Supporting information:

Preparation of Heat-Induced Artificial Collagen Gels Based on Collagen-Mimetic Dendrimers

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Experimental Procedure

Synthesis of POGn-modified Dendrimers (POGn-den)

The detailed synthetic method was described in our previous report [1,2]. Acetylated POG5 and POG10 (Ac-POG5 and Ac-POG10) were synthesized by reacting POG5 or POG10 with acetic anhydride in an alkali aqueous solution at 4°C. After dialysis and subsequent lyophilization, a white solid was obtained. Ac-POG5: Yield, 96%. 1H NMR: δ 1.96 (br, Hβ and Hγ of Pro), 2.06 (br, Hβ of Hyp and Hγ of Pro), 2.13 (s, Ac), 2.35 (br, Hβ of Pro and Hyp), 2.54 (br, Hβ of Hyp), 3.65 (m, Hδ of Pro), 3.83 (m, Hδ of Hyp), 3.96 (m, Hδ of Hyp and Hα of Gly), 4.26 (m, Hα of Gly), 4.63 (m, Hα of Pro and Hα and Hγ of Hyp); Ac-POG10: Yield, ~100%. 1H NMR: δ 1.94 (br, Ac and Hβ and Hγ of Pro and Hβ of Hyp), 2.09 (br, Ac), 2.18 (br, Hβ of Hyp), 2.32 (br, Hβ of Pro), 3.21 (br, Hδ of Pro), 3.51 (br, Hδ of Pro), 3.73 (br, Hδ of Hyp and Hα of Gly), 3.86 (br, Hδ of Hyp and Hα of Gly), 4.63 (m, Hα of Pro and Hα and Hγ of Hyp), 7.90 (br, NH of Gly) [3].

PAMAM dendrimer (G4) was reacted with Ac-POG5 or Ac-POG10 using 4-(4,6-Dimethoxy-1,3,5-triazin-2-yl)-4-methylmorpholinium chloride (DMT-MM) in an alkali solution (pH 9-10) at room temperature. After stirring the reaction mixture for 3-4 days, the POG5-den reaction solution was dialyzed (pore size: 2 kDa). In the case of POG10-den, the crude compounds were purified by a Sephadex LH-20 column (GE Healthcare Technologies, Uppsala, Sweden) eluted with water and then dialyzed. After lyophilization, a white solid was obtained. Yield, 57% (POG5-G4); 93% (POG10-G4).
Characterization

$^1$H NMR analysis was performed using a JEOL JNM-LA400 instrument (JEOL, Japan). The fluorescamine analysis was performed according to our previous reports [1,2,4,5]. The HPLC system was equipped with a column, Cosmosil 5C18-MS-II (Nacalai Tesque, Inc., Japan) and a UV detector (210 nm; UV-2075Plus, Jasco Inc., Japan). 3 μl samples (2 mg/ml) were injected and eluted with 2% phosphoric acid (A) and methanol (B) at 1.0 ml/min by PU-2089Plus (Jasco Inc.). The eluent was linearly increased from 5% (A) to 80% (A) after 30 min.

(References)


Figure S1. HPLC chromatograms of Ac-POG10 (a) and POG10-den (b).

Figure S2. POG10-based hydrogel after the incubation at 80°C for 1 h.