

## SUPPLEMENTARY INFORMATION

# **Dexamethasone-loaded polymeric nanoconstructs for monitoring and treating inflammatory bowel disease**

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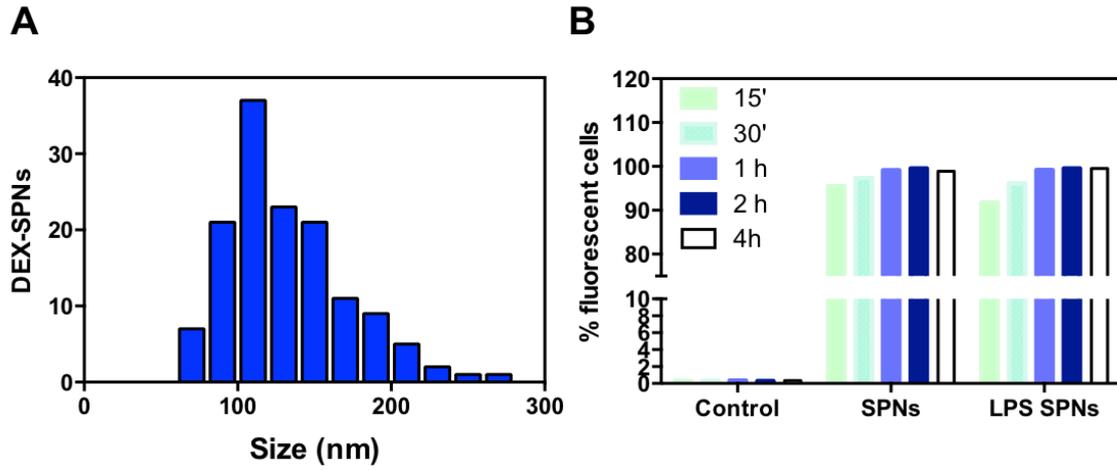
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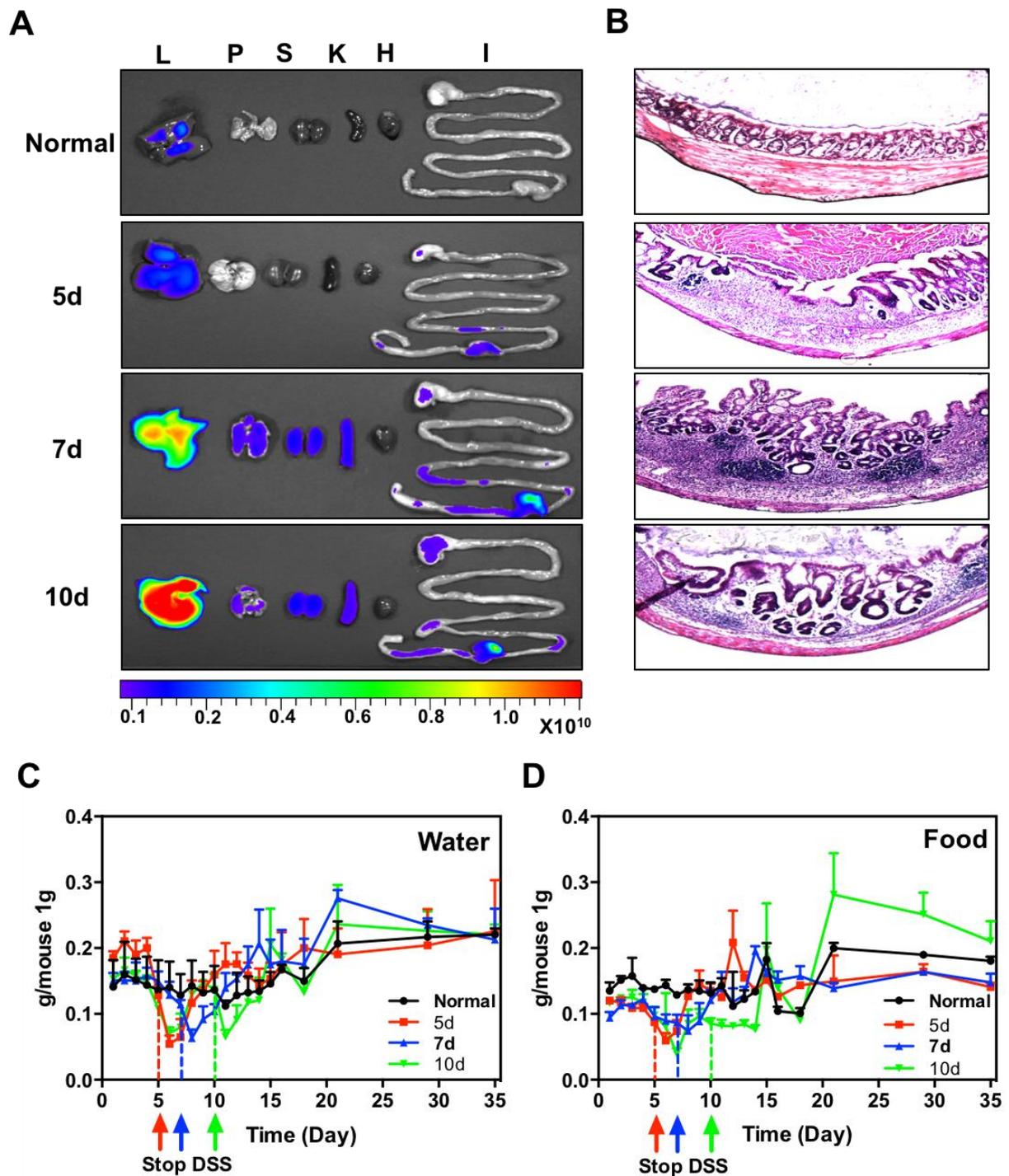
