Support Information of

Thermosensitive polymer hydrogel as a physical shield on colonic mucosa for colitis treatment

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Synthesis of block copolymers. The triblock copolymers were synthesized by ring-opening polymerization of DL-lactide in the presence of PEG_{1500} which was purified by a partition from aqueous solution by dichloromethane, followed by precipitation into an excess of diethyl ether as previously reported [41]. Taking PDLLA-PEG-PDLLA as an example, a mixture of DL-lactide and PEG_{1500} with a certain molar ratio was reacted in an oil bath at 130 ℃ for 48 h with stannous octoate (0.3% w/w) as the catalyst in vacuum. The mixture was dissolved in dichloromethane and then precipitated in cold diethyl ether. The precipitates were dried under vacuum to attain PDLLA-PEG-PDLLA. PLLA-PEG-PLLA and PDLLGA-PEG-PDLLGA were synthesized similarly.

Characterizations. All the copolymers were characterized with a 400 MHz ^{1}H NMR spectrometer (Bruker Avance II, Bruker) to determine the chemical compositions and structures. All NMR spectra were recorded at room temperature using chloroform-d_1 ($CDCl_3$-d_1) with 0.05% tetramethylsilane as the solvent.

A gel permeation chromatography (GPC) system (EcoSEC HLC-8320) was used to analyze the molecular weights and molecular weight distributions of block copolymers. Tetrahydrofuran with a flow rate of 0.6 mL/min at 40 ℃ was used as eluent.

Differential scanning calorimetry and X-ray diffraction. The thermal properties of copolymers were studied by a differential scanning calorimeter (Q2000, TA Instruments). Appropriate samples were loaded into aluminum pans. The samples were first heated to 80 ℃ and then isothermal for 5 min to eliminate the thermal history. Then, the cooling curves were recorded when the samples were cooled from 80 ℃ to −50 ℃. After being kept at −50 ℃ for 5 min, the samples were heated to 80 ℃ again, and the heating curves were recorded as well. Both the cooling and the heating rates were 5 ℃/min.

X-ray diffraction (XRD) analysis was performed on a diffractometer (XRD-6000, Shimadzu) equipped with a Cu Kα radiation source. The copolymer samples were loaded in a glass lamella. The diffraction patterns of a scan range between 5° to 50° were recorded with a scanning rate of 5°/min at room temperature. The voltage was set at 40 kV and the current was fixed at 40 mA.

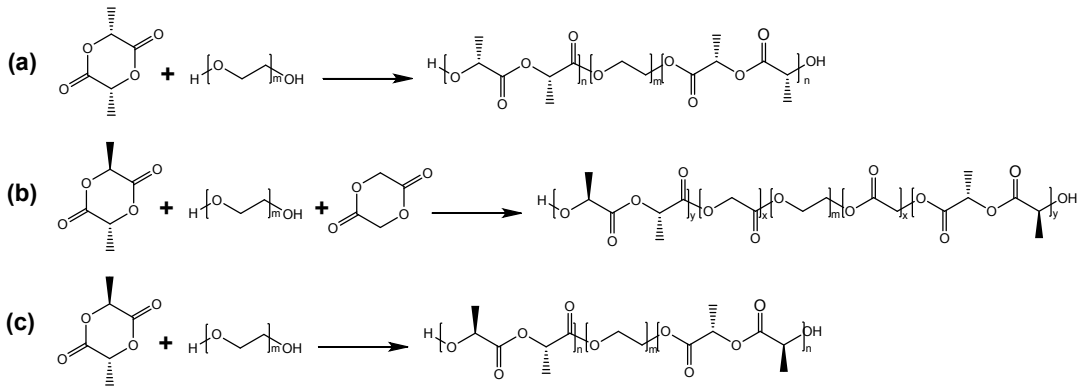

Figure S1. Synthesis of PLLA-PEG-PLLA (a), PDLLGA-PEG-PDLLGA (b), and PDLLA-PEG-PDLLA (c). Reaction conditions: $Sn(Oct)_2$, 130 ℃.

