

Electronic Supplementary Information (ESI)

The experiments of phase separation curvature:

A mixture solution PEGDA (% v/v) and Dextran (% w/v) was prepared. The phase separation was observed by measuring the turbidity [1]. By changing the ratio of PEGDA (% v/v) and Dextran (% w/v) as tables below, the phase separation points and without phase separation points were recorded. The phase separation curvature was built based on the points.

Turbidity is the cloudiness or haziness of a fluid caused by large numbers of individual particles. By using UV-vis spectroscopy, the absorbance of the mixtures (A) was characterized. The turbidity was calculated following the equation below:

$$\text{Turbidity} = -\ln(10^{-A})$$

Reference:

[1] A. Y. Kwok, E. L. Prime, G. G. Qiao and D. H. Solomon, Polymer, 2003, 44, 7335-7344.

Table S1. Table of building the phase separation curvature (%PEGDA/%dextran):

Red points	Green points
28/15	26/15
28/10	26/10
30/7.5	28/7.5
32/5	29/5
35/3	32/3
40/1	40/0

Table S2. Table of building the phase separation of the immiscible and miscible regions (%PEGDA/%dextran):

20/1	20/5	20/10	20/15
30/1	30/5	30/10	30/15
40/1	40/5	40/10	40/15
50/1	50/5	50/10	50/15

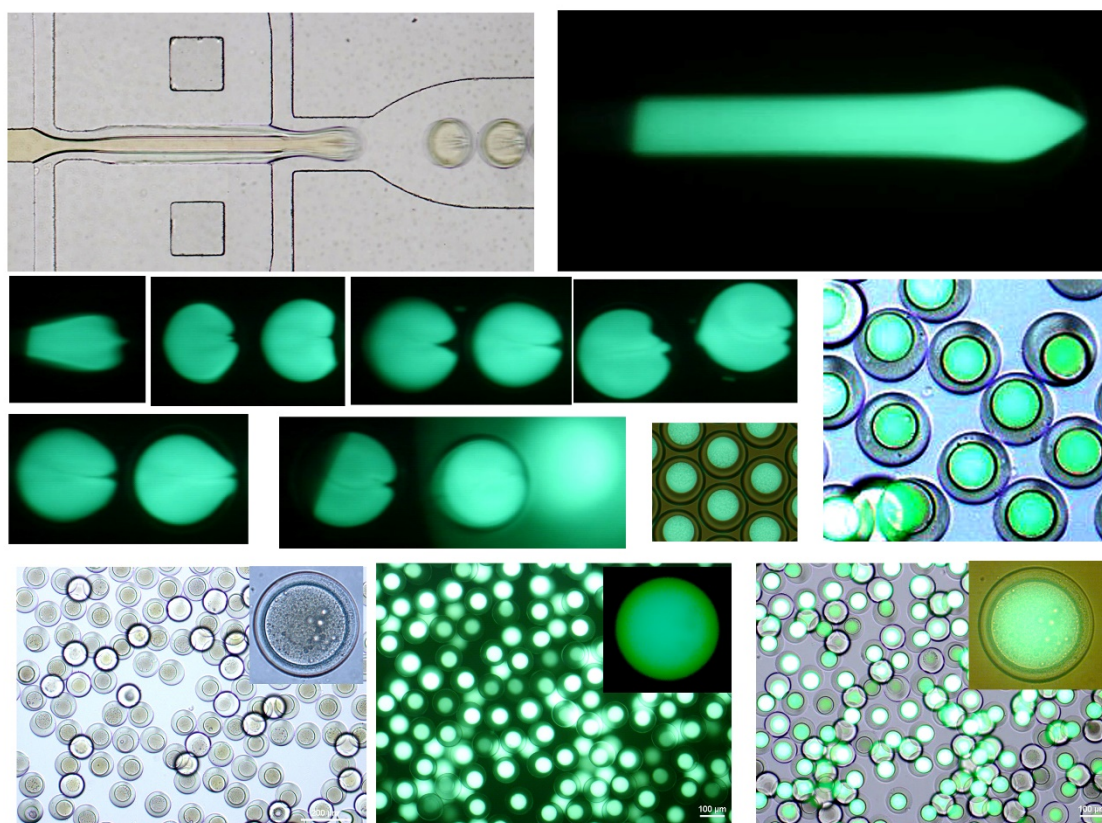


Fig. S1. Core-shell microcapsule droplet formation: The microfluidic system used for the synthesis of hydrogel microcapsules. Time-lapse images of the core (dextran-labeled fluorescence) during droplet formulation.

