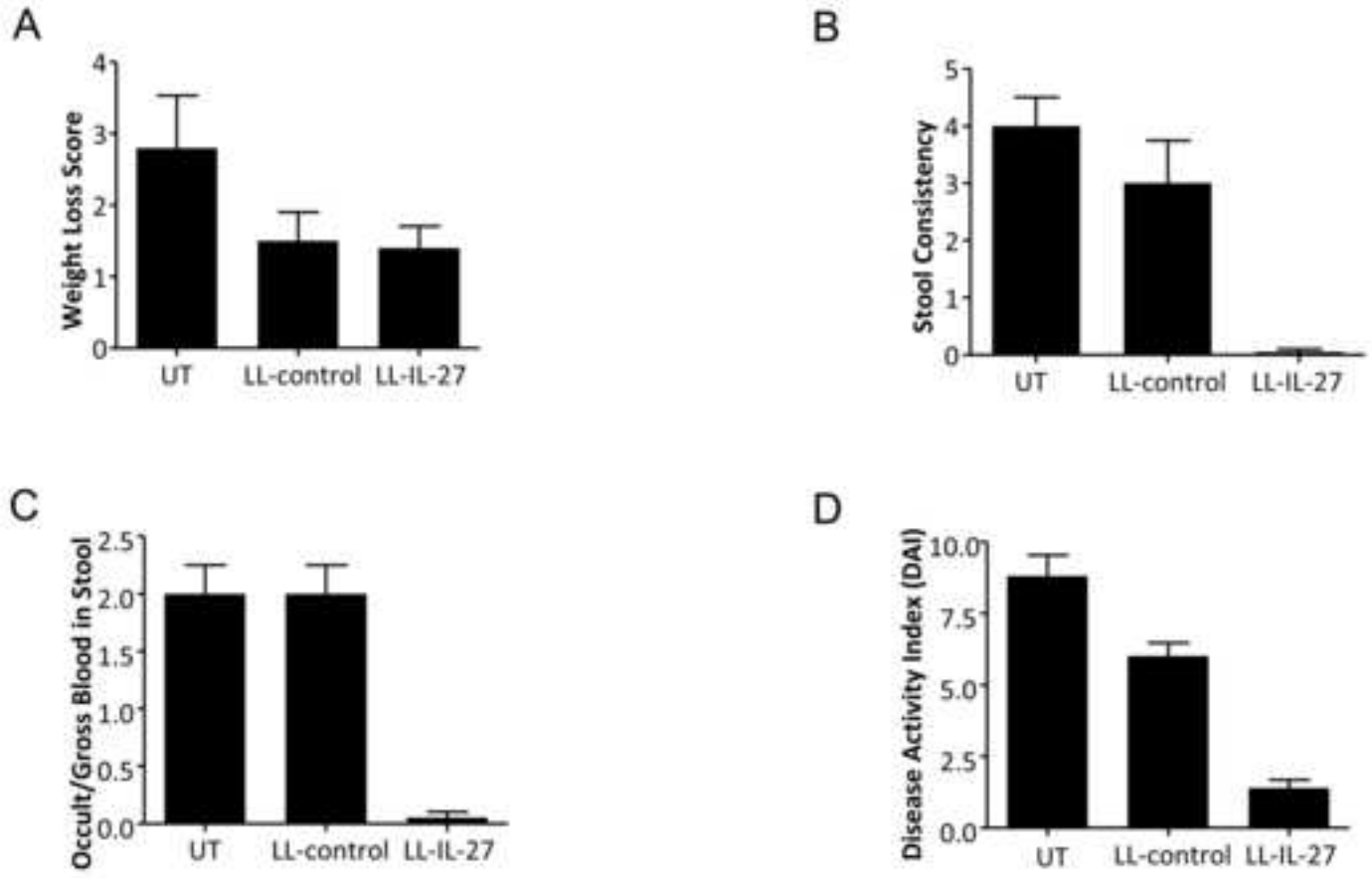
Supplementary Figure 4



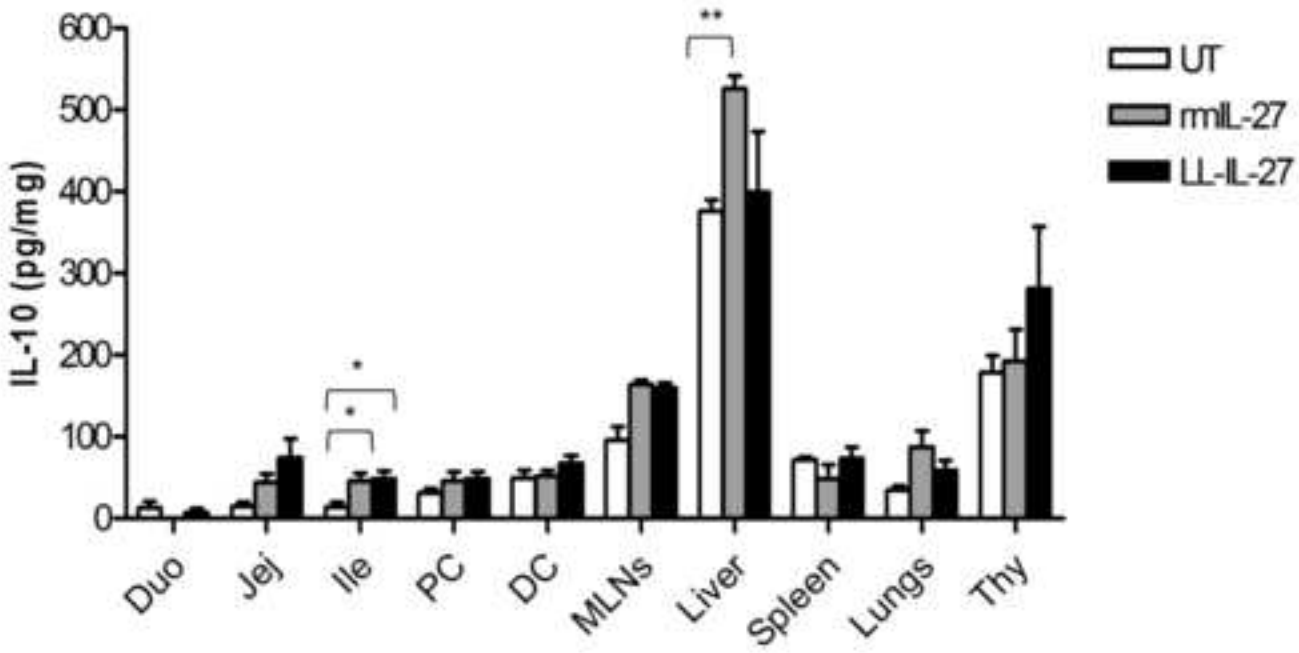
Supplementary Figure 5