Table S1. Molecular weights of triblock copolymers.

	Polymers	Thero	M_n[a]	M_n[b]	M_w[b]	(M_w/M_n)[b]
P1	PLLA-PEG-PLLA	2000-1500-2000	6500	6,895	9,555	1.39
P2	PDLLGA-PEG-PDLLGA	1500-1500-1500	4200	6,100	8,000	1.31
P3	PDLLA-PEG-PDLLA	1550-1500-1550	4800	4750	5845	1.23
P4	PDLLA-PEG-PDLLA	1850-1500-1850	5200	6,436	7,980	1.23
P5	PDLLA-PEG-PDLLA	2150-1500-2150	6100	7653	9530	1.25

[a]The umber-average MW (M_n) of the central block PEG was provided by Sigma-Aldrich. The M_n of each polyester blocks and molar ratios of lactide/glycolide (LA/GA) were calculated by ^{1}H NMR.

[b]Measured by GPC, relative to polystyrene standards.

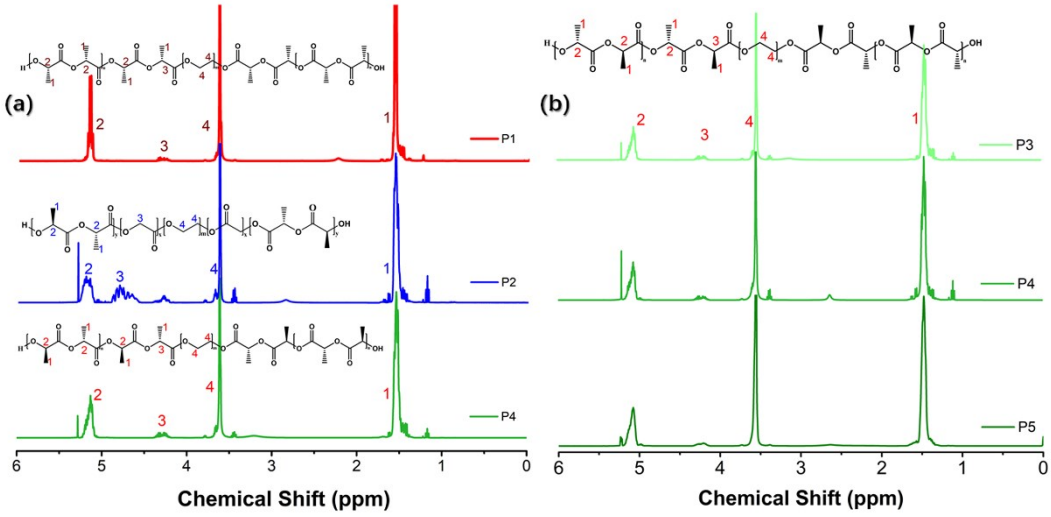

Figure S2. ^{1}H NMR spectra of block copolymers in $CDCl_3$.

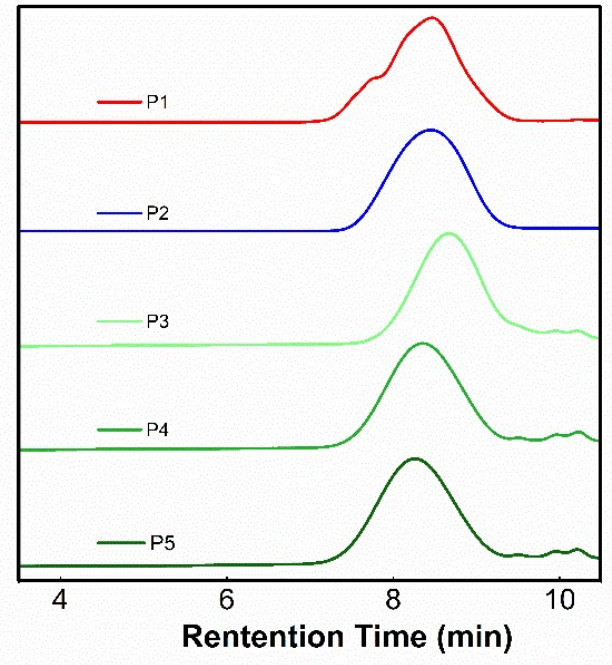

Figure S3. GPC traces of block copolymers.