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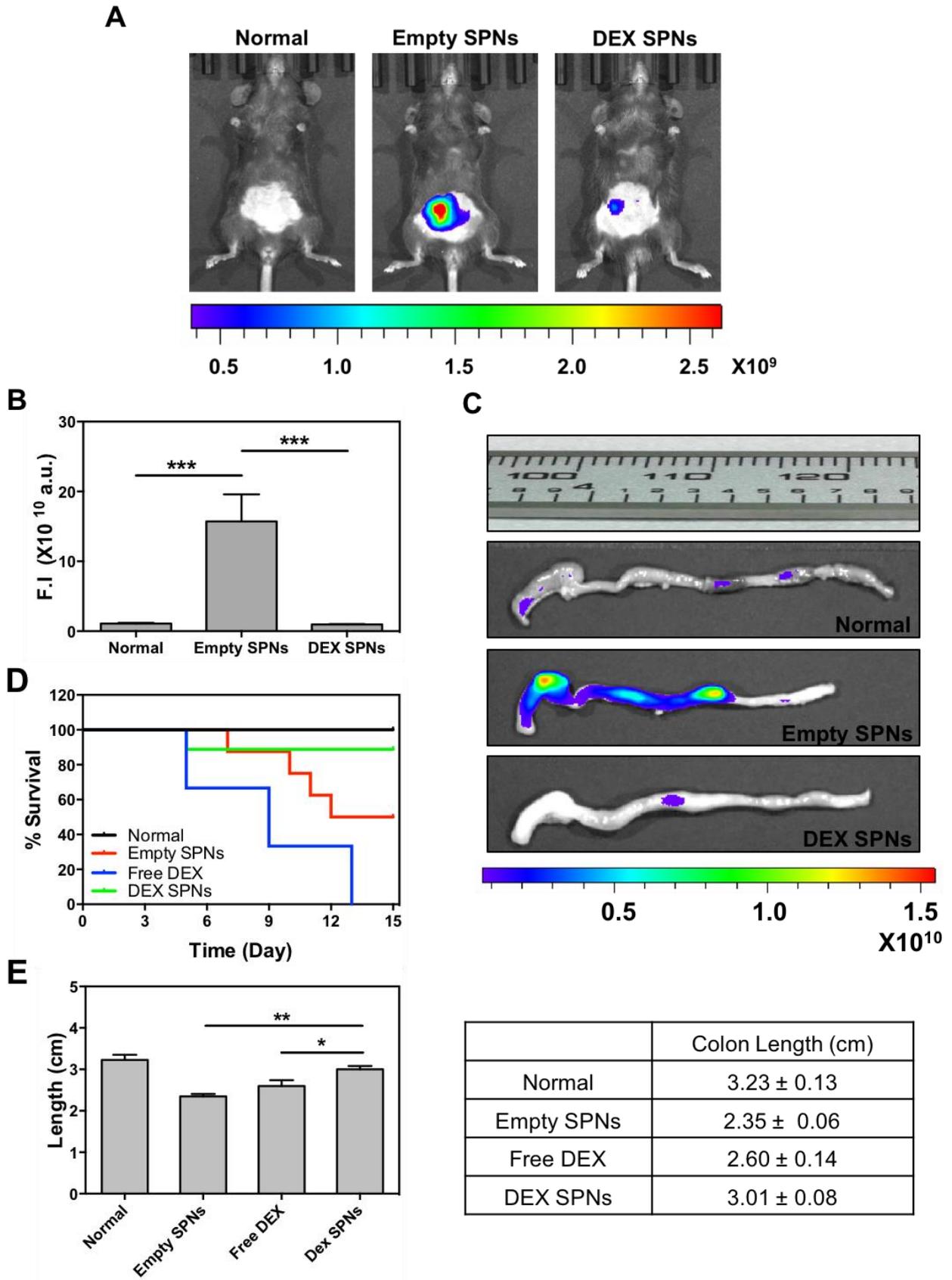
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**Figure S1. In vitro characterization.** **A.** cryo-EM based size distribution analysis. **B.** Analysis of Cy5-SPNs cell internalization by FACS. Raw 264.7 cells are pre incubated with LPS and without LPS.

