

Supporting Information for

**pH-responsive supramolecular polymer gel as an enteric
elastomer for use in gastric devices**

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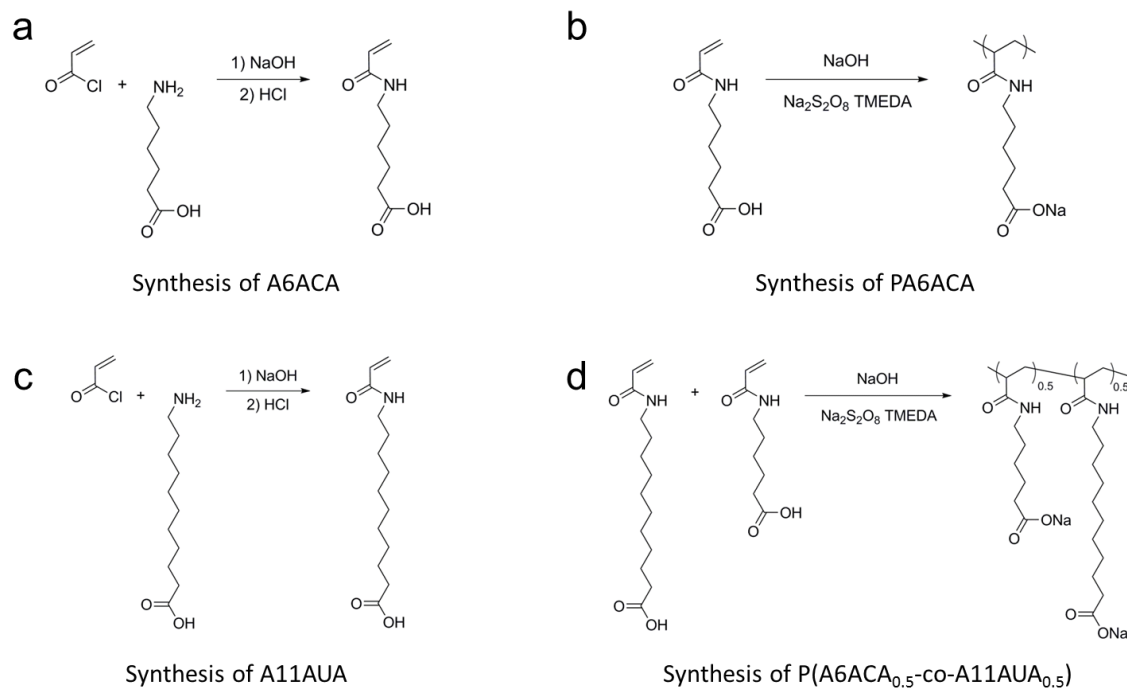
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Scheme S1. a. Preparation of A6ACA from 6-aminocaproic acid and acryloyl chloride. b. Radical polymerization of A6ACA. d. Preparation of A11UA from 11-aminoundecanoic acid and acryloyl chloride. d. Radical co-polymerization of A6ACA and A11UA at a 1:1 molar ratio. 50:50 composition ratio of P(A6ACA_{0.5}-co-A11UA_{0.5}) was the feeding ratio of the radical polymerization.

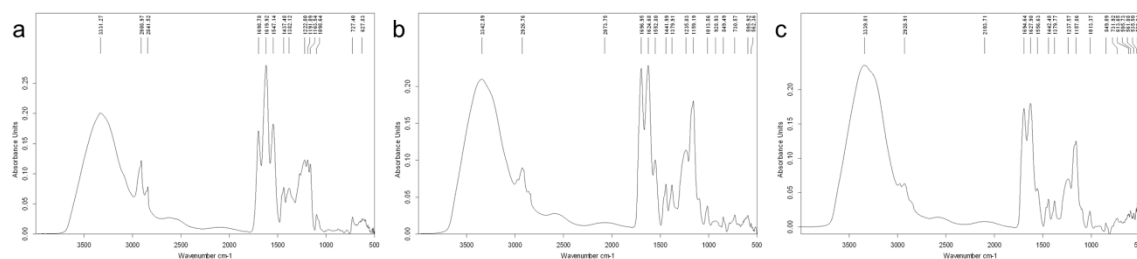


Figure S1. IR spectroscopy of PA6ACA (a), PA6ACA:L100-55=1:1 (b) and PA6ACA:L100-55=2:1 (c) demonstrating the presence of multiple types of hydrogen bonds. $\sim 1700\text{ cm}^{-1}$ indicates hydrogen-bonding between carboxylic-acid groups, while $\sim 1620\text{ cm}^{-1}$ indicates hydrogen-bonding between amide and carboxylic-acid.