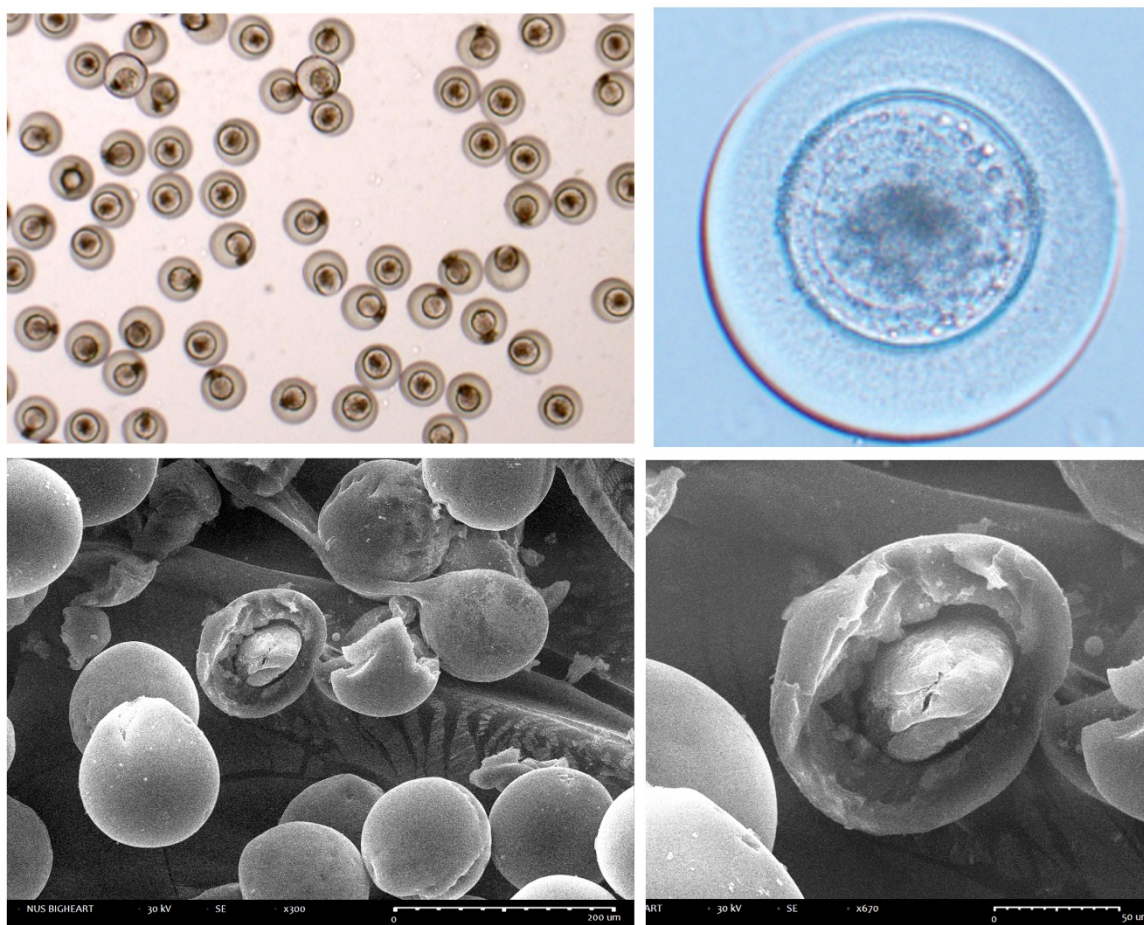


Fig. S2. Microcapsules developed through the optimal microcapsule fabrication process: Bright field and SEM images of microcapsules were recorded to indicate the morphologies of the reservoir microcapsules.

