Supporting Information for

Enzymatically degradable oxidized dextran/chitosan hydrogels with anisotropic aligned porous structure

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Supporting Information Methods

Mechanical property of the hydrogels

Dynamic viscoelastic properties of the non-porous oxDex/CHI hydrogel was performed with a rheometer (RS6000, HAAKE, Deutschland) using parallel plates of 20 mm diameter. The gap between the plates was set to 1 mm. Small amplitude shear experiments were performed over a frequency range of 0.1 to 10 Hz at a constant shear strain of 0.1%. All the rheology measurements were carried out at 25±0.1 °C controlled by a Peltier plate.

Uniaxial compression experiments on the cryogels prepared by a unidirectional freezing technique were performed using a Universal Material-Testing Machine (Zwick/Roell Z020, Germany). The fully swollen cryogel columns were cut into cubes with a length of approximately 12 mm. The samples were compressed into 60% of their original thickness along the direction that was parallel to the freezing direction at room temperature. The speed of compression between the two parallel plates was 1 mm min^{-1}.

MTT examination

The Madin-Darby Canine Kidney (MDCK) cells were seeded in a 96-well plate at 5×10^4 cells/well and incubated for 24 h. Then the culture medium was removed and 200 μL gel extraction medium was added to each well. After 24 h the medium was replaced with 200 mL fresh medium containing 20 mL MTT (3-(4,5-dimethyl-2-thiazoyl)-2,5-diphenyl tetrazolium bromide, Alfa Aesar, 5 mg/mL in PBS) and incubated for another 4 h. Finally all medium was removed and 150 μL/well DMSO was added, followed by shaking for 15 min. The absorbance of each well was measured at 560 nm on a plate-reader (Metertech) with pure DMSO as a blank. Non-treated cell was used as a control and the relative cell viability (mean% ±SD, n =3) was expressed as $Abs_{sample}/Abs_{control} \times 100\%$.

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Gelation kinetics determined by viscosity study

Viscosity was measured using a RS 6000 rheometer (Haake, Karlsruhe, Germany) equipped with a coaxial rotational cylinder system (MV II measuring cell, gap size - 2.8 mm). A temperature of 30 ± 0.5℃ was maintained by a Haake F6 thermostat. The shear rate was fixed at 1 s^{-1}.

Weight loss of the cryogels during the

Chitosanase was dissolved in HAc-NaAc buffer solutions at pH=5.6. OxDex-CHI cryogels (0.5 g) with different constitutions were placed in a 15 mL bottle and treated at 37 °C without stirring with chitosanase solutions (8 mL) of different concentrations (0, 1.0, 2.0, 4.0 mg/mL).

Supporting Information Figures

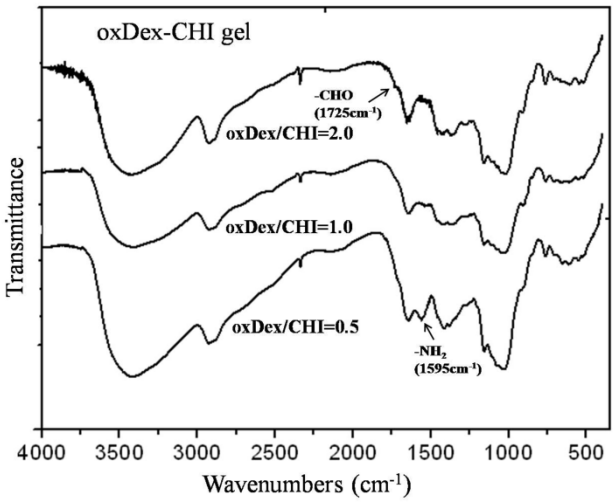

Fig. S1 FTIR spectra of oxDex-CHI gels with different constitutions.