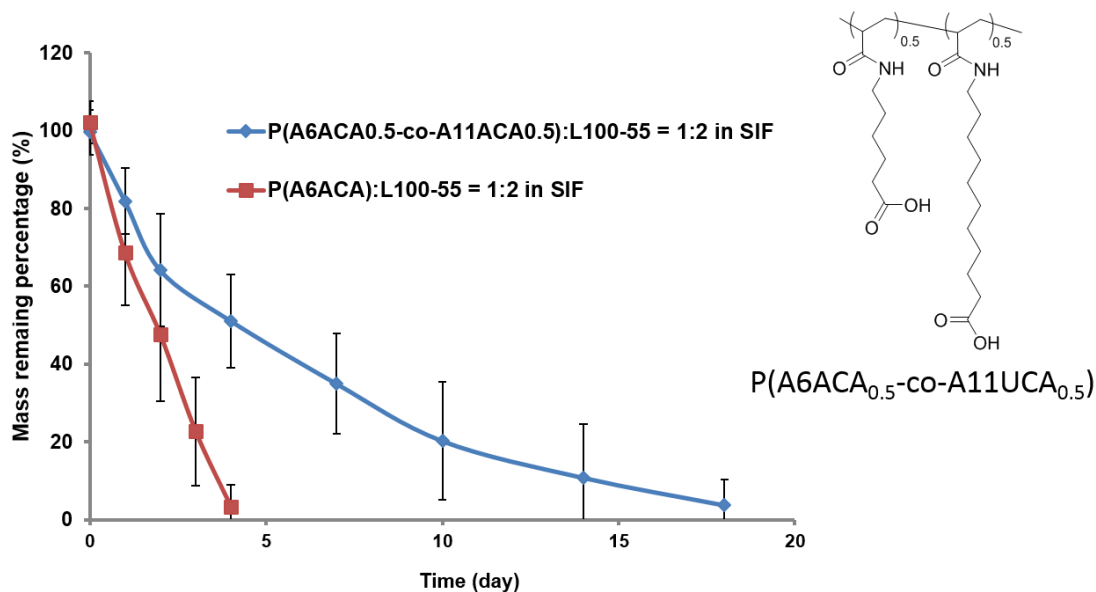


Figure S2. Tuning dissolution rate of the polymer gel: dissolution test of polymer gels composed of P(A6ACA_{0.5}-co-A11AUA_{0.5}) and L100-55 in 1:2 mass ratio in simulated intestinal fluid (SIF) showing complete dissolution up to 18 days. The vertical error bars correspond to the standard deviations of total 6 replicates.

