Supporting Information

Fabrication of oxygen-releasing dextran microgels by droplet-based microfluidic method

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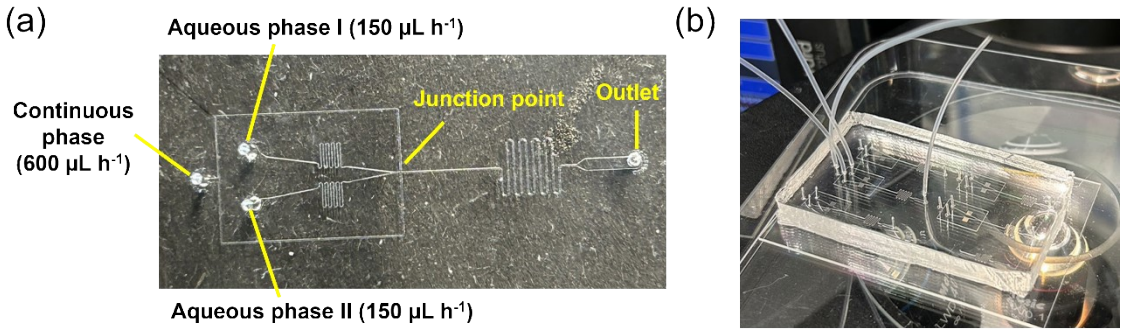

Fig. S1 Pictures of (a) microfluidic device and (b) microgel fabrication process.

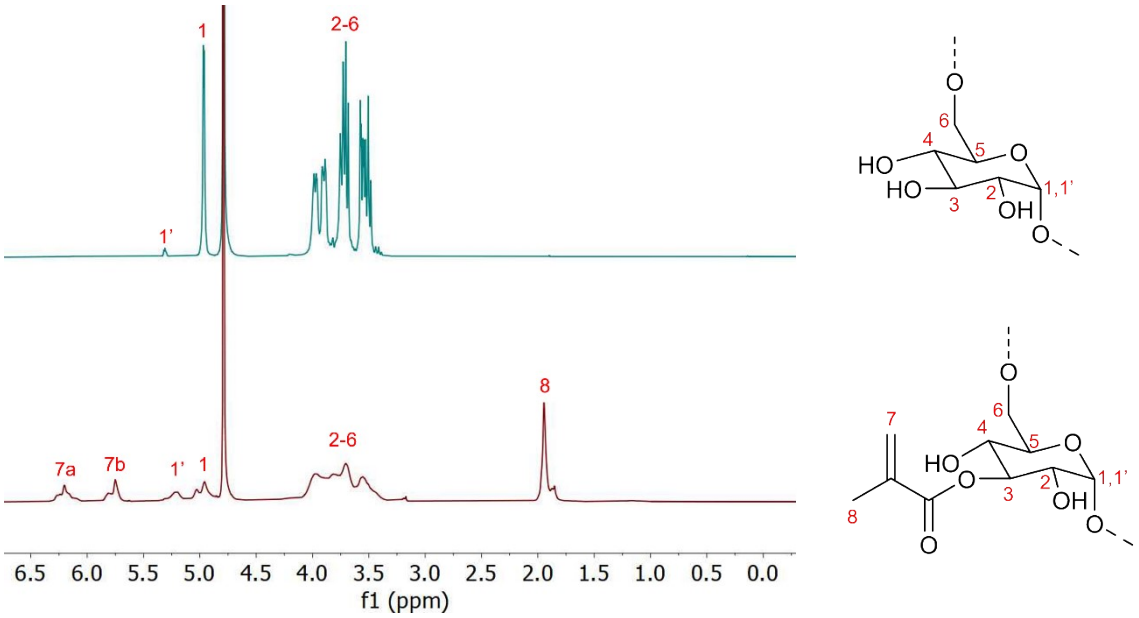

Fig. S2 ^{1}H-NMR of dextran (top) and Dex-MA (bottom) in D_2O.