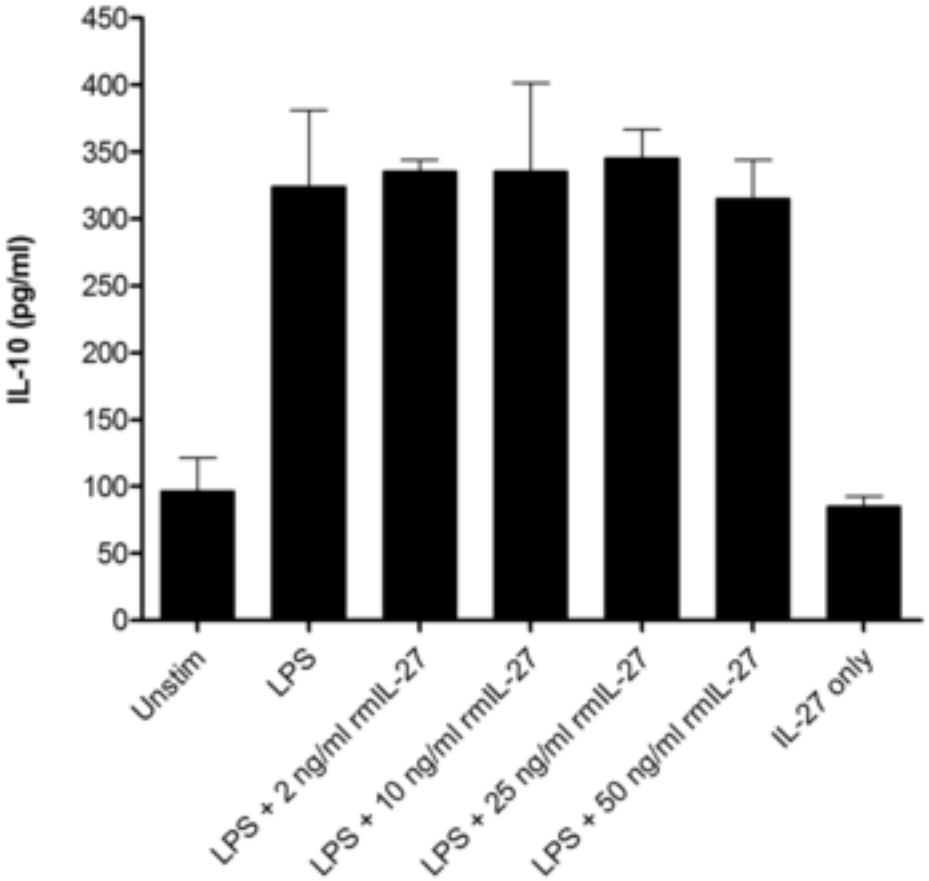
Supplementary Figure 6



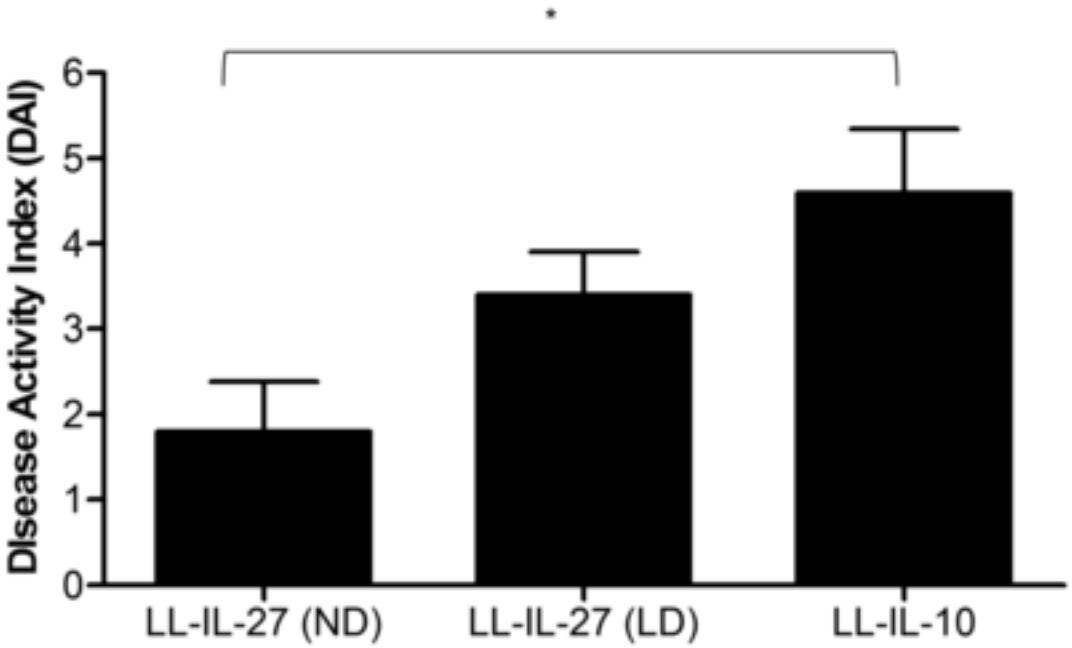
Supplementary Figure 7



Supplementary Figure 8