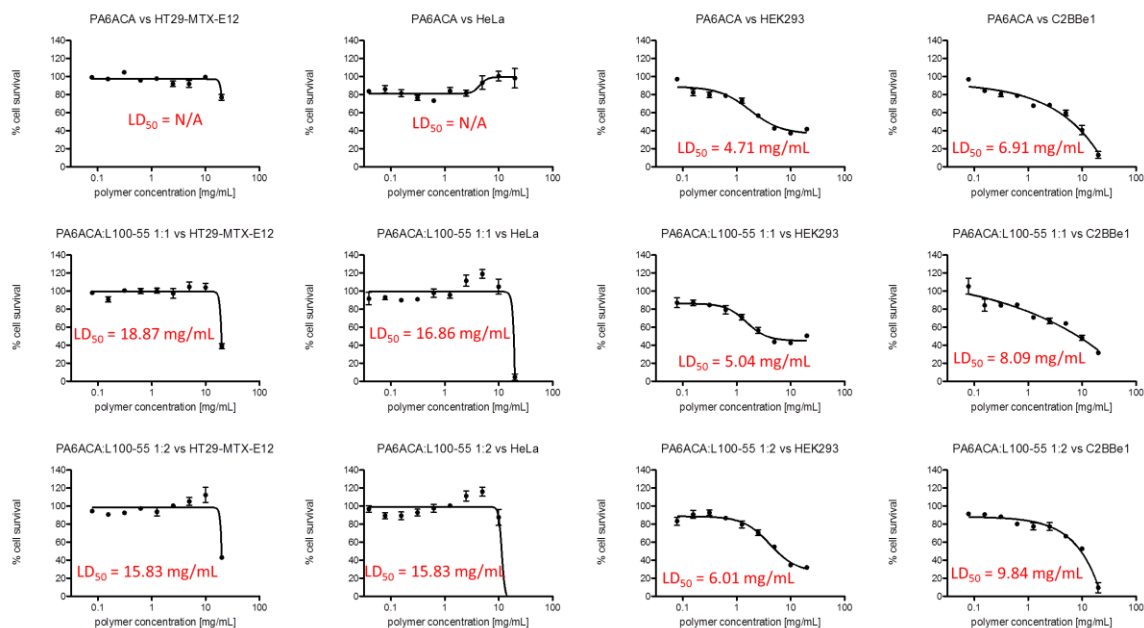


Figure S3. Cytotoxicity study of dissolved PA6ACA (top row), PA6ACA:L100-55 1:1 (middle row) and PA6ACA:L100-55 2:1 (bottom row) towards HT29-MTX-E12 (first column), HeLa (second column), HEK293 (third column) and C2BBe1 (fourth column).

column) cells after exposure to a concentration range of 0.078 - 20 mg/mL over 72 h. Lethal dosage (LD₅₀) values are shown under the corresponding curves. The vertical error bars correspond to the standard deviations of total 3 samples.

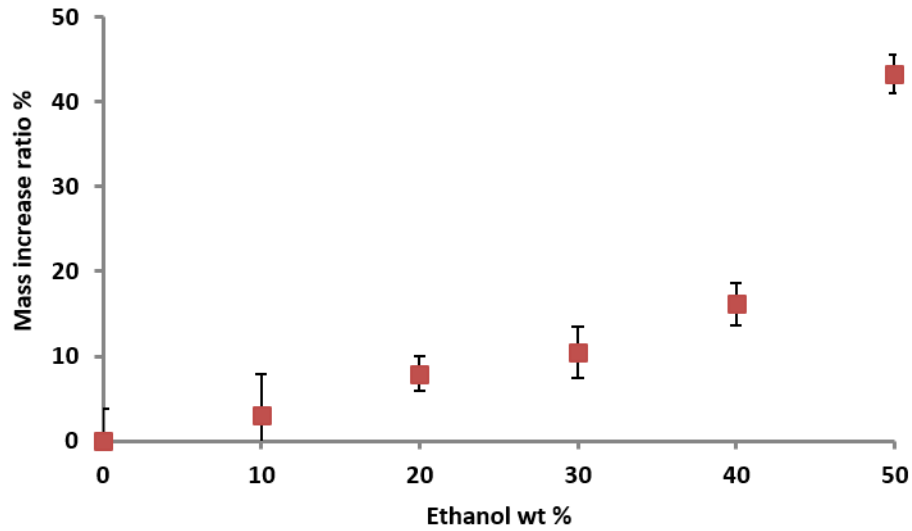


Figure S4. Swelling in ethanol: polymer content vs. ethanol concentration for PA6ACA after immersion in ethanol-water (pH = 2) solution for 24 hours. The vertical error bars correspond to the standard deviations of a total 6 samples.