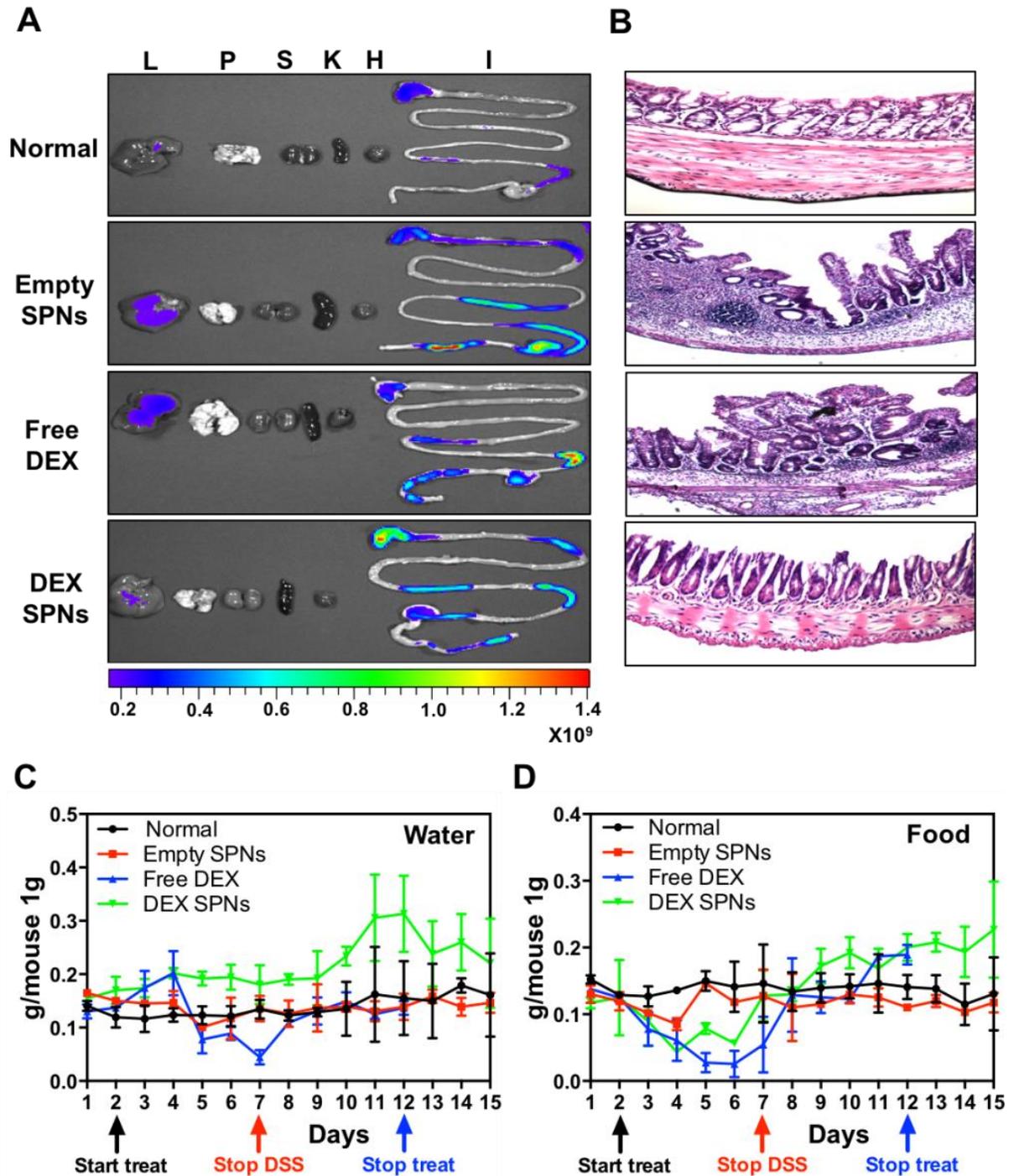


**Figure S2. Disease Severity dependent Cy5-SPNs organ-specific accumulation and water/food intake in DSS-induced mouse models of colitis. A.** *Ex vivo* organ (Liver-L, Lung-P, Spleen-S, Kidney-K, Heart-H, Intestine-I) near infra-red fluorescence (NIRF) images for normal mice and DSS-administered mice for 5, 7, and 10 days. **B.** H&E staining of colon tissue from normal mice and DSS-administered mice for 5, 7, and 10 days. **C.** Water intakes. **D.** Food intake.