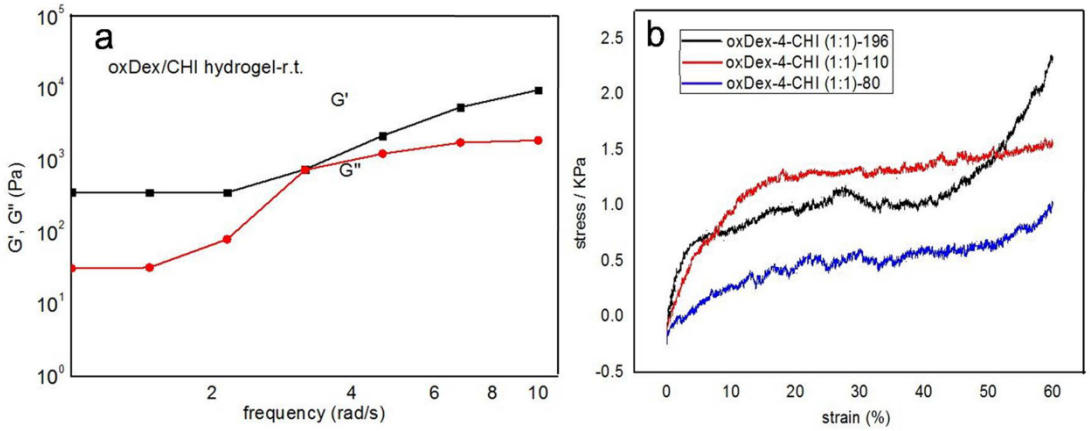

Fig. S2 a) Dynamic rheological behaviors of the non-porous oxDex/CHI hydrogel prepared at room temperature. b) Compression test of the oxDex-4-CHI (1:1) cryogels prepared at different freezing temperatures.

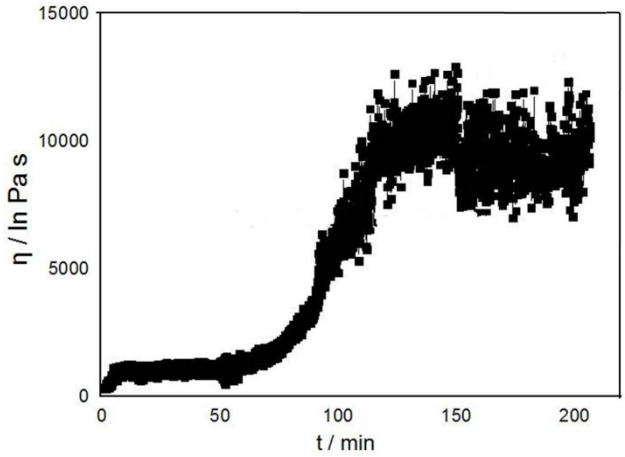

Fig. S3 Viscosity change during the gelation process of oxDex/CHI hydrogel at room temperature.

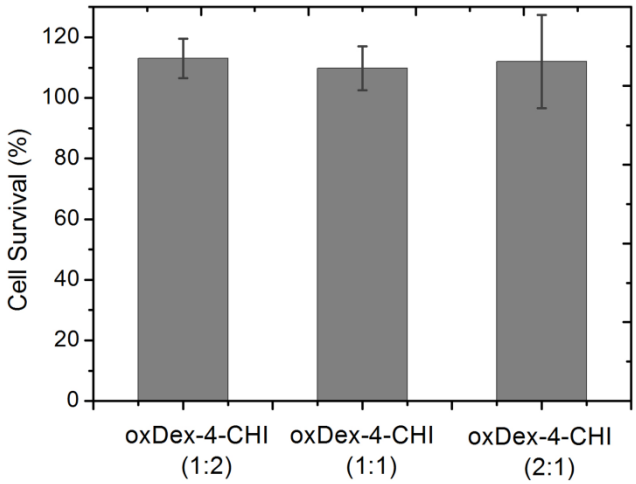

Fig. S4 Cell viability of MDCK cells as evaluated by the MTT assay following 24 h exposure to the extracts of hydrogels.