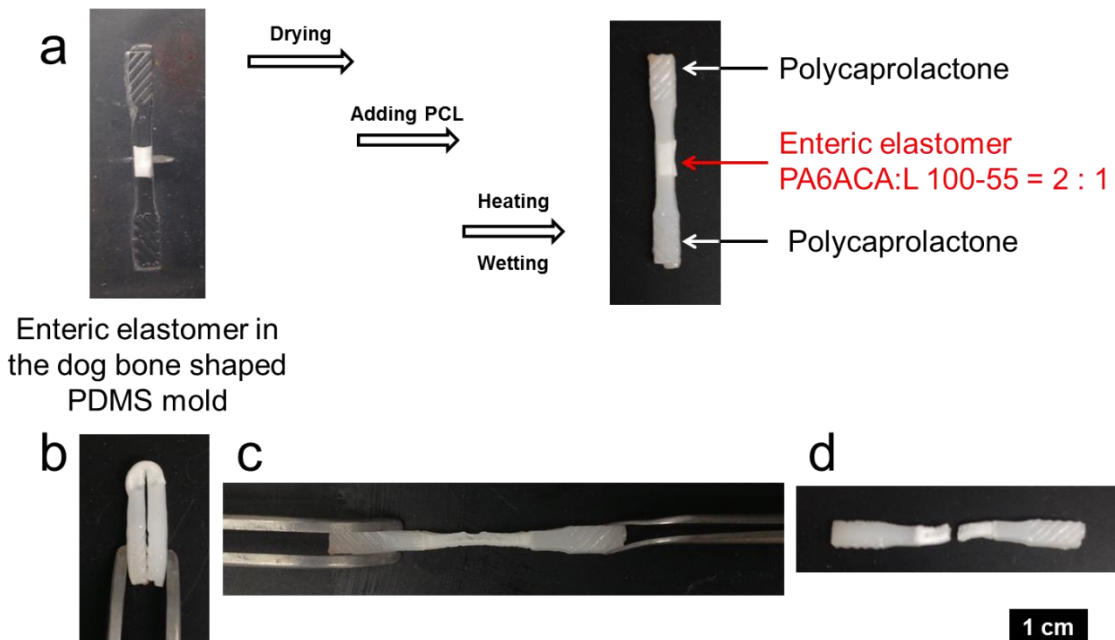


Figure S5. Joint molding of polymer gel with PCL in a dog-bone shape. a. Fitting a cuboid shape of polymer gel composed of PA6ACA:L100-55 1:1 in the middle of a dog-bone shaped PDMS mold, then filling PCL in two ends before heating to 70 °C, and wetting the polymer gel before removal from the mold. b. Bending of the dog-bone shaped device up to an angle of 180° without breakage. c. Pulling two PCL ends of the dog-bone shaped device until fracture took place. d. Fracture occurred in the middle of EE instead of the interfaces between PCL and EE. Scale bar is 1 cm for all images.

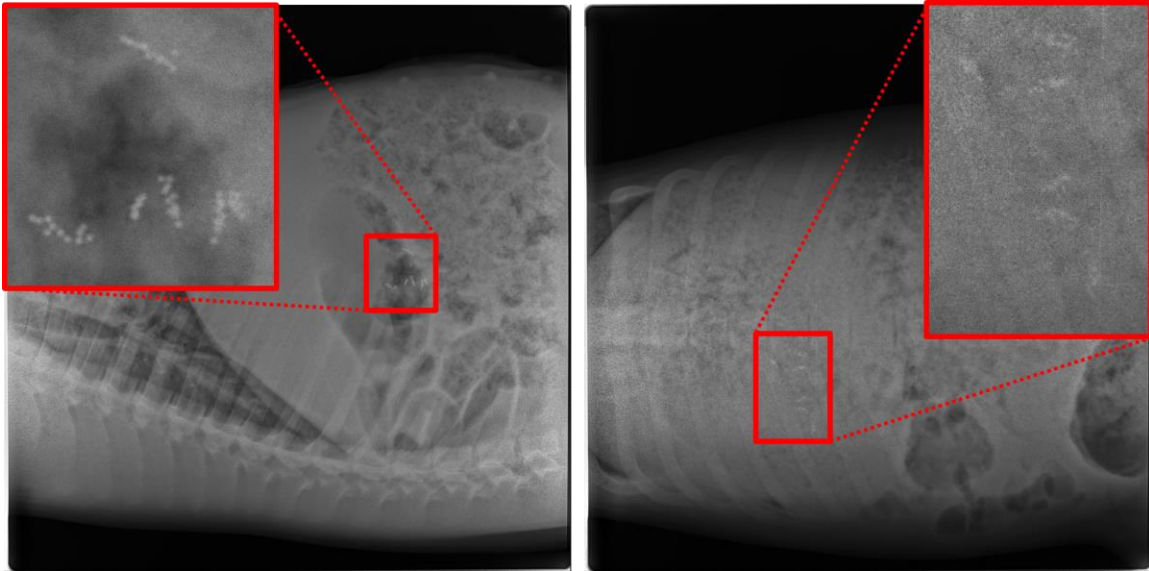


Figure S6. Two representative X-ray images of failed circle-shaped devices in the gastric cavity showing one PCL arm separated from the rest of the device (left) and three PCL arms separated from other three (right).

