Supplementary materials

Electrospun collagen core/poly-L-lactic acid shell nanofibers for prolonged release of hydrophilic drug

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Supplementary Materials and Methods

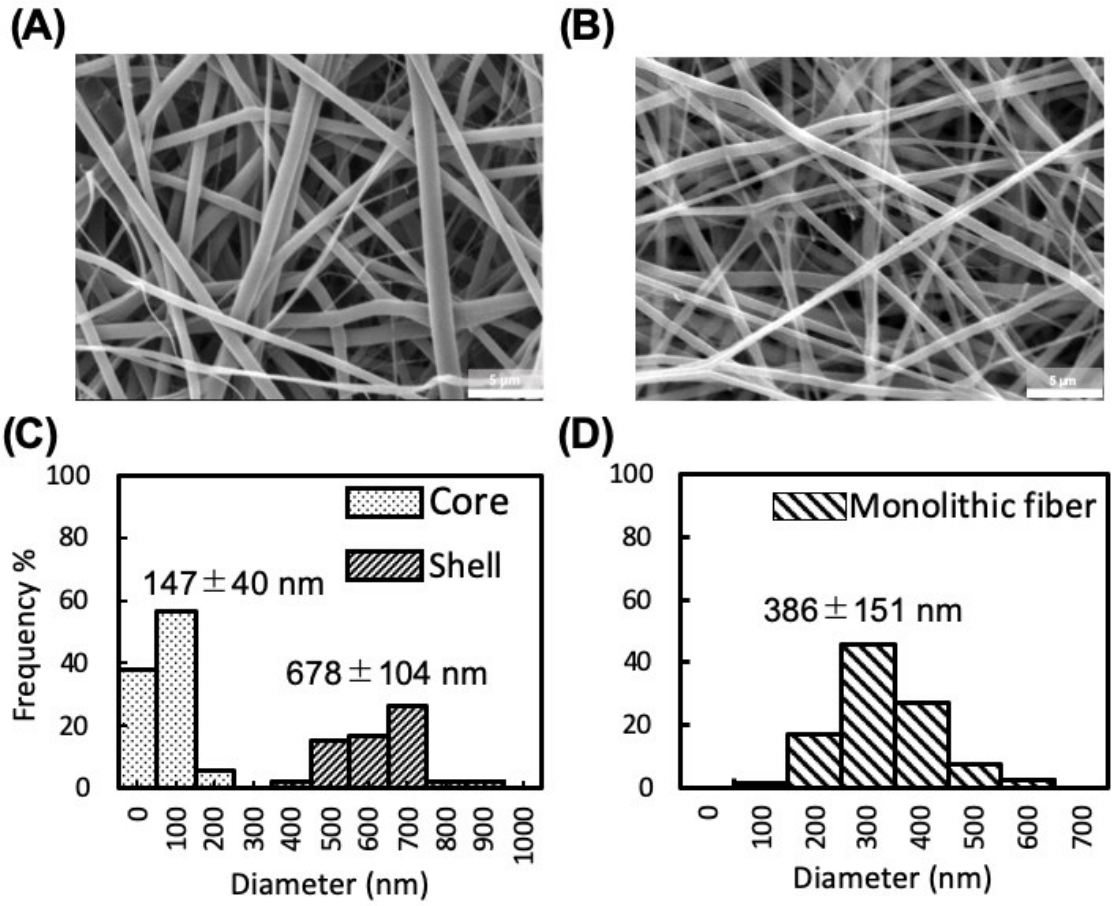
Gel permeation chromatography (GPC)

The molecular weight of PLLA was measured using GPC. The analysis utilized a Shodex RI detector and a column (Shodex, LF-804, 8.0×300 mm, i.d.) at 40 °C, at a flow rate of 0.6 mL°·min^{-1} for 30 min with $CHCl_3$ (HPLC grade, filtered) as the eluent. The samples were dissolved in HPLC grade $CHCl_3$ to a concentration of 0.05w/v% and the solution was filtered (Millipore, SLLGH04NL, 0.2 μm) prior to GPC analysis. Polystyrene standards (Shodex) with low polydispersity were used to obtain a calibration curve.