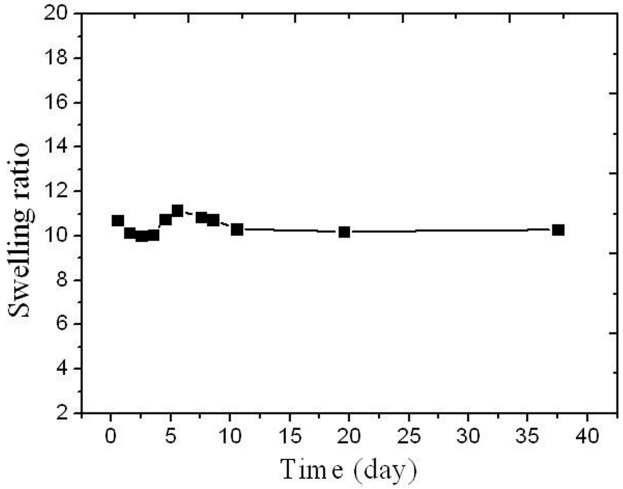

Fig. S5 Swelling ratio of oxDex-4-CHI (1:1) gel in buffer solution (pH=5.6) without enzymes

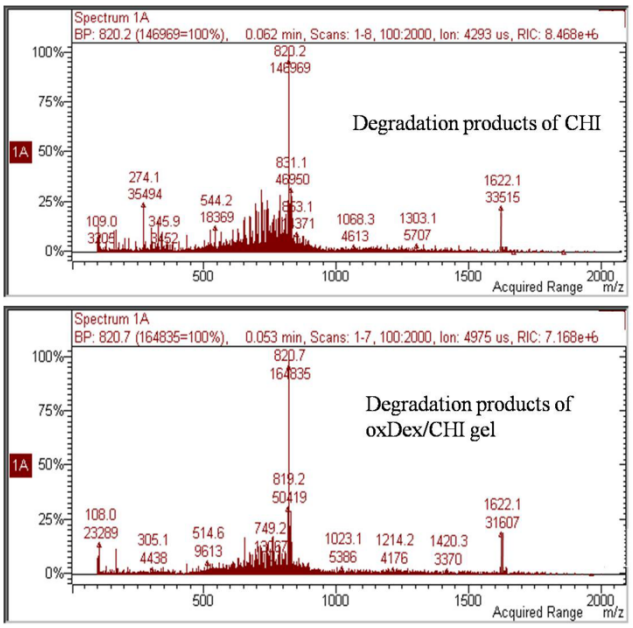

Fig. S6 Mass spectrum of the degradation products of CHI and oxDex-4-CHI (1:1) gel

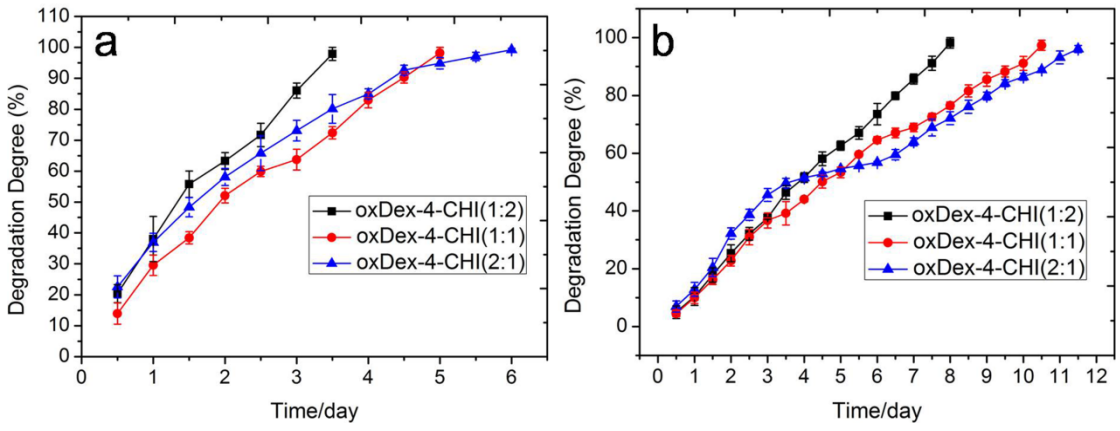

Fig. S7 Degradation rates of oxDex-CHI gels with different constitutions under different enzyme concentrations: a) 2.0 mg/mL, b) 1.0 mg/mL.