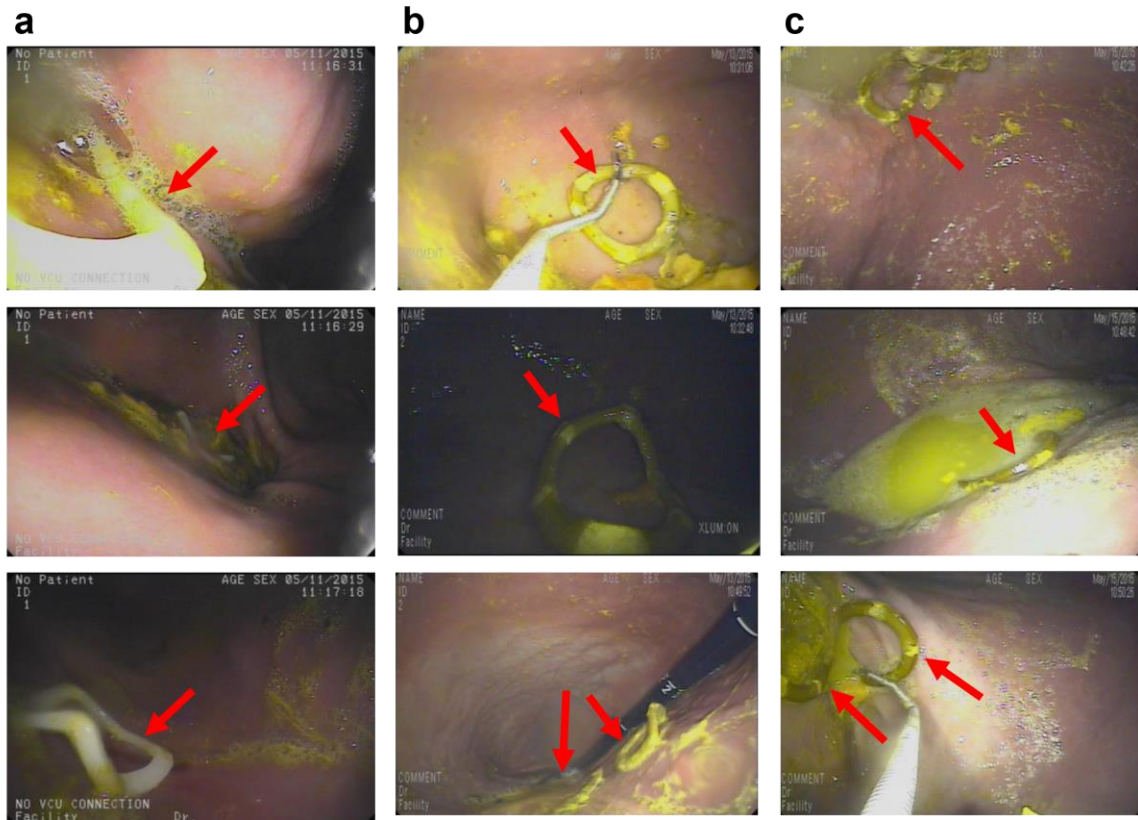


Figure S7. Representative endoscopic images of ring-shaped devices without stainless steel bead as the X-ray contrast agent. (a) Half an hour after the deployment of capsulated ring-shaped devices. (b) Two days after the deployment. (c) Four days after the deployment.

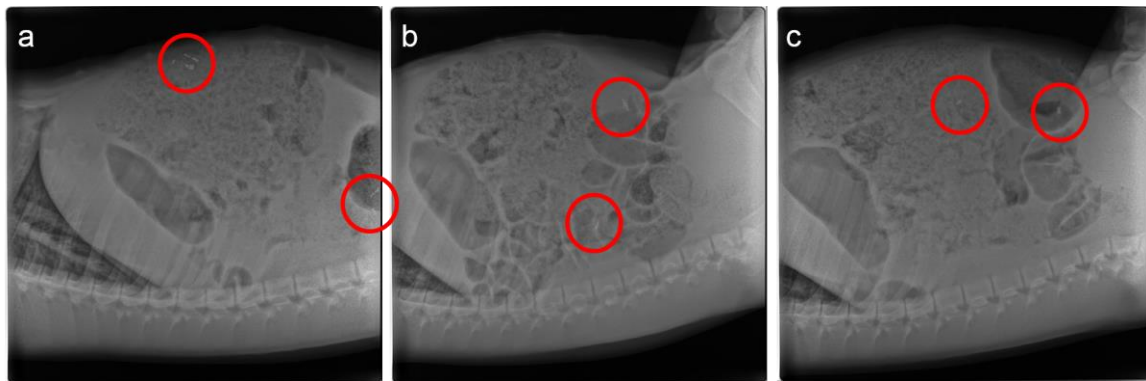


Figure S8. X-ray image of M (a) I (b) T (c) shapes passing through the intestine after the breakage of EE linker. All remaining PCL segments were circled.