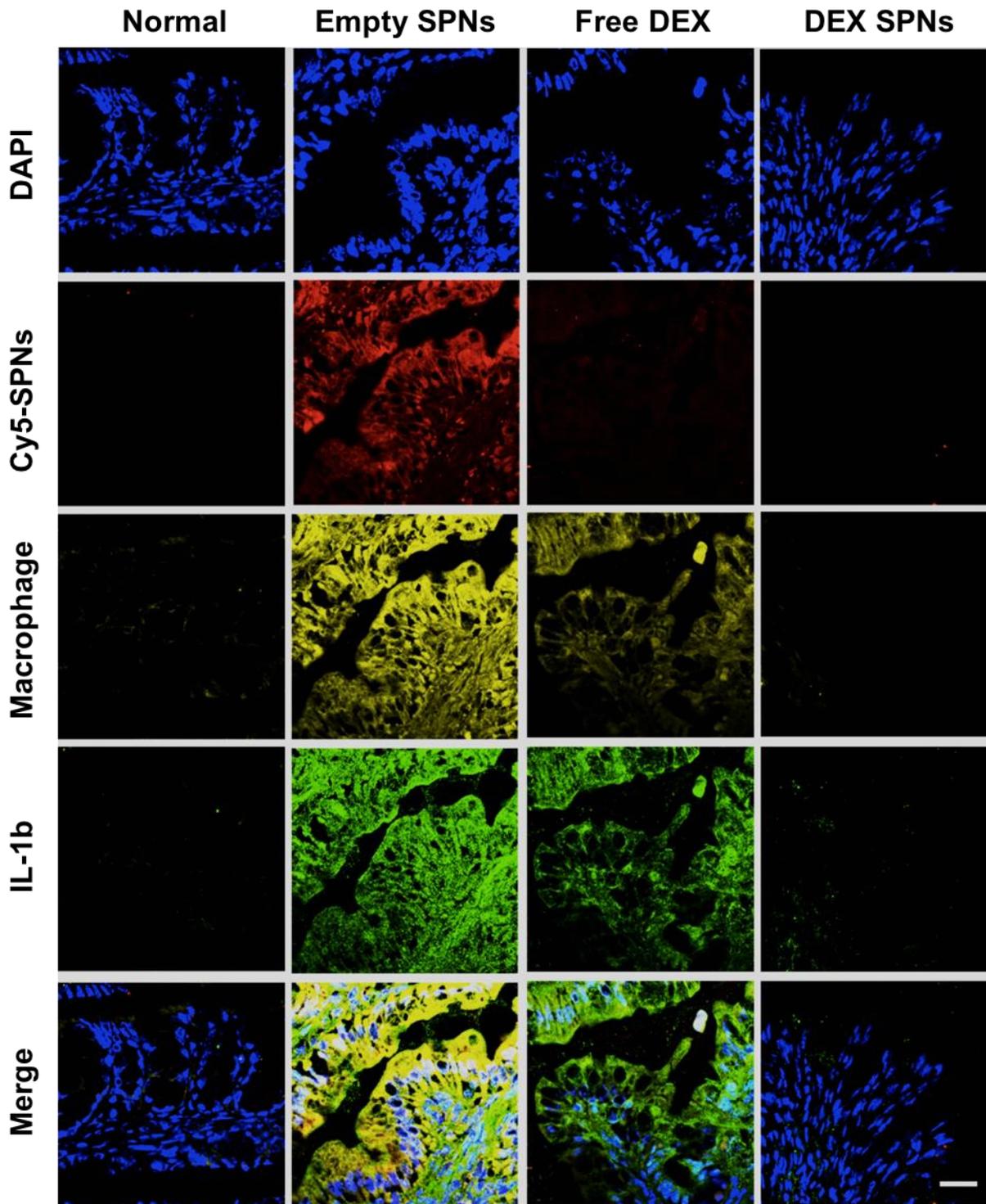


**Figure S3. *In vivo* and *Ex vivo* NIRF image of 6 times treatment therapeutic efficacy with Cy5-SPNs in DSS-induced mouse models of colitis. A.** Representative near-infrared fluorescent (NIRF)

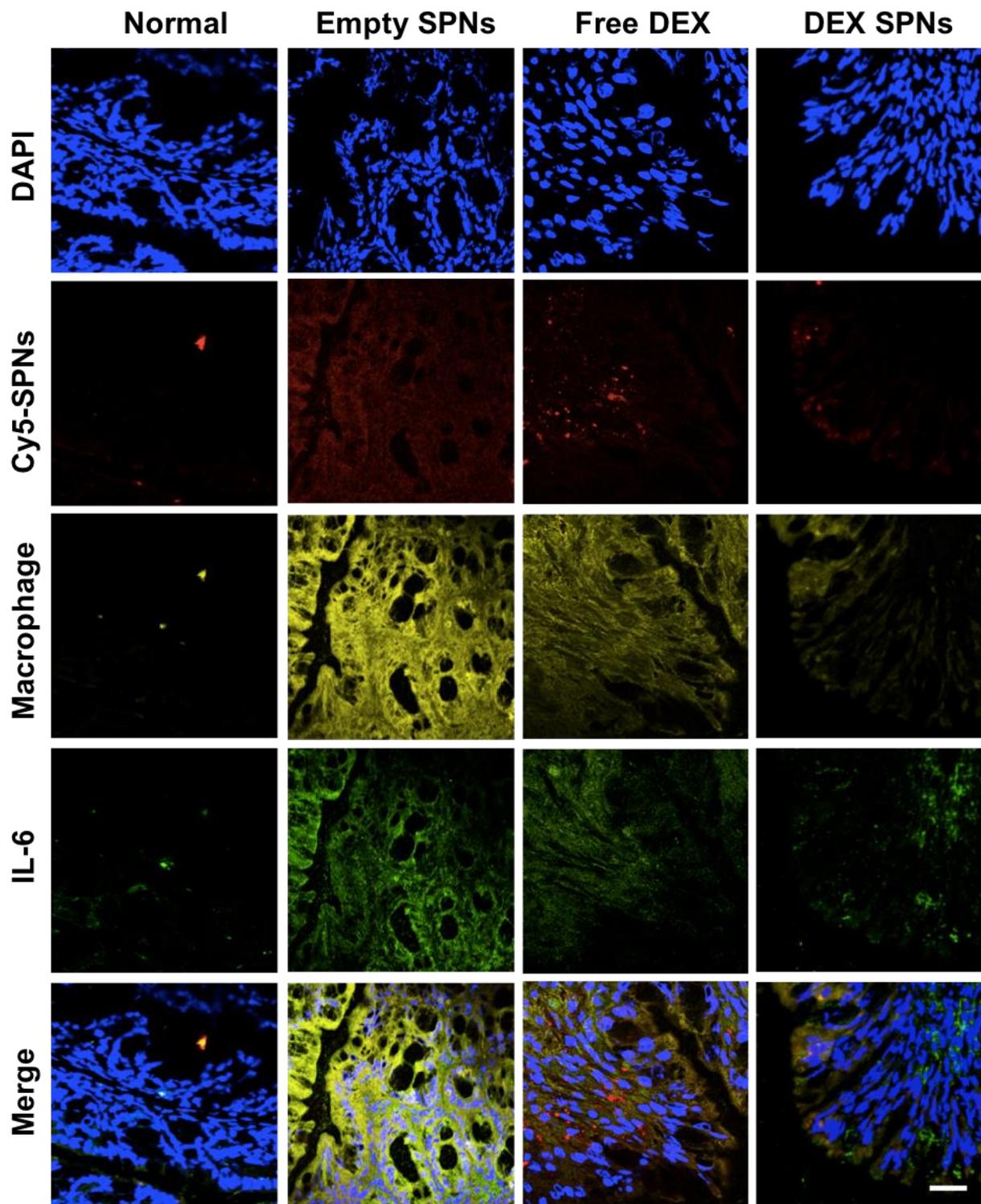
imaging of Cy5-SPNs accumulating within the abdominal area of mice administered with DSS for 7 consecutive days, after six consecutive treatment sessions with Empty SPNs and DEX-SPNs. **B.** Normalized NIRF signal intensities from the *in vivo* images. Results are presented as mean  $\pm$  SD (n=3). \*\* indicates  $P < 0.05$ ; \*\*\* indicates  $P < 0.001$ . **C.** *Ex vivo* colon NIRF imaging and length. **D.** Survival rate over time of mice administered with DSS. **E.** Length of colons for the four experimental groups. Data are presented as mean  $\pm$  SD (n=3). \* indicates  $P < 0.01$ ; \*\* indicates  $P < 0.05$ .