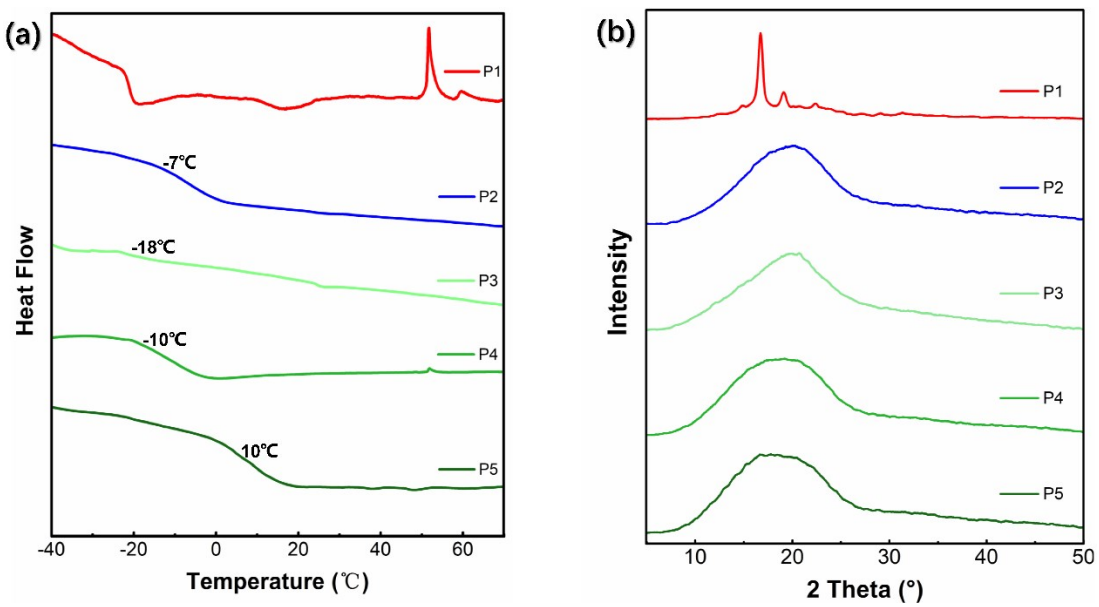

Figure S4. Thermal properties of the copolymers. (a) DSC thermograms. (b) XRD patterns.

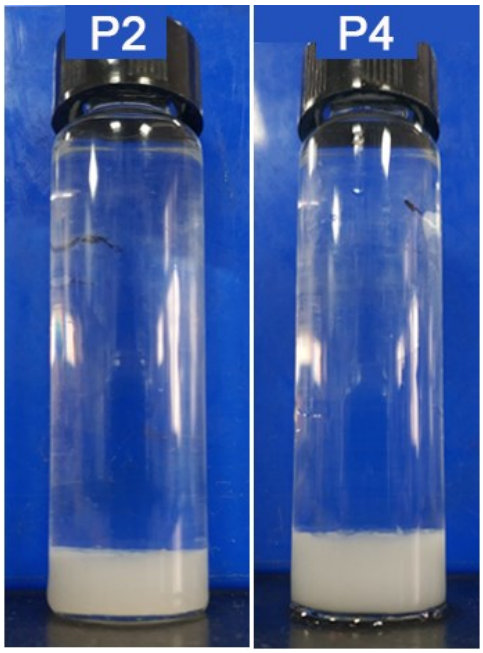

Figure S5. The photographs of P2 and P4 hydrogels after mesalazine release for 168 h.