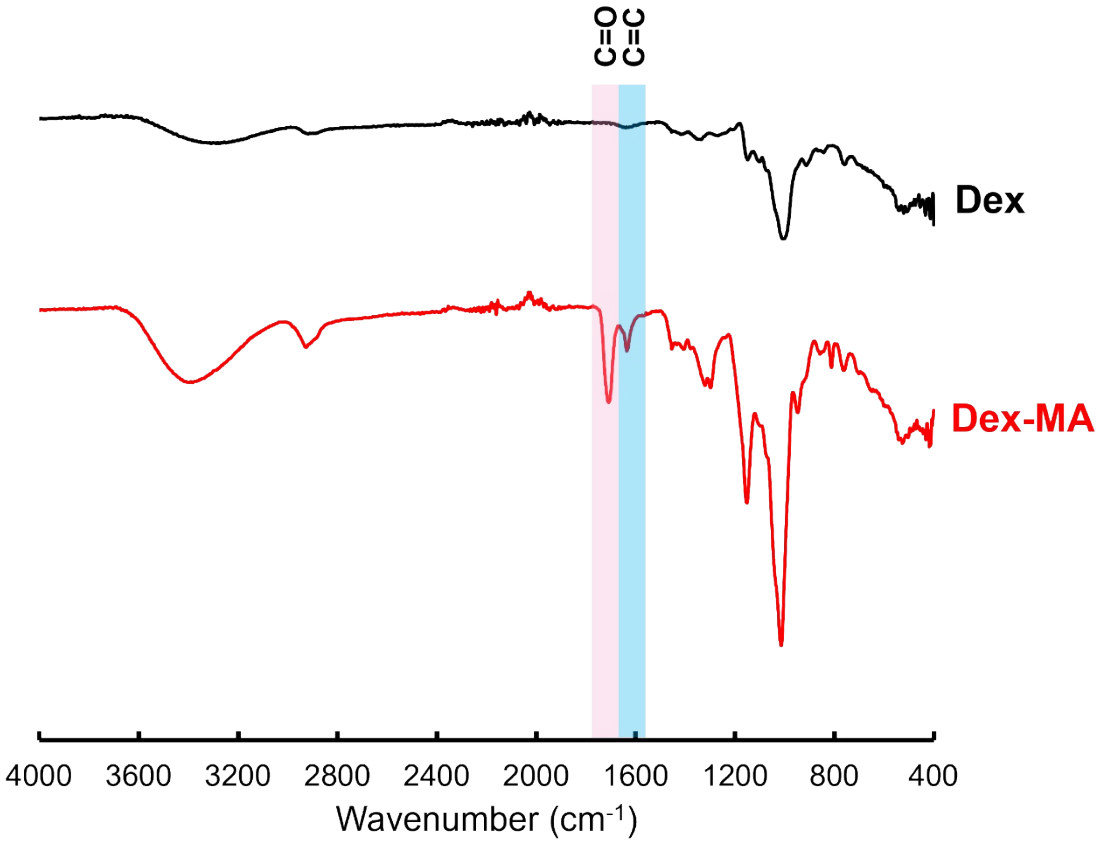

Fig. S3 FT-IR spectra of dextran and Dex-MA.

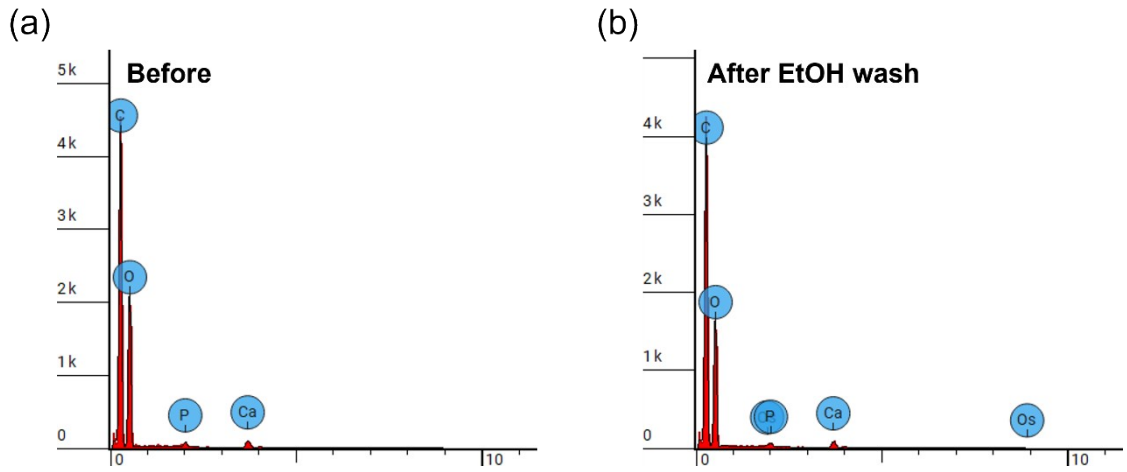

Fig. S4 EDX spectra of microgel containing 10 mg mL^{-1} CP nanoparticles (a) before and (b) after dispersing in ethanol for three times.