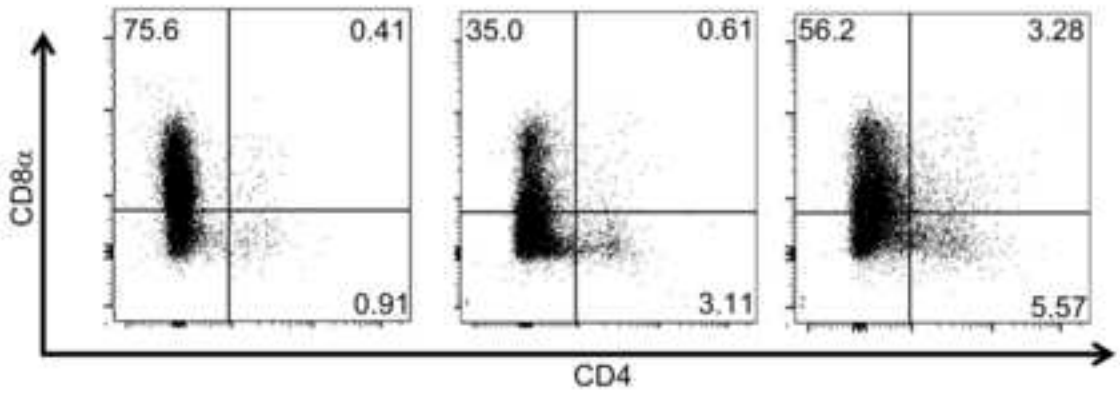


Supplementary Figure 9



Supplementary Figure 10

A



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