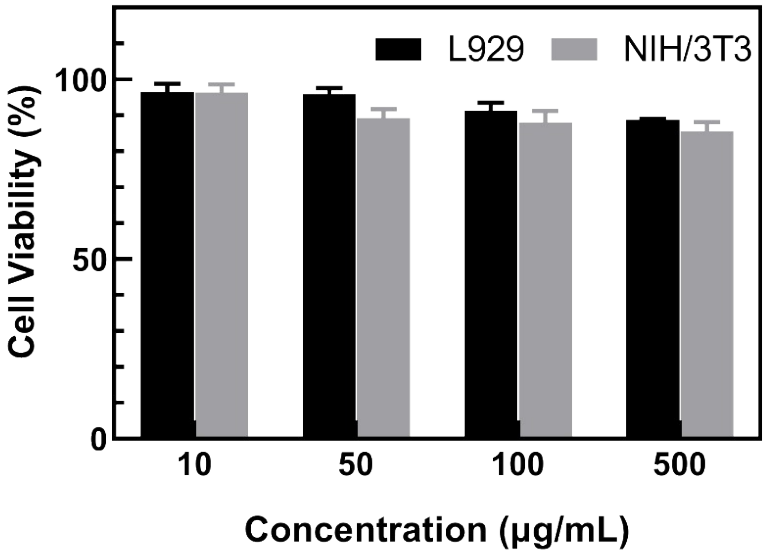

Figure S6. The *in vitro* biocompatibility of PDLLA-PEG-PDLLA incubated with NIH/3T3 and L929 cells for 48 h.

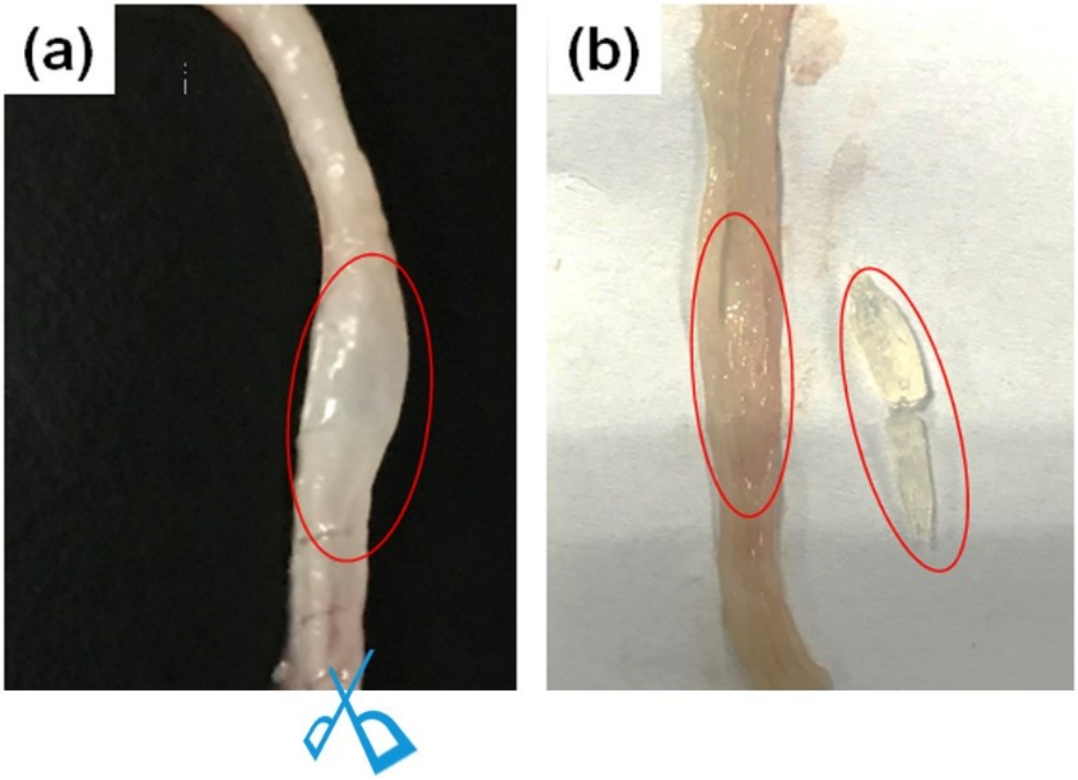

Figure S7. (a, b) The photographs of P4 gel formed in the colon.