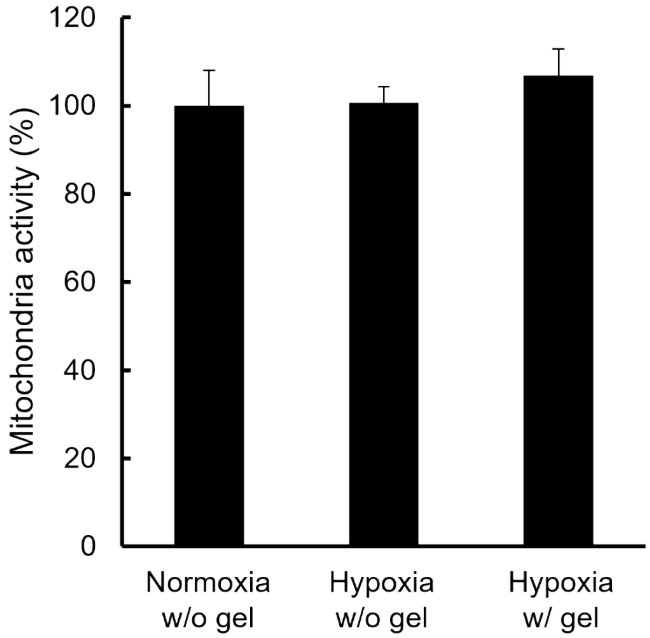

Fig. S5 Mitochondrial activities of NHDF after 1 day incubation with and without microgels containing 10 mg mL^{-1} CP nanoparticles in the presence of 1000 U mL^{-1} catalase under a hypoxic condition. Mitochondrial activity of each sample was standardized from the relative values as compared to 100 % for that of a cell culture under normoxic condition. All data are representative of four independent experiments, mean ± SD.

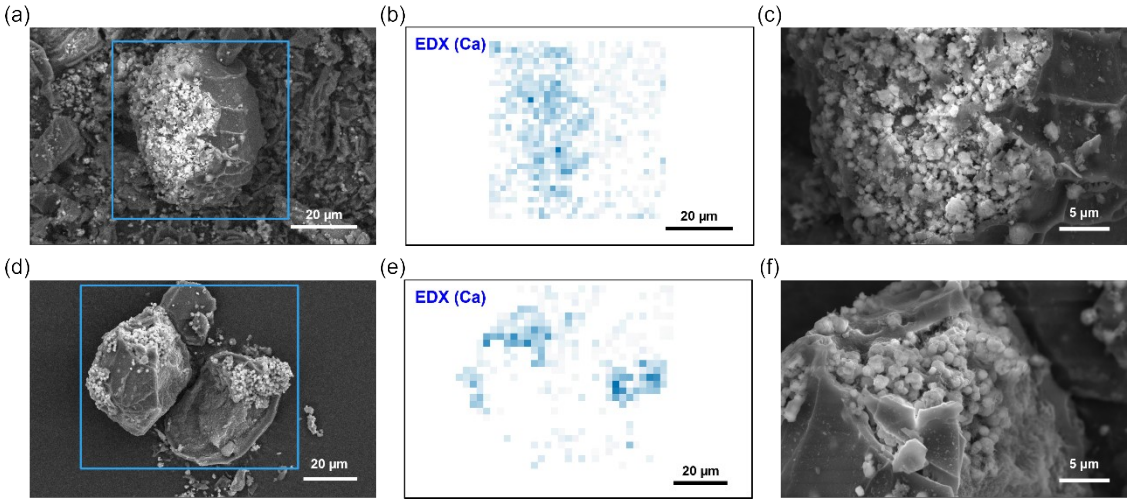

Fig. S6 (a) SEM image, (b) elemental mapping of calcium at the blue square area in (a) by EDX and (c) high magnification SEM image of the cross section at the crashed microgels containing 10 mg mL^{-1} CP nanoparticles. (d) SEM image, (e) elemental mapping of calcium at the blue square area in (d) by EDX and (f) high magnification SEM image of the cross section at the crashed ACC-CP microgels.