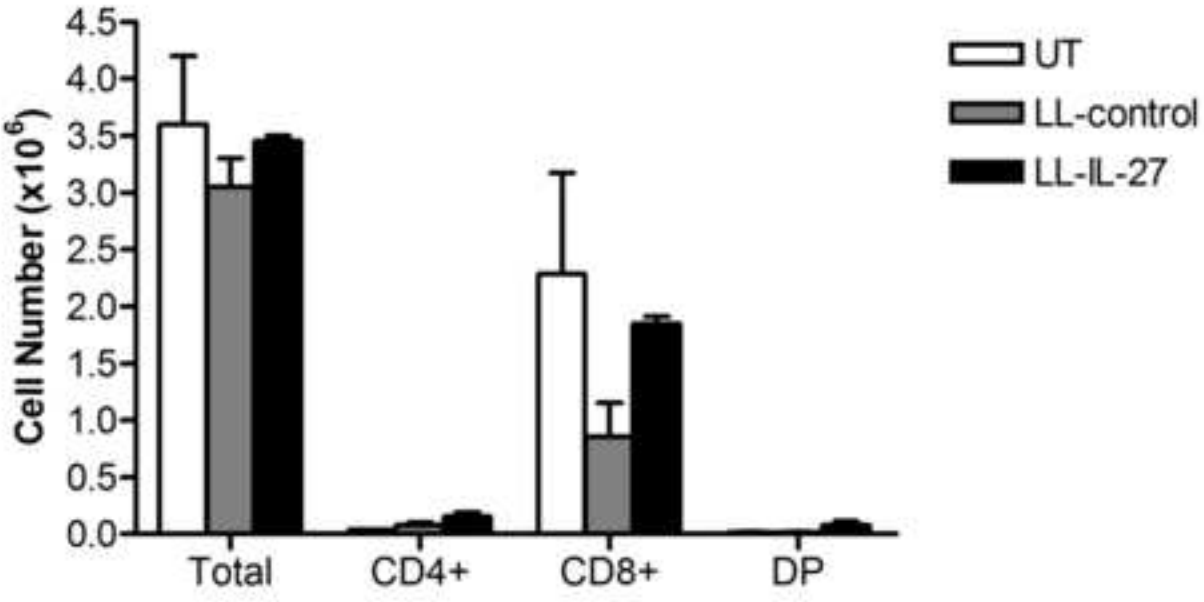
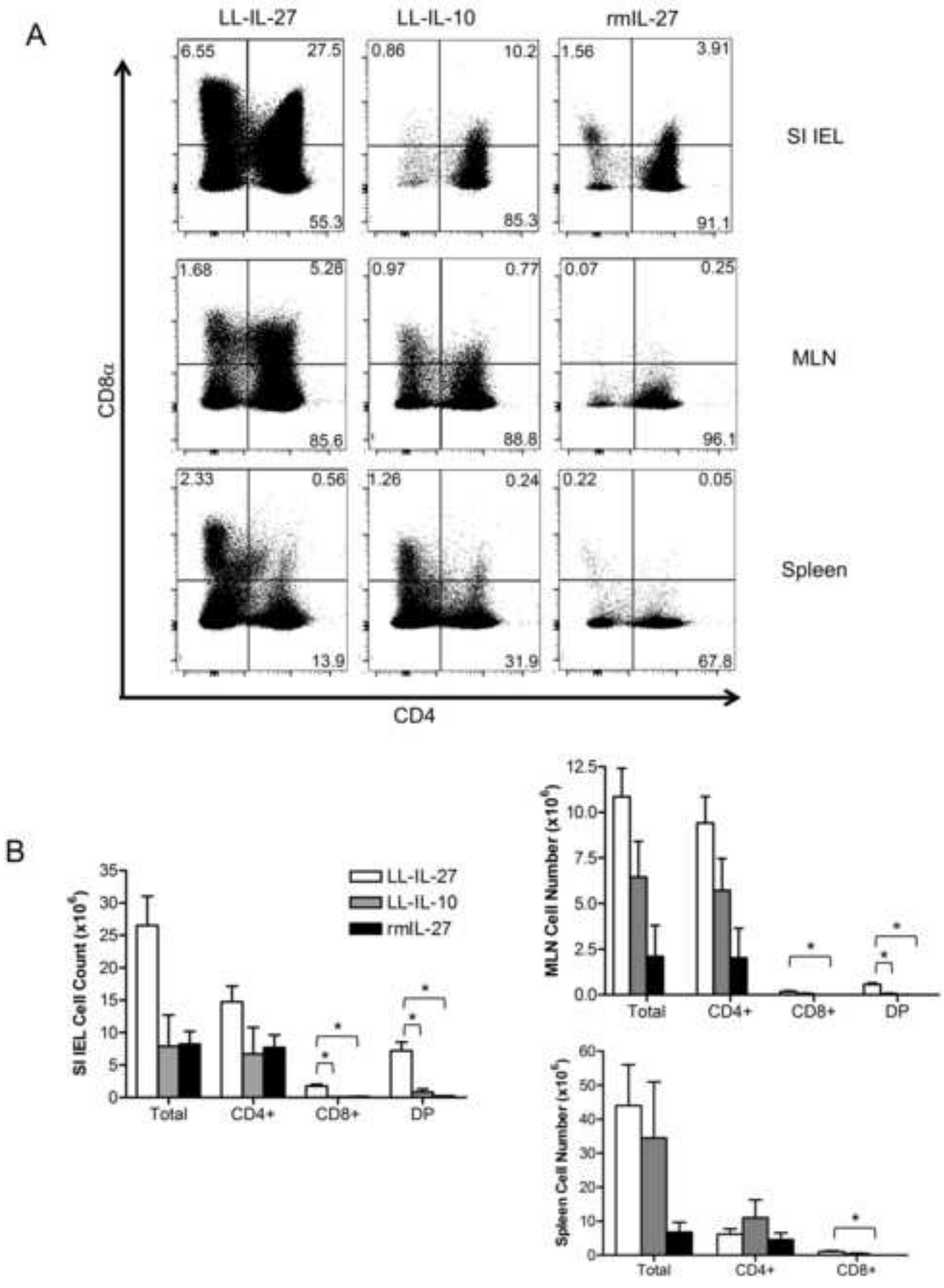
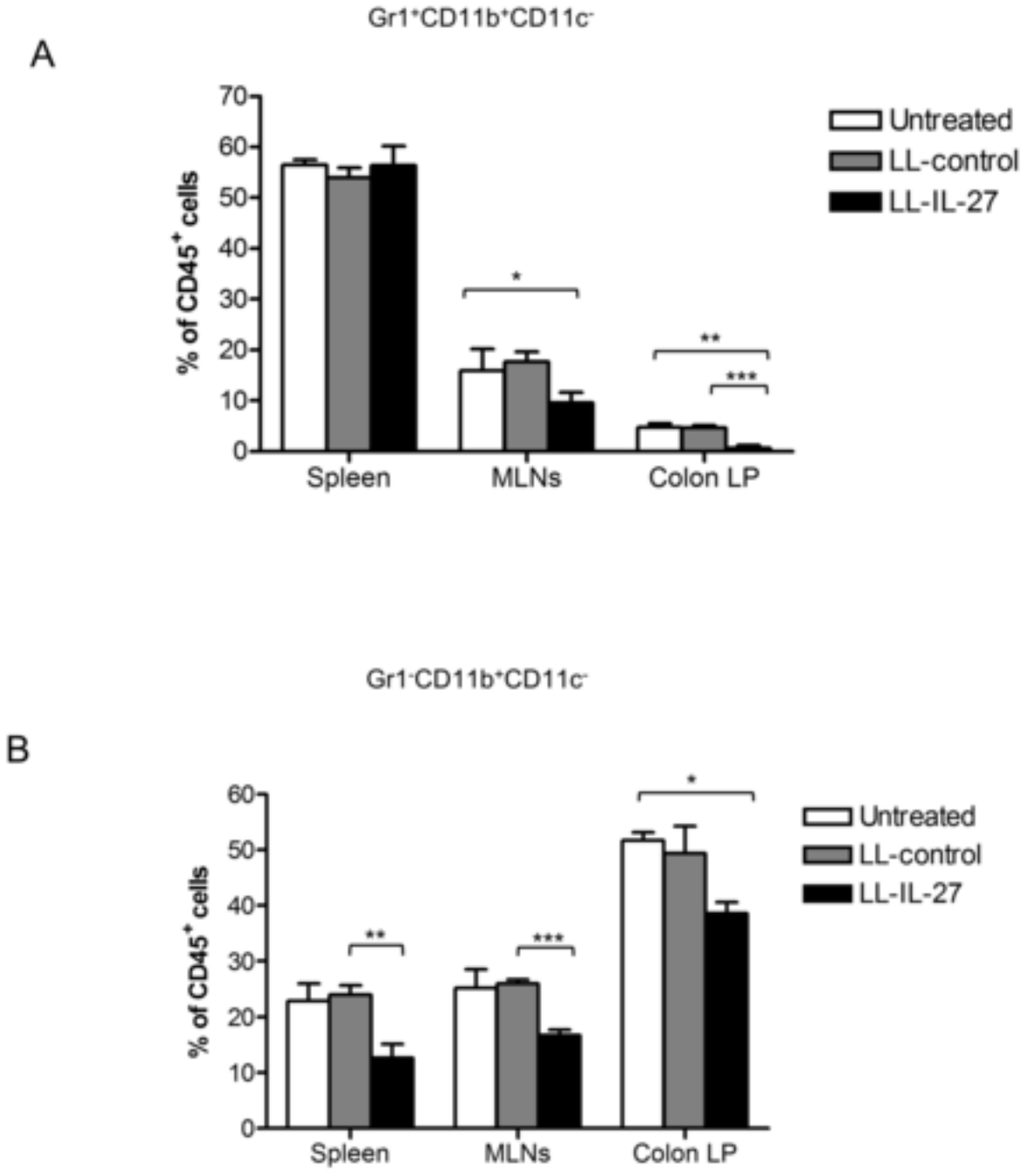