Figure S8. A photograph of UC mice (left) and healthy mice (right).

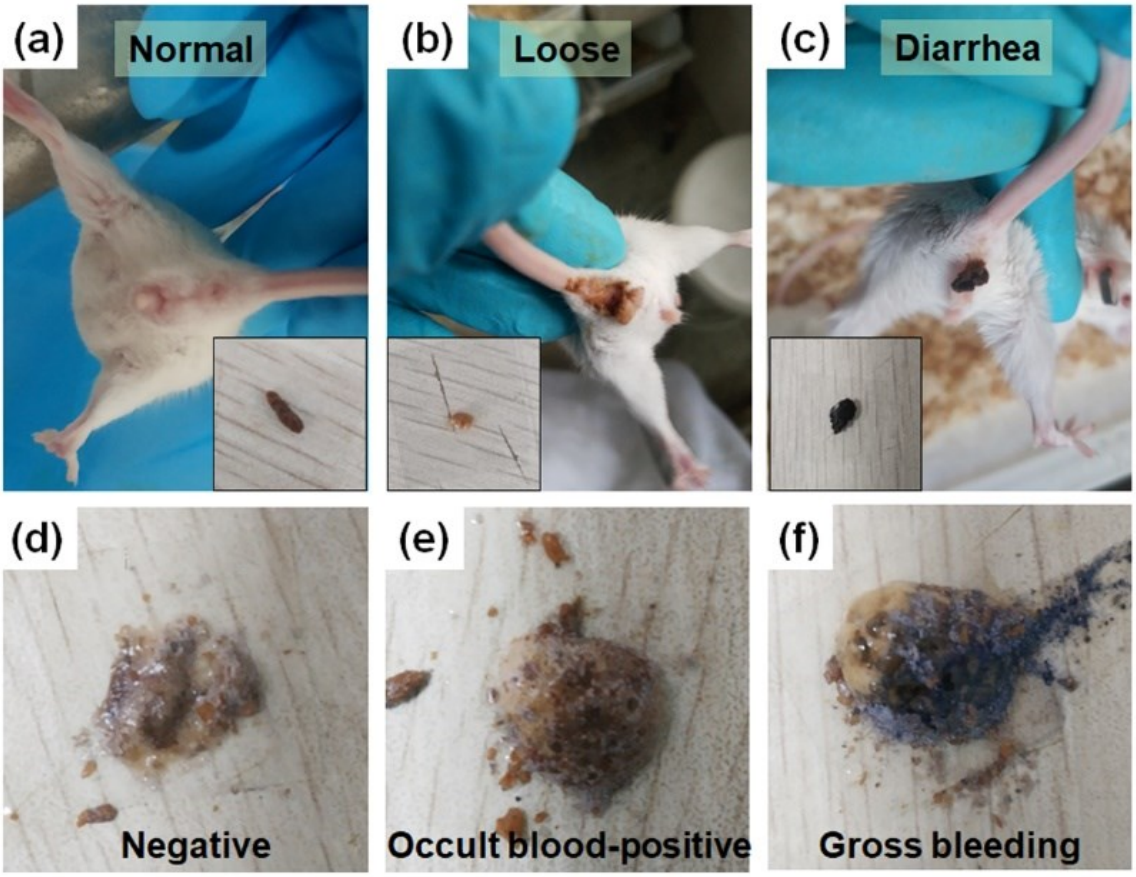

Figure S9. (a-c) The stool consistency of mice and (d-f) occult/gross blood.

Table S2. Disease activity index[a]

Score	Weight loss (%)	Stool consistency[b]	Occult /gross blood
0	0	Normal	Negative
1	1-5		Occult blood-positive
2	5-10	Loose	Blood traces in stool visible
3	10-20		
4	>20	Diarrhea	Gross bleeding

a. The disease activity index (DAI) = (combined score of weight loss, stool consistency and bleeding)/3.

b. Normal stools = well formed pellets; loose = pasty stools which do not stick to the anus; diarrhoea = liquid stools that stick to the anus.