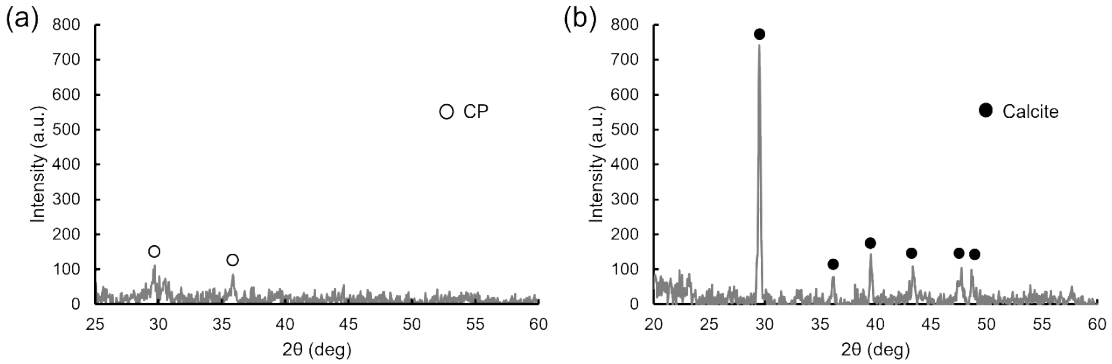

Fig. S7 XRD spectra of (a) microgel containing 10 mg mL^{-1} CP nanoparticles and (b) ACC-CP microgel.

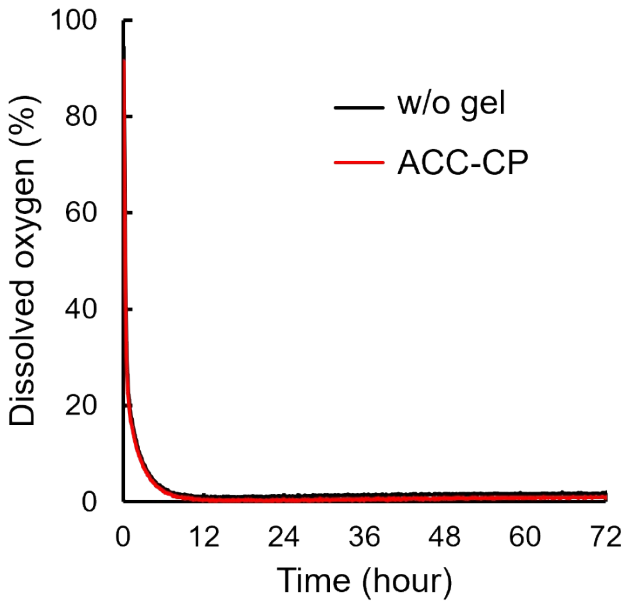

Fig. S8 Dissolved oxygen concentration changes in 500 μL DMEM containing 100 U mL^{-1} catalase and 15 mg mL^{-1} Dex-MA microgel encapsulating ACC-CP under a hypoxic condition for 72 hours.

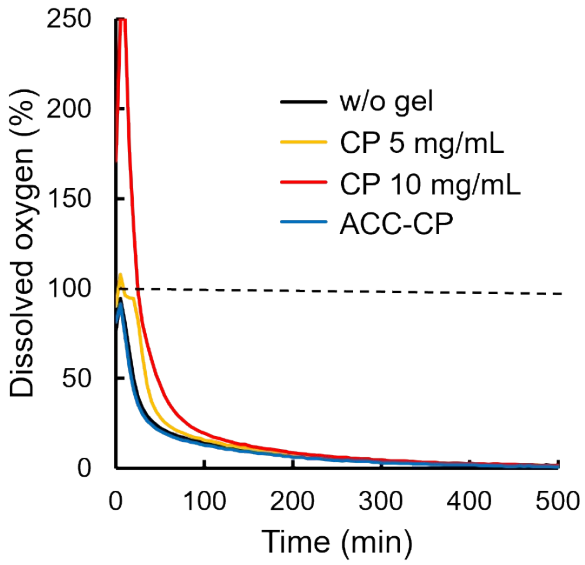

Fig. S9 Dissolved oxygen concentration changes in 500 μL DMEM containing 100 U mL^{-1} catalase and 15 mg mL^{-1} Dex-MA microgel encapsulating 5 and 10 mg mL^{-1} CP nanoparticles and ACC-CP under a hypoxic condition for the comparison.