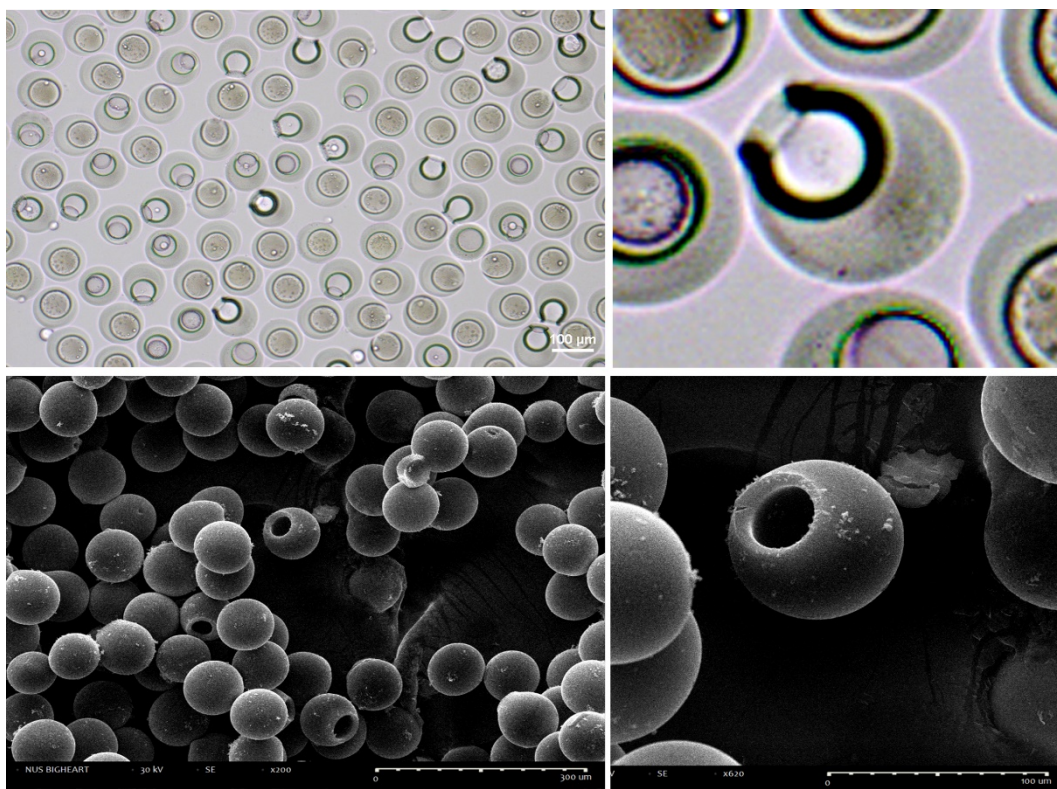


Fig. S3. Non-optimized microcapsule fabrication: Bright field and SEM images of microcapsules were recorded to indicate the internal structures of the reservoir microcapsules.

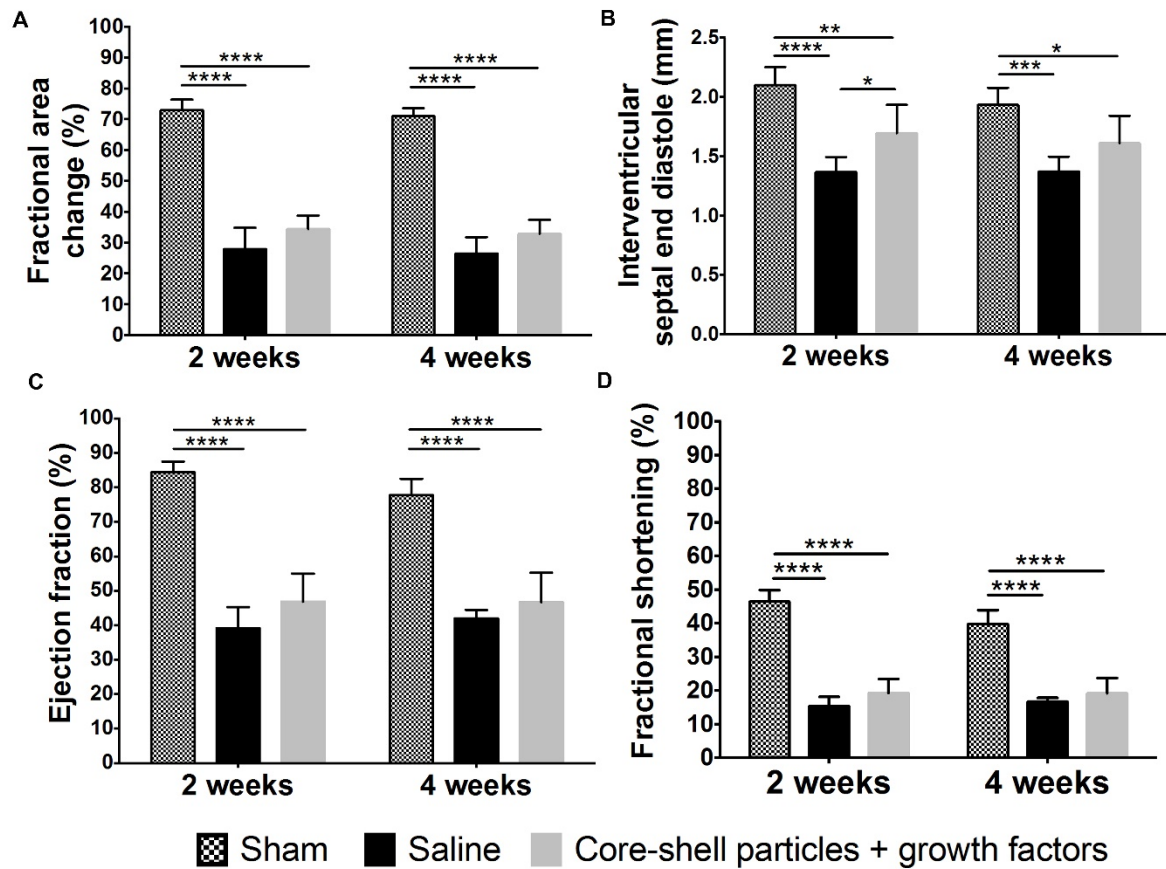


Fig. S4. Echocardiography for cardiac function: Echocardiography for cardiac function. (A) fractional area change (%), (B) interventricular septal end diastole (mm), (C) ejection fraction (%), (D) fractional shortening.

Video S1. Microfluidic reservoir microcapsule fabrication.

Video S2. The phenomenon of the fluorescent core during droplet formulation.