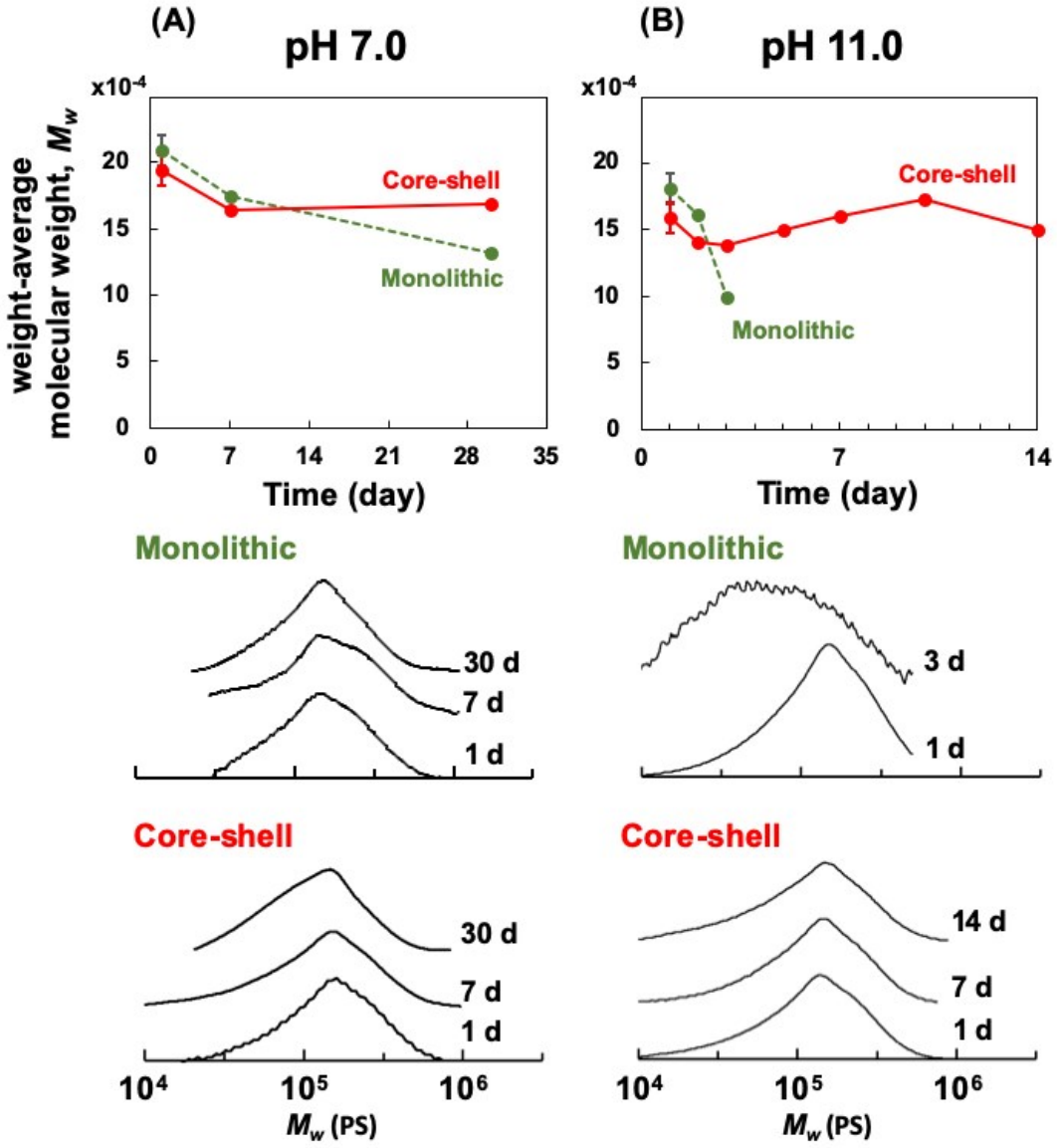
Cytotoxicity

The anti-cancer effect of released BC was evaluated by cell viability. The drug-loaded nanofiber was treated with oxygen plasma and immersed in PBS for 1 week. Subsequently, the sample was collected, lyophilized, dissolved in DMSO, and then centrifuged (100 rpm, 5 min). The supernatant was collected and diluted with PBS. The concentration of BC in the supernatant solution was determined by absorbance measurement. As a control, BC powder solution was dissolved in DMSO at the same concentration of the BC released (concentration range: 5 to 150 μg·mL^{-1}). MDA-MB-231 cells, a mammary gland cancer cell line, were seeded onto a 96-well plate at 5×10³ cells per 200 μL of Dulbecco's modified Eagle's medium (DMEM) supplemented with 10% FBS and 1% penicillin-streptomycin, and cultured at 37°C in a humidified atmosphere containing 5% CO_2 for 24 h. BC solution was serially diluted, and 10 μL of sample was added to each well of the 96-well plate that had cells. After 72 h of culture, the medium was replaced with 100 μL of PBS and added with 10 μL of cell count reagent SF for detecting live cells, and the mixture was kept at 37°C for 2 h. Lastly, the cell number was determined by measuring the absorbance at the wavelength of 450 nm in a microplate reader.