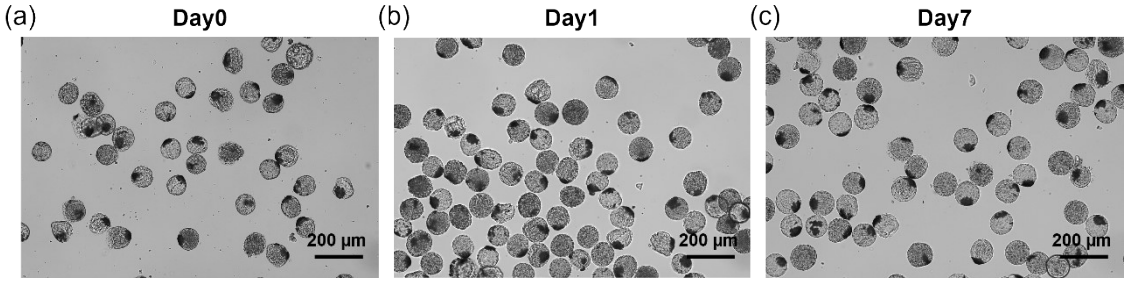

Fig. S10 Bright field images of a freeze-dried ACC-CP microgel (a) soon after the dispersion in DMEM model solution (44 mM $NaHCO_3$ solution containing 0.1 mg mL^{-1} NaH_2PO_4) and (b) 1 day and (c) 7 days incubation in DMEM model solution at room temperature.

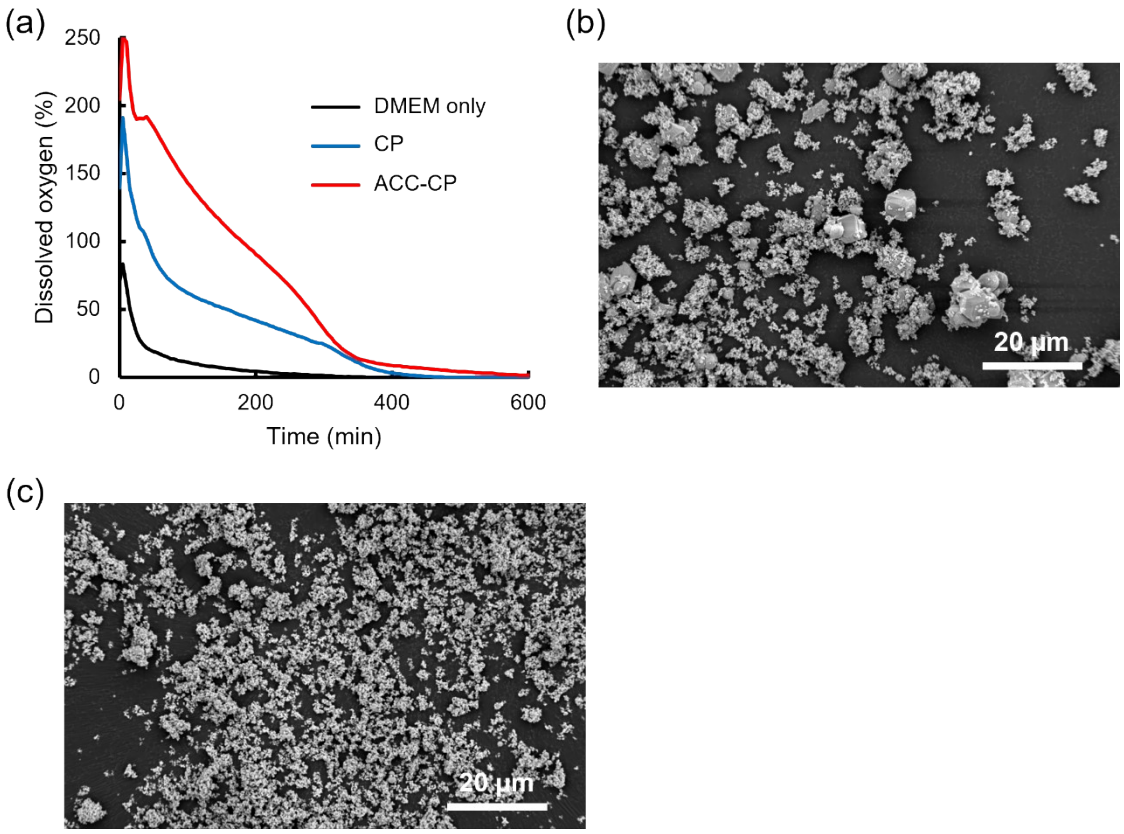

Fig. S11 (a) Dissolved oxygen concentration changes in 500 μL DMEM containing 100 U mL^{-1} catalase and 1 mg mL^{-1} CP nanoparticles and ACC-CP under a hypoxic condition. ACC-CP was fabricated by immersing 0.5 mg CP nanoparticles in 50 μL of 44 mM $NaHCO_3$ including 0.1 mg mL^{-1} NaH_2PO_4 for 1 hour. SEM images of (b) prepared ACC-CP and (c) CP nanoparticles immersed in DMEM for 1 hour at a concentration of 1 mg mL^{-1}.