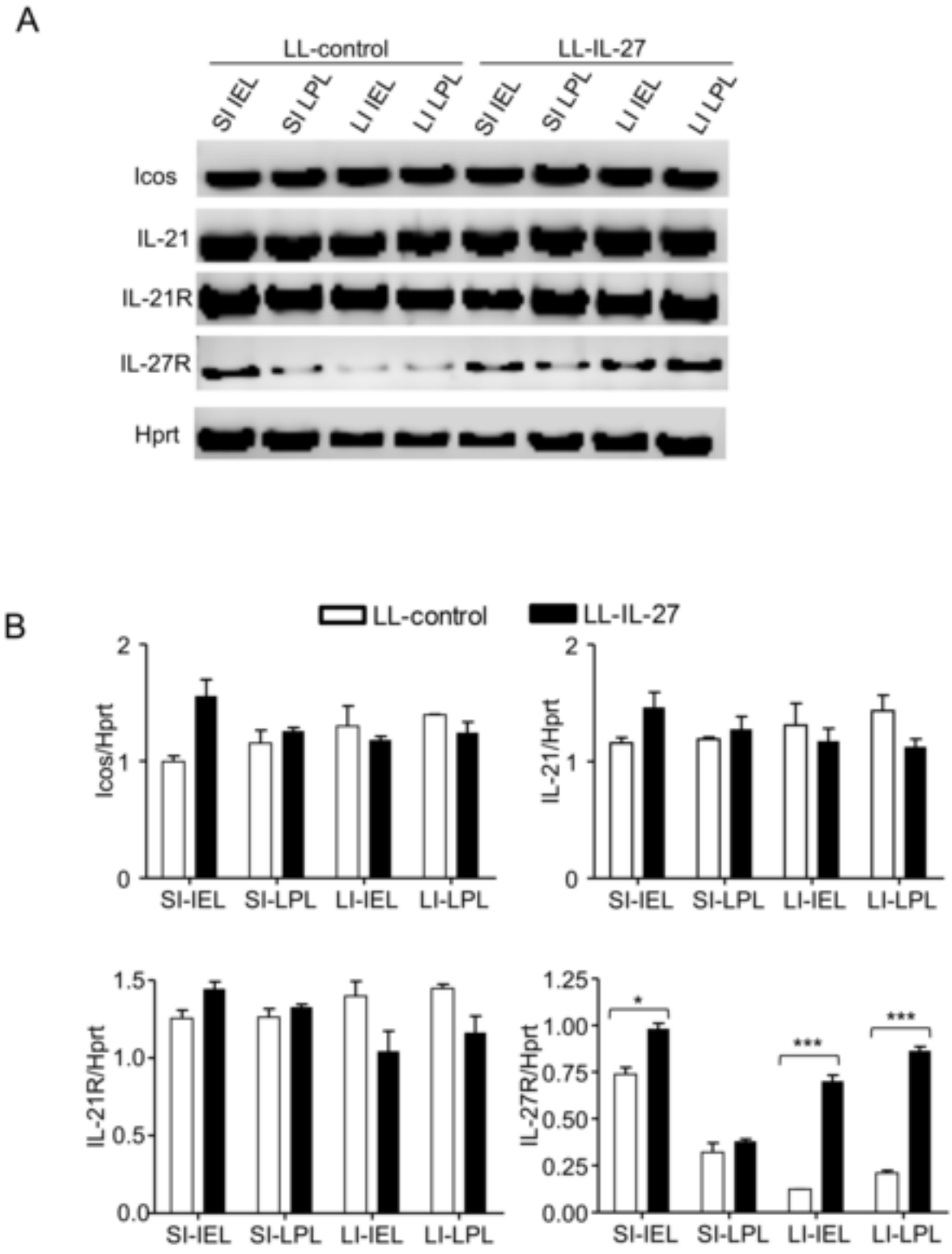
Supplementary Figure 11



Supplementary Figure 12



Supplementary Figure 13



Supplementary Figure Legends

Supplementary Figure 1: Sequence of single chain murine IL-27. A DNA fragment encoding a fusion of the Usp45 signal sequence, the EBI3 and p28 chains of IL-27 and the linker that connects them, was cloned in the *L. lactis* expression plasmid pT1NX, under the control of the constitutive *L. lactis* promoter P1. The vectors obtained were used to electroporate electrocompetent *L. lactis* MG1363 cells. aa, amino acid

Supplementary Figure 2: Bioactivity of *L. lactis* is mediated by IL-27. Murine $CD4^+$ T cells were stimulated with anti-CD3/CD28 in the presence of LL-IL-27 or rmIL-27 with or without α-p28 and/or α-Ebi3. Bioactivity of LL-IL-27 was confirmed through (A) phosphorylation of STAT1 by Western blot, (B) increased IL-10 protein by ELISA, and (C) induction of Tbet (*top*) and IL-10 (*bottom*) mRNA by RT-PCR. Data represents mean ± s.e.m.

Supplementary Figure 3: *L. lactis* localization in healthy mice. Healthy C57BL/6 mice were treated with 10 serial gavages of *L. lactis*. The GI tract was removed and tissue and luminal contents were homogenized. (A) CFUs were enumerated on erythromycin plates. (B) The majority of *L. lactis* was recovered in the luminal contents. Induction of IL-10 was measured by ELISA in the (C) lumen. Sto: stomach, Duo: duodenum, Jej: jejunum, Ile: Ileum, Cec: cecum, PC: proximal colon, TC: transverse colon, DC: distal colon (n=5, data representative of three independent experiments). Data represents mean ± s.e.m.

Supplementary Figure 4: Intestinal barrier is not affected by LL-IL-27 administration. LPS levels were measured in plasma samples of healthy C57BL/6 or diseased mice treated with LL-control or LL-IL-27 using a Limulus amoebocyte lysate assay (LAL) (n=4-5, data representative of two independent experiments). Data represents mean ± s.e.m.

Supplementary Figure 5: LL-IL-27 treatment does not exacerbate *Citrobacter rodentium* infection. C57BL/6 mice were infected with *C. rodentium* (2×10^9 CFU) on day 0 and received daily gavages of BM9 media (untreated, UT), LL-control, or LL-IL-27. Naïve mice were C57BL/6 mice that were not infected. (A) Average weight change was determined daily. Viable *C. rodentium* count was determined in fecal material, colons, spleens, MLNs, (B) and livers (C). (n=7-8, data represents mean ± s.e.m. $^{**}P \leq .005$ *** $P \leq .001$ determined by two-tailed Student's t test.

Supplementary Figure 6: LL-IL-27 improves disease activity in the dextran sodium sulfate (DSS) acute colitis model. C57BL/6 mice were given 3.5% DSS in water for 5 days. On day 6, mice resumed normal drinking water and gastric gavages of LL-control or LL-IL-27 were given for 5 consecutive days. Three days following the last gavage, mice were observed for (A) weight loss, (B) stool consistency, (C) occult/gross blood in stool. The sum of these parameters (A-C) is reflected in (D) disease activity index. (n=5-10, data representative of 2 independent experiments). Data represents mean ± s.e.m.

Supplementary Figure 7: LL-IL-27 gavages and systemic rmIL-27 treatment induce comparable levels of IL-10 both locally in the GI tract and in peripheral tissues in healthy mice. Healthy C57BL/6 mice received gavages of BM9 media (untreated, UT), LL-IL-27, or injections of rmIL-27 (1 μg) for 5 consecutive days. Tissues were homogenized 3 days later and analyzed for IL-10 levels by ELISA. Normal mice refer to untreated controls. Duo: duodenum, Jej: jejunum, Ile: Ileum, PC: proximal colon, DC: distal colon, Thy: thymus, MLNs: mesenteric lymph nodes. (n=3-5, data representative of two independent experiments) Data represents mean ± s.e.m. $^{*}P \leq .05$, $^{**}P \leq .01$, determined by two-tailed Student's *t* test.

Supplementary Figure 8: Macrophages are not a source of IL-27-induced IL-10. Murine splenic macrophages were stimulated with 1 μg/ml LPS in the absence or presence of rmIL-27 at various doses for 24 hours. IL-10 in supernatant was analyzed by ELISA. Data representative of two independent experiments. Data represents mean ± s.e.m.

Supplementary Figure 9: LL-IL-10 treatment results in higher disease activity index (DAI) than LL-IL-27. $CD4^{+}CD45Rb^{hi}$ T cells from C57BL/6 mice mice were transferred to $Rag^{-/-}$ mice. Following the onset of enterocolitis at 7.5 weeks, mice were gavaged with a normal dose of LL-IL-27 (ND), a 10-fold lower dose of LL-IL-27 (LD), or LL-IL-10 for 14 days. DAI was determined on day 14 of treatment. Data represents mean ± s.e.m. (n=5) $*P \leq .05$ determined by two-tailed Student's *t* test.