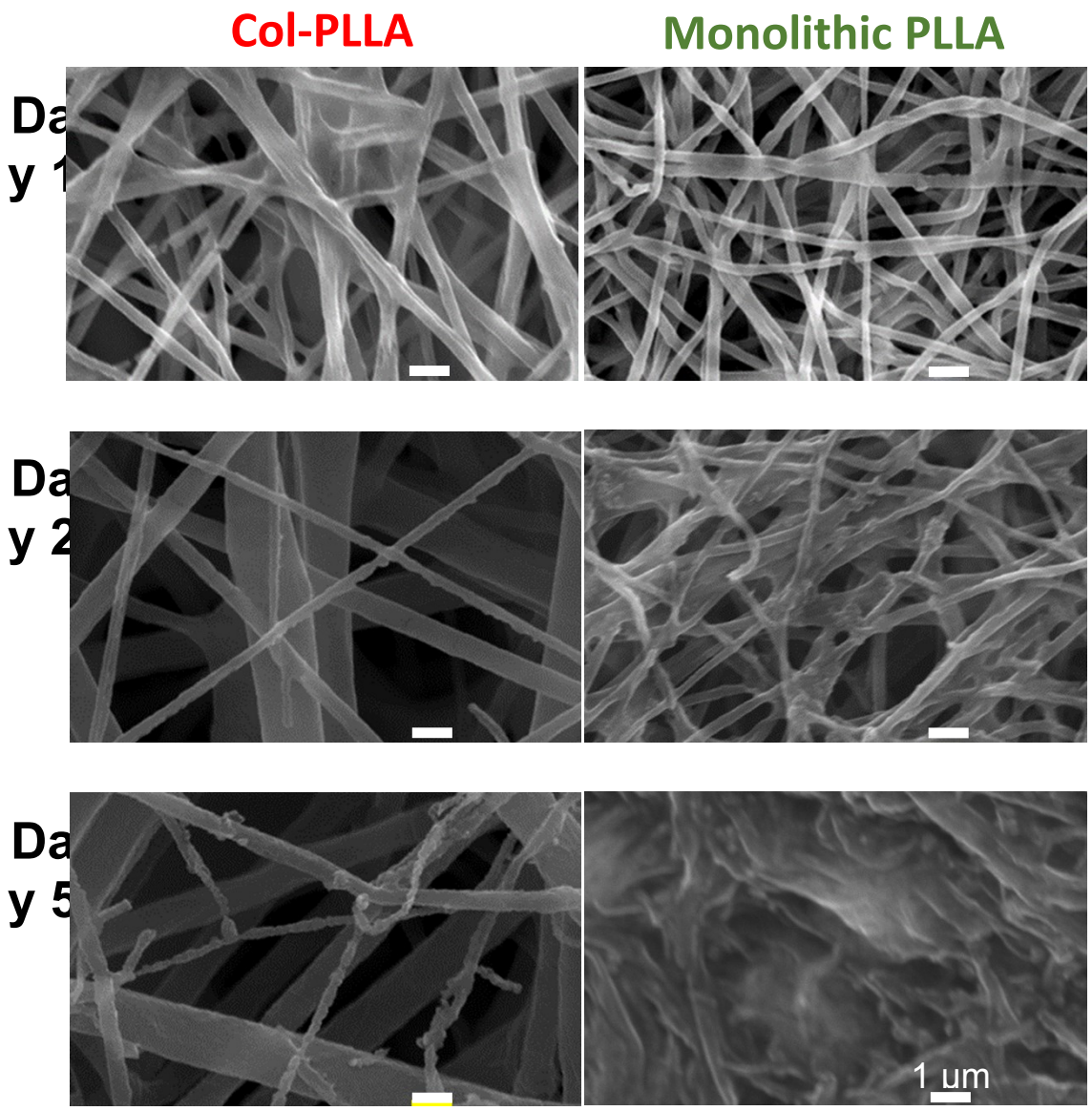
Supplementary Results



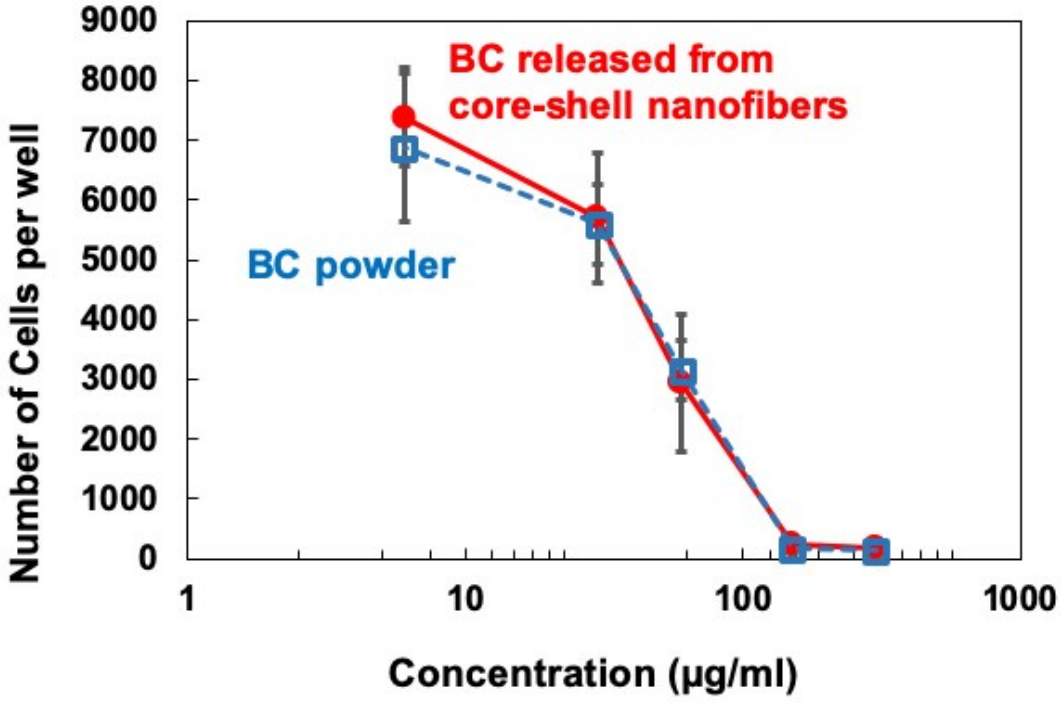
Supplementary Figure S1 SEM images of (A) drug-loaded Col/PLLA core-shell nanofibers and (B) drug-loaded PLLA monolithic nanofibers. Bar = 5 μm. Distribution of diameter of (C) Col/PLLA core-shell fibers and (D) PLLA monolithic fibers.



Supplementary Figure S2 Degradation of matrix PLLA measured by molecular weight average under (A) physiological and (B) hydrolysis-accelerated conditions.



Supplementary Figure S3 SEM images of nanofibers degraded under pH 11.0.



Supplementary Figure S4 Cell viability after treatment with BC released from core-shell nanofibers (close circle) and the BC powder (open square) (means ± SD, $n = 6$).