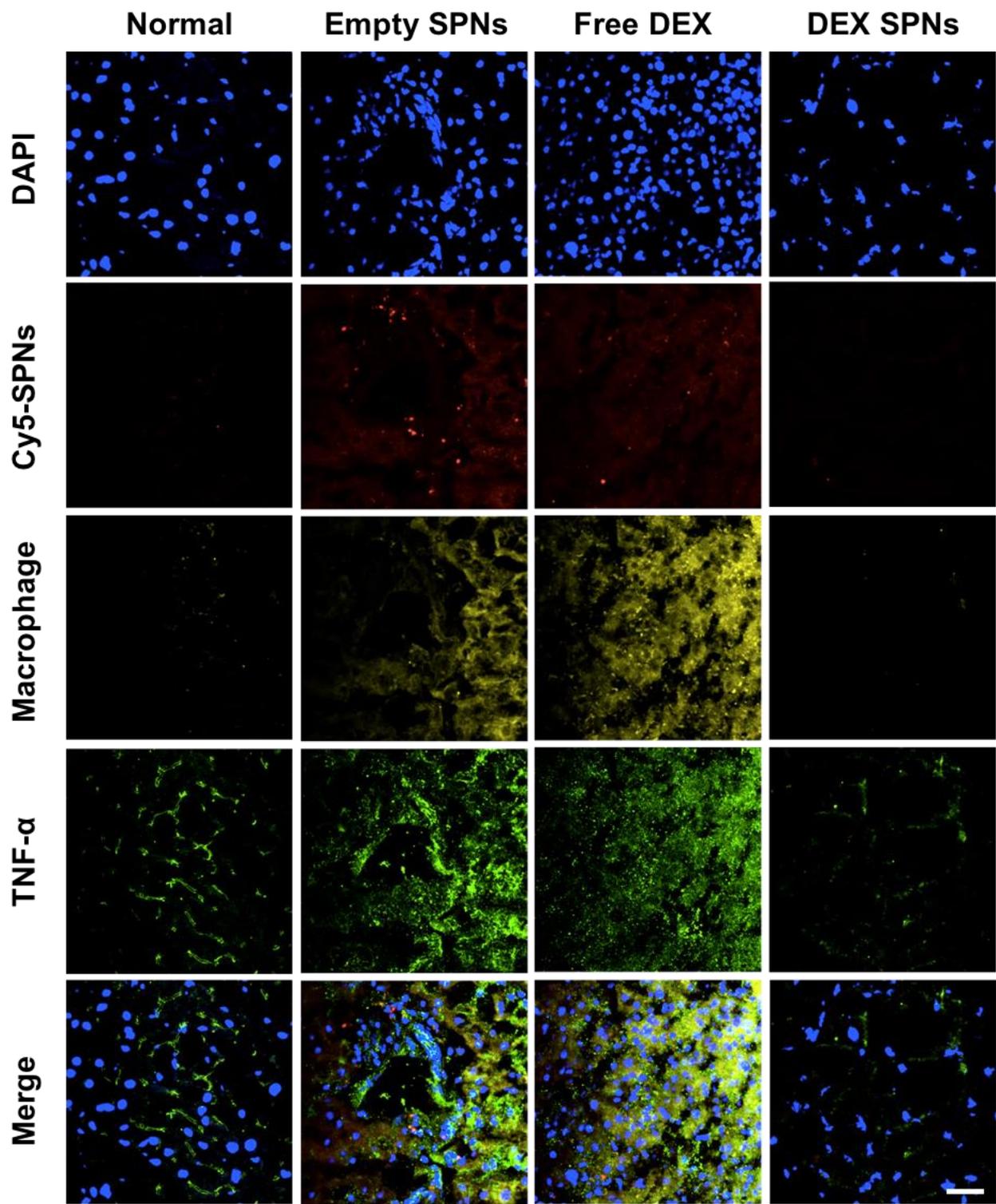
**Figure S4. Therapeutic efficacy dependent Cy5-SPNs organ-specific accumulation and water/food intake in DSS-induced mouse models of colitis. (3 times post treatment) A.** *Ex vivo* organ (Liver-L, Lung-P, Spleen-S, Kidney-K, Heart-H, Intestine-I) near infra-red fluorescence (NIRF) images for normal mice and mice treated with Empty SPNs, Free DEX, and DEX SPNs. **B.** H&E staining of colon tissue from normal mice and mice treated with Empty SPNs, Free DEX, and DEX SPNs. **C.** Water intakes. **D.** Food intake.