Supplementary Figure 10: LL-IL-27 treatment has no effect on $CD4^{+}$ and $CD8\alpha^{+}$ T cell frequency in small intestinal intraepithelium in healthy mice. Healthy C57BL/6 mice were treated with 10 serial gavages of BM9 media (untreated, UT), LL-control, or LL-IL-27 on day 1 and a single gavage on day 2. Small intestines were harvested 1 hour after gavage on day 2 and lymphocytes were isolated from the intraepithelium and pooled from two mice. (A) Representative dot plot analysis of $CD4^{+}$ and $CD8\alpha^{+}$ cells. Numbers in quadrants indicate percent of $CD3^{+}$ cells. (B) Average total cells and CD4 single positive ($CD4^{+}$), CD8α single positive ($CD8^{+}$), and $CD4^{+}CD8\alpha^{+}$ (double-positive, DP) cells were calculated from the total cell count multiplied by the percentage of T lymphocytes obtained from flow cytometric analyses. (*n*=2-3, data representative of two independent experiments). Data represents mean ± s.e.m.

Supplementary Figure 11: LL-IL-27 treatment effects T cell phenotype differently than LL-IL-10 or rmIL-27 treatment in mice with enterocolitis. $CD4^{+}CD45Rb^{hi}$ T cells from C57BL/6 mice were transferred to $Rag^{-/-}$ mice. Following onset of enterocolitis around 7.5 weeks, mice were gavaged with LL-IL-27, LL-IL-10, or received injections of rmIL-27 (1 μg) for 7 days. Tissues were harvested <5 days following the last treatment. Lymphocytes were isolated from small intestine intraepithelium (SI IEL), mesenteric lymph nodes (MLN), and spleens and pooled from two mice. (A) Representative dot plot analysis of $CD4^{+}$ and $CD8\alpha^{+}$ cells. Numbers in quadrants indicate percent of $CD3^{+}$ cells. (B) Average total cell and $CD4^{+}$ and $CD8\alpha^{+}$ lymphocytes were calculated from the total cell count multiplied by the percentage of T lymphocytes obtained from flow cytometric analyses. (*n*=3, data representative of two independent experiments). Data represents mean ± s.e.m. $*P \leq .05$ determined by two-tailed Student's *t* test.

Supplementary Figure 12: LL-IL-27 reduces the frequency of phagocytic cells. $Rag^{-/-}$ mice with colitis were treated with LL-control or LL-IL-27 for 14 days. Tissues were harvested upon death (UT and LL-control) or the day after the last gavage (LL-IL-27). Single cell suspensions from spleens, mesenteric lymph nodes (MLNs), and lamina propria (LP) from the colon were analyzed by flow cytometry for $Gr1^{+}CD11b^{+}CD11c^{-}$ (predominately granulocytes) and $Gr1^{-}CD11b^{+}CD11c^{-}$ (predominately monocytes). (n=6, data representative of 2 independent experiments). Data represents mean ± s.e.m.

Supplementary Figure 13: Increased IL-27R in distal colon of LL-IL-27 treated mice. $Rag^{-/-}$ mice with enterocolitis were treated with LL-control or LL-IL-27 for 14 days. Small intestines and colons were harvested upon death (UT and LL-control) or the day after the last gavage (LL-IL-27). (A) Gene expression of Icos, IL-21, IL-21R, and IL-27R in intraepithelial (IEL) and lamina propria (LPL) lymphocytes of small intestine (SI) and large intestine (LI) were assessed

by RT-PCR (B) Gene expression was normalized to Hprt levels. (For small intestines, n=4; for colons, n=2; data representative of 2 independent experiments). Data represents mean ± s.e.m. ***$P \leq 0.005$, determined by two-tailed Student's *t*-test.

Supplementary Methods

Mouse IL-27 hyperkine

The mouse IL-27 hyperkine was designed by incorporating a linker sequence (SRGSGSGGSGGSGSGKL) between the EBI3 and p28 sequences. DNA sequences with optimal LL codon usage were synthesized by Geneart (Burlingame, CA). Downstream of the lactococcal P1 promoter, a DNA fragment encoding the Usp45 secretion signal from L.lactis strain MG1363[1], was fused to the hyperkine gene.

Bacteria

LL strain MG1363 was used throughout this study. Bacteria were cultured in Difco M17 broth (BD, Franklin Lakes, NJ) supplemented with 0.5% glucose and 5 mg/ml erythromycin (Sigma, St. Louis, MO). Stock suspensions were stored at -80°C in 50% glycerol in GM17E. For intragastric inoculations, stock suspensions were diluted 1000-fold in fresh GM17E and incubated for 16 h at 30°C, reaching a saturation density of 2×10^9 CFU per ml. Bacteria were harvested by centrifugation and concentrated 10-fold in buffered M9 salt (Sigma) medium (BM9). Treatment doses consisted of 100 μl of this suspension. For quality control, cultures used for gavages were evaluated for the presence of IL-27 via ELISA.

Protein expression and immunoblotting of *L.lactis*

L. lactis strains were routinely grown as standing cultures at 30°C. For the analysis of protein expression and secretion, saturated cultures grown in GM17E were diluted 1/100 and grown for 3 h in fresh BM9. Bacteria and culture supernatants were separated by centrifugation at 1500 x g for 10 min. Supernatants were run on a 4-12% Bis-Tris gel under reducing conditions. Anti-Ebi3 (M-75) (Santa Cruz Biotechnology, Inc, Santa Cruz, CA) and anti-mouse IL-27p28 (R & D Systems) were used as primary antibodies in standard western blotting procedures. Recombinant mouse IL-27 (rmIL-27) (R & D Systems, Inc., Minneapolis, MN) was used as a positive control. IL-27 concentration in L.lactis supernatants was determined by ELISA using Quantikine Mouse IL-27 p28 (R &D Systems) (LOD: 1.5 pg/ml).

Animals

Mice were bred and maintained in specific pathogen-free conditions in accordance with the procedures outlined in the "Guide for Care and Use of Laboratory Animals" (National Institute of Health, Bethesda, MD, 2011)[2]. All animal studies were approved by the Animal Care and Use Committee at the National Cancer Institute, NIH, USA. C57BL/6Ncr mice were obtained from the Animal Production Program, Charles River, NCI-Frederick. $Rag1^{-/-}$ (C57BL/6 background) mice were originally purchased from The Jackson Laboratory. Mice were maintained by homozygous breeding at the National Cancer Institute (NCI)-Frederick, Maryland. Vert-X (C57BL/6 bicistronic IL-10/eGFP) mice were kindly provided by C. Karp (Cincinnati Children's Hospital). $IL\text{-}10^{-/-}$ mice (C57BL/6 background) were kindly provided by G. Trinchieri (NCI-Frederick). For the generation of IL-17 reporter mice (C57BL/6 background), murine bacterial

artificial chromosome (BAC RP23-4E16) (Invitrogen) was modified to introduce a GFP and a tdTomato reporter gene into the *Il17* locus which includes IL-17A and IL-17F using recombineering technology as described previously[3]. By homologous recombination, the sequence of the signal peptide of *Il17a/f* in the BAC was disrupted and the GFP gene with polyA was inserted immediately after the ATG start site of *Il-17f*, replacing exon 1, while the tdTomato gene with polyA was inserted immediately after the ATG start site of *Il-17a*. Animal care was provided in accordance with US NIH Animal Use and Care guidelines. All mice used were 8–12 weeks old.

Bioactivity assays

For the p-STAT-1/3 assay, 2 x 10^6 naïve T cells/ml were stimulated with anti-CD3/28 (2.5 μg/ml of each) (eBioscience, San Diego, CA) and rmIL-27 (5 ng/ml) (R&D, Minneapolis, MN), *L. lactis* control vector, or LL-IL-27 (approximately 1 ng/ml) strains for 20 min at 37°C. Prepared lysates were run on 4-12% Bis-Tris gel. p-STAT-1/3 expression was detected using phospho-STAT1 (Tyr701) and phospho-STAT3 (Tyr705) (Cell Signaling Technology, Danvers, MA) as primary antibodies and STAT1 and STAT3 (124H6) (Cell Signaling Technology) antibodies as loading controls, in standard western blotting procedures. For the IL-10 protein induction assay, T cells were stimulated with anti-CD3/28 and rmIL-27 (5 ng/ml), *L. lactis* control vector, or LL-IL-27 (5 ng/ml) strains for 72 hours. Supernatants were analyzed using READY-SET-GO! Mouse IL-10 ELISA (eBioscience) (LOD: 30 pg/ml). For analysis of IL-10 and Tbet mRNA induction, cells were stimulated with anti-CD3/28 and rmIL-27 (5 ng/ml), *L. lactis* control vector, or LL-IL-27 (5 ng/ml) strains for 2 hours. Total RNA was extracted from cells with Qiagen RNeasy Mini Kit (Valencia, CA) according to manufacturer's protocol. Reverse

transcription was performed using SuperScript III First-Strand Synthesis System (Invitrogen; Carlsbad, CA) according to manufacturer's protocol. PCR amplification was achieved using FastStart PCR Master (Roche Applied Science, Indianapolis, IN) and oligonucleotide primers (Integrated DNA Technologies; Coralville, IA) (Supplementary Table 1). The amplified products were separated by electrophoresis on a 1.5% agarose gel and visualized using SYBR Safe DNA gel stain (Invitrogen). To semi-quantify the induction of mRNA expression, transcript levels were normalized relative to the expression of HPRT mRNA using densitometric analysis by ImageJ 1.41 software. In neutralization assays, α-IL-27p28 or α-Ebi3 were used at 5 or 10 μg/ml. Antibodies were incubated with *L. lactis* supernatant or rmIL-27 in media overnight at 4°C on a rotator.

Macrophage stimulation

1 x 10^6/ml spleen cells were cultured in complete media for 3.5 hrs at 37°C. Non-adherent cells were removed by washing with warm HBSS until visual inspection confirmed a lack of lymphocytes. Adherent cells were removed from plates by incubating for 15 min with ice-cold PBS and rinsing repeatedly. The isolated adherent cell population was stimulated with 1 μg/ml LPS in the absence or presence of rmIL-27 (R & D) at 2, 10, 25, and 50 ng/ml at 10^6 cells/well in 6-well culture plates for 24 hrs. Supernatant was stored at -80°C until analysis by ELISA.

Lactis localization

Healthy C57BL/6 mice were administered 10 serial gavages of LL-IL-27 over a 5 hour time span (every 30 minutes). The stomach, small intestine, cecum, colon, mesenteric lymph nodes, and spleen were removed. Mouse intestinal content was collected by flushing through with 1 ml

cold 1x PBS supplemented with protease inhibitors. The flush-through and the whole tissues were homogenized with a hand-held rotor, centrifuged at 14,000 rpm for 5 min at 4°C and supernatants were stored at -80°C or used for colony forming unit (CFU) determination. Supernatant was diluted 1:10 in 1x M9 salts and 100 µl was plated on GM17E agar plates containing 5 µg/ml erythromycin. The plates were incubated overnight at 30°C and colonies were counted. IL-27 and IL-10 concentrations were determined using ELISA kits.

T cell transfer

Single cell suspensions were made from harvested spleens. $CD4^+$ T cells were enriched using MACS $CD4^+$ T cell Isolation Kit (Miltenyi Biotec Inc.). $CD4^+$ T cells were fluorescently labeled using anti-CD4 (clone RM4-5, BD Pharmingen, Franklin Lakes, NJ) and anti-CD45RB (clone 16A, BD Pharmingen). $CD4^+CD45RB^{high}$ cells were sorted by flow cytometry using a FACSAria (BD Biosciences) and injected into the recipient mice (0.5×10^6 cells/mouse).

Disease Activity Index (DAI)

Following cell transfer, mice were monitored twice a week prior to *L. lactis* administration and then daily once *L. lactis* administration began. Monitoring included analysis of body weight, stool consistency, and occult/gross blood in stool using Hemoccult slides (Beckman Coulter, Fullerton, CA). A score for each parameter was given based on a DAI scale[4]. DAI represents the combined parameter scores. This scoring system has shown to correlate well with histological assessment of inflammation and crypt damage.

Cell isolation from spleen, MLNs, small intestine, and colon

Spleens and MLNs were removed and ground individually between two frosted slides into a single-cell suspension in 4% FACS buffer on ice. The suspension was then passed through a 100 μm cell strainer and pelleted. Red blood cells from splenic suspensions were removed using hypotonic lysis and the resulting leukocytes were washed to remove lysis solution. Cells were resuspended in RPMI media or FACS buffer and viable cells were counted using 0.4% trypan blue dye/PBS solution. Lymphocytes from the intraepithelium and lamina propria of the small and large intestines were isolated as detailed by Weigmann et al.[5] Lymphocytes from small intestines were pooled from 2 mice, while lymphocytes from colons were pooled from 4 mice