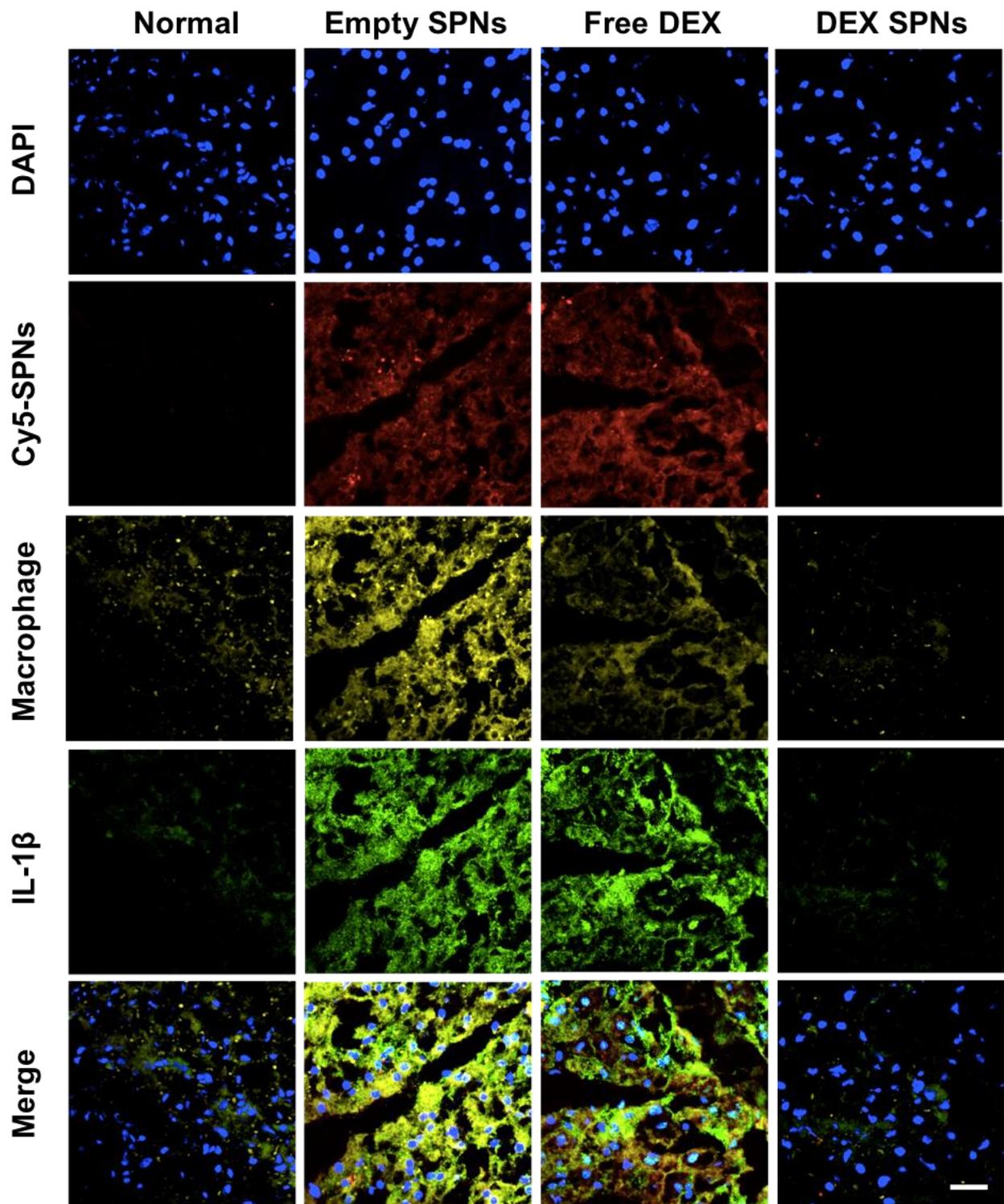
**Figure S5. Immunofluorescence staining (IL-1 $\beta$ ) of intestinal tissues from DSS-induced mouse models of colitis.** Histological analysis of IL-1 $\beta$  protein expression after three consecutive treatment sessions with Empty SPNs, Free DEX and DEX-SPNs. (Blue: DAPI, Red: Cy5-SPNs, Yellow: Macrophage, Green: IL-1 $\beta$ ). Scale bar: 100  $\mu$ m



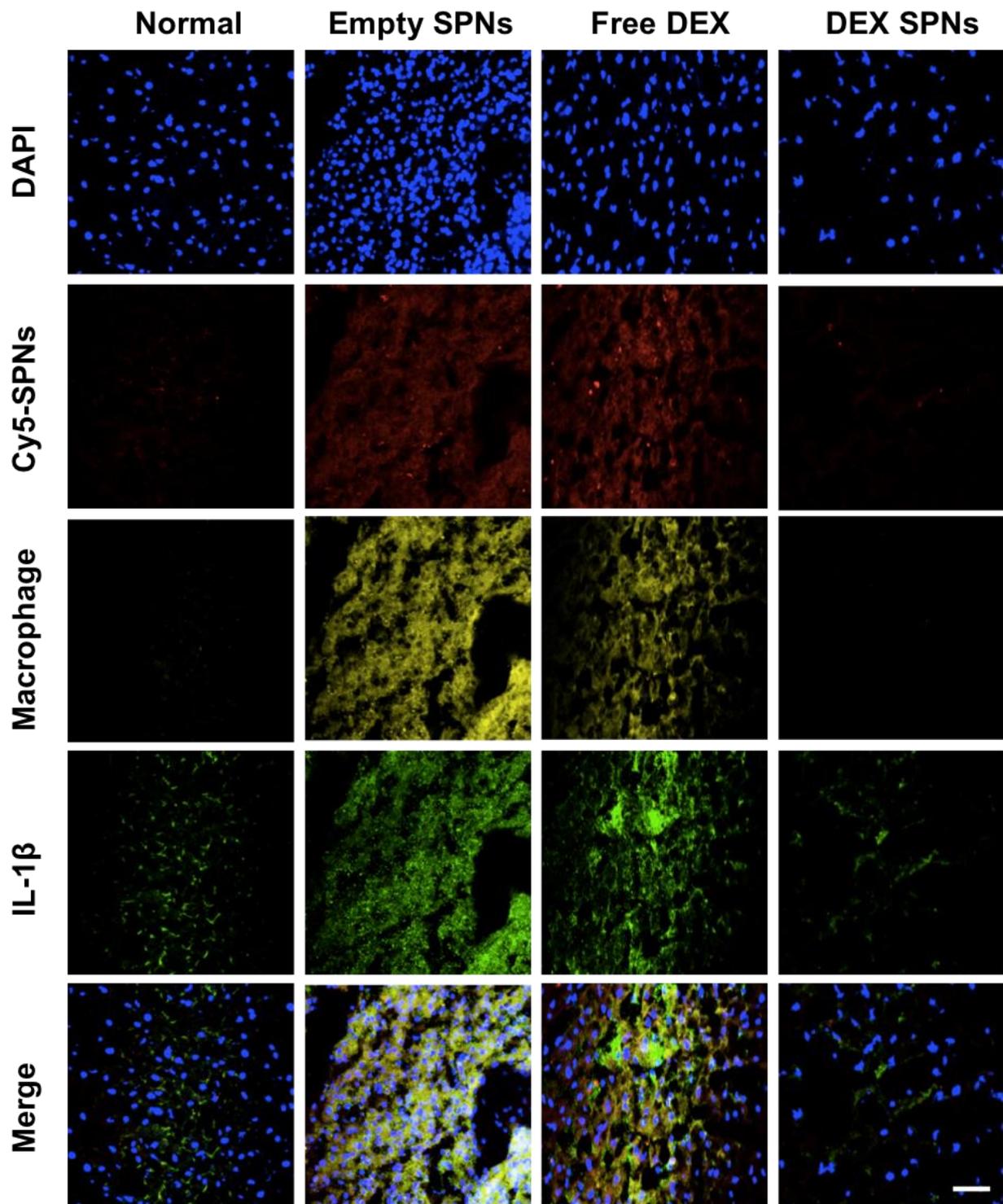
**Figure S6. Immunofluorescence staining (IL-6) of intestinal tissues from DSS-induced mouse models of colitis.** Histological analysis of IL-6 protein expression after three consecutive treatment sessions with Empty SPNs, Free DEX and DEX-SPNs. (Blue: DAPI, Red: Cy5-SPNs, Yellow: Macrophage, Green: IL-6). Scale bar: 100  $\mu$ m



**Figure S7. Immunofluorescence staining (TNF- $\alpha$ ) of liver tissues from DSS-induced mouse models of colitis.** Histological analysis of TNF- $\alpha$  protein expression after three consecutive treatment sessions with Empty SPNs, Free DEX and DEX-SPNs. (Blue: DAPI, Red: Cy5-SPNs, Yellow: Macrophage, Green: TNF- $\alpha$ ). Scale bar: 100  $\mu$ m



**Figure S8. Immunofluorescence staining (IL-1 $\beta$ ) of liver tissues from DSS-induced mouse models of colitis.** Histological analysis of IL-1 $\beta$  protein expression after three consecutive treatment sessions with Empty SPNs, Free DEX and DEX-SPNs. (Blue: DAPI, Red: Cy5-SPNs, Yellow: Macrophage, Green: IL-1 $\beta$ ). Scale bar: 100  $\mu$ m



**Figure S9. Immunofluorescence staining (IL-6) of liver tissues from DSS-induced mouse models of colitis.** Histological analysis of IL-6 protein expression after three consecutive treatment sessions with Empty SPNs, Free DEX and DEX-SPNs. (Blue: DAPI, Red: Cy5-SPNs, Yellow: Macrophage, Green: IL-6). Scale bar: 100  $\mu$ m