Flow cytometry and antibodies

To perform surface staining, 1×10^6 cells were placed in individual wells of a 96-well round bottom plate and incubated with the appropriate antibody cocktails for 15 min at 4°C on a slow rocker. After the staining, cells were fixed in a solution of 2% ultrapure formaldehyde (Polysciences, Inc., Warrington, PA, USA) in FACS buffer for 20 min on ice, washed twice and analyzed the following day on the Canto II (BD Biosciences) or FACSCalibur (BD Biosciences). Intracellular staining was performed using Cytofix/Cytoperm Fixation/Permeabilization Solution Kit with BD GolgiStop (BD biosciences) according to the manufacturer's instruction. Flow cytometry acquisition was performed on an LSRIISorp. Data were analyzed using FACS Express or FlowJo software (Tree Star, Inc., Ashland, OR, USA). Antibodies against CD45 (clone 30-F11, BD Pharmingen), CD3 (clone 145-2C11, BD Pharmingen), CD4 (clone GK1.5, BD Pharmingen), CD8 (clone 5H10, Caltag, Burlingame, CA), Gr1 (clone RB6-8C5, BD Pharmingen), CD11b (clone M1/70, BD Pharmingen), CD11c (clone HL3, BD Pharmingen), IL-17A (clone ebio17B7, eBioscience), IL-17F (clone ebio18F10, eBioscience), Foxp3 (clone FJK-

16s, eBioscience), CXCR3 (clone CXCR3-173, eBioscience), Tbet (clone eBio4B10, eBioscience), TCRβ (clone H57-597, BD Pharmingen), CD8β (clone H35-17.2, BD Pharmingen), CD25 (clone PC61, BD Pharmingen), CD44 (IM7, eBioscience), CD62L (clone MEL-14, Ebioscience), and CD69 (clone H1.2F3, BD Pharmingen) were used.

Induction of colitis by dextran sodium sulfate (DSS)

C57BL/6Ncr female mice were given 3.5% DSS (MW 36,000–50,000; MP Biomedicals, Solon, OH) dissolved in reverse osmosis water ad libitum for 5 d. On day 6, mice were returned to normal drinking water and gastric gavages of BM9 or bacterial treatments were given for five consecutive days. Three days following the last gavage, mice were assessed for disease activity.

LAL Assay

Plasma samples were diluted 1:10 with sterile limulus ameobocyte lysate (LAL) reagent water (Lonza, Walkersville, MD), mixed by vortex, and placed in a 75°C water bath for 10 min. Samples were allowed to cool to room temperature for 10 min before colorimetric assay using the LAL kit (Lonza). Standards and samples were incubated with LAL for 10 min at 37°C followed by 6-min incubation with colorimetric substrate. The reaction was stopped with 25% acetic acid, and the absorbance at 405 nm was read.

Infection with *C. rodentium* and treatment

C. rodentium strain DBS100 (ATCC 51459) was cultured in Luria broth overnight and 6 week-old C57BL/6 mice were inoculated orally with 2×10^9 colony-forming units of bacteria as described (Zheng et al, 2008) on day 0. Mice received daily gavages of BM9 media, LL-control,

or LL-IL-27 on days 3-14. Mice were weighed daily until mice were euthanized on day 14. Fecal samples, colons, liver, spleens, and MLNs were homogenized and the number of viable bacteria in homogenates was determined by viable count on MacConkey plates.

Histological scoring

A semiquantitative scale from 0 to 4 was used where histopathologic changes were identified as minimal = 1, mild = 2, moderate = 3, and severe = 4. For the colon, cumulative histopathology scores were calculated based on the sum of individual changes of parameters (crypt hyperplasia, goblet cell depletion, lymphocytic infiltrates, eosinophils, neutrophils, gut intraepithelial neoplasm, crypt abscess, and chronic active inflammation. For the small intestine, cumulative histopathology scores were calculated based on the sum of individual changes of parameters (crypt hyperplasia, crypt loss, lymphocytic infiltrates, and chronic active inflammation).

Supplementary Table 1. Primer sequences used for semi-quantitative RT-PCR.

Gene analyzed	Primer sequences (5' to 3')	Product size (bp)
IL-1β	f: TGA GCG ACC TGT CTT GGC CGA r: CAT GCA CAC GGA CAC AGA CGT	385
IL-4	f: CGA AGA ACA CCA CAG AGA GTG AGC T r: GAC TCA TTC ATG GTG CAG CTT ATC G	170
IL-10	f: ACC TGG TAG AAG TGA TGC CCC AGG CA r: CTA TGC AGT TGA TGA AGA TGT CAA A	237
IL-17A	f: CTC CCT CCC CCG TTC CTG CT r: CAG GTG CAG CCC ACA CCC AC	282
IL-17F	f: CTT GCC AGT CCA GCC CCT GC r: GAG TCT GCG CTG CTC CCT GC	797
IL-21	f: TCA TCA TTG ACC TCG TGG CCC r: ATC GTA CTT CTC CAC TTG CAA TCC	2527
IL-21R	f: ATG CCC CGG GGC CCA GTG GCT G r: CAC AGC ATA GGG GTC TCT GAG GTT C	5317
IL-23	f: AGG CGA GGT GAC CGC TTT GC r: CAC TCA GGG CCT GGC TGT GC	308
IL-27R	f: AGG GGT GCC GTT TTC TCA CCT TG r: ATG GAA CGC AGG ACC ACA CCC	615
IFN-γ	f: AGC GGC TGA CTG AAC TCA GAT TGT AG r: GTC ACA GTT TTC AGC TGT ATA GGG	220
TNF-α	f: GGC AGG TCT ACT TTG GAG TCA TTG C r: ACA TTC GAG GCT CCA GTG AAA TTC GG	299
TGF-β	f: TGG ACC GCA ACA ACG CCA TCT ATG AGA AAA CC r: TGG AGC TGA AGC AAT AGT TGG TAT CCA GGG CT	525
PDL1	f: TCG CCT GCA GGT AAG GGA GC r: ACA GTC AAG TCG CGC TAG GAC CA	214
Gata-3	f: GAC ATC TTC CGG TTT CGG GT r: AAC ACA GGA ACA CAT CCC TGG	166
Foxp3	f: CAG CTG CCT ACA GTG CCC CTA G r: CAT TTG CCA GCA GTG GGT AG	382
ICOS	f: TGA CCC ACC TCC TTT TCA AG r: TTA GGG TCA TGC ACA CTG GA	1568
RORγt	f: ACC TGG ACT GCC AGC TGT GTG CTG TC r: CAA GTT CAG GAT GCC TGG TTT CCT C	725
Tbet	f: TGC CTG CAG TGC TTC TAA CA r: TGC CCC GCT TCC TCT CCA ACC AA	870
HPRT	f: GTT GGA TAC AGG CCA GAC TTT GTT G r: GAA GGG TAG GCT GGC CTA TAG GCT	320

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