Electronic Supplementary Material (ESI) for Soft Matter.

Poly(vinyl alcohol)-induced Thixotropy of a L-Carnosine-Based Cytocompatible, Tripeptidic Hydrogel

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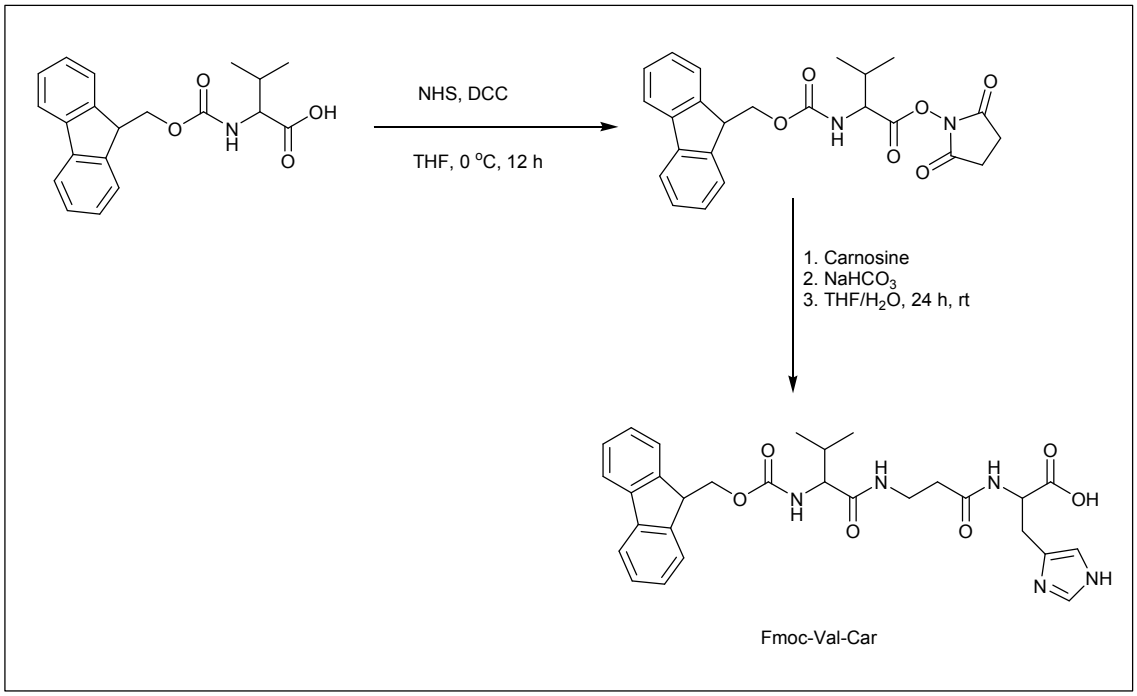
Synthesis of Tripeptide

Fmoc-L-Valine (0.5 g, 1 eq.) was treated with N-hydroxysuccinimide (NHS) (1.1 eq., 0.115 g) in dry THF (8 mL) under a N_2 atmosphere. Then, a solution of 1,3-dicyclohexylcarbodiimide (DCC) (1.5 eq., 0.282 g) in dry THF (2 mL) was added drop wise at 0-5 ^oC to produce the corresponding NHS-ester. The reaction mixture was stirred at room temperature for 12 h. Upon completion of the reaction, a white precipitate (dicyclohexyl urea, DCU), a biproduct, was filtered off and the filtrate was reduced to ca. one-fourth of its initial volume. The THF solution of NHS-ester of the Fmoc-protected amino acid was added slowly to a cold (0-5 ^oC) aqueous solution (1 mL) of L-carnosine (1 eq., 0.206 g) containing $NaHCO_3$ (2.2 eq., 0.213 g). The ratio of water to THF was maintained at 1:9. The reaction mixture was stirred for 24 h at room temperature and the THF part was evaporated leaving a white precipitate in the aqueous medium. The precipitate was filtered off and the filtrate was diluted with distilled water and acidified with 1 N HCl to obtain a white precipitate of the tripeptide. The precipitate was collected by filtration

and air dried. The product was purified by column chromatography using silica gel (60-120 mesh) and an 8:2 (v/v) dichloromethane-methanol mixture as eluent. The purified product was characterized by FT-IR, NMR and high resolution mass spectrometry (HRMS).



Scheme S1 Scheme for the synthesis of Fmoc-Val-Car tripeptide.

Chemical Identification:

Fmoc-Val-Car: White solid(75 % yield), mp 156-158 ^{o}C, **FTIR** (KBr, cm^{-1}): 3424 (-OH stretching), 3294 (N-H stretching), 1684 (-C=O of –COOH), 1652 (-C=O of amide), 1541 (N-H bending). ESI MS: Calculated mass $[M+H]^+$ m/z 548.2509, obtained mass $[M+H]^+$ m/z 596.2498, ***^{1}H NMR*** (DMSO-d_6, δ ppm): 8.142-8.129 (1H, d, 7.8 Hz), 8.019-8.005 (1H, t, 4.2 Hz), 7.902-7.889 (2H, d, 7.8 Hz), 7.764-7.738 (2H, t, 7.8 Hz), 7.558 (1H, s), 7.432-7.333 (3H, m), 7.329-7.309 (2H, m), 6.796 (1H, s), 4.402-4.393 (1H, t), 4.280-4.259 (2H, t), 4.227-4.206 (1H, m), 3.782-3.755 (1H, t), 3.191-3.169 (2H, t), 2.916-2.908 (2H, d), 2.837-2.813 (2H, t), 2.293-2.257 (1H, m), 0.848-0.823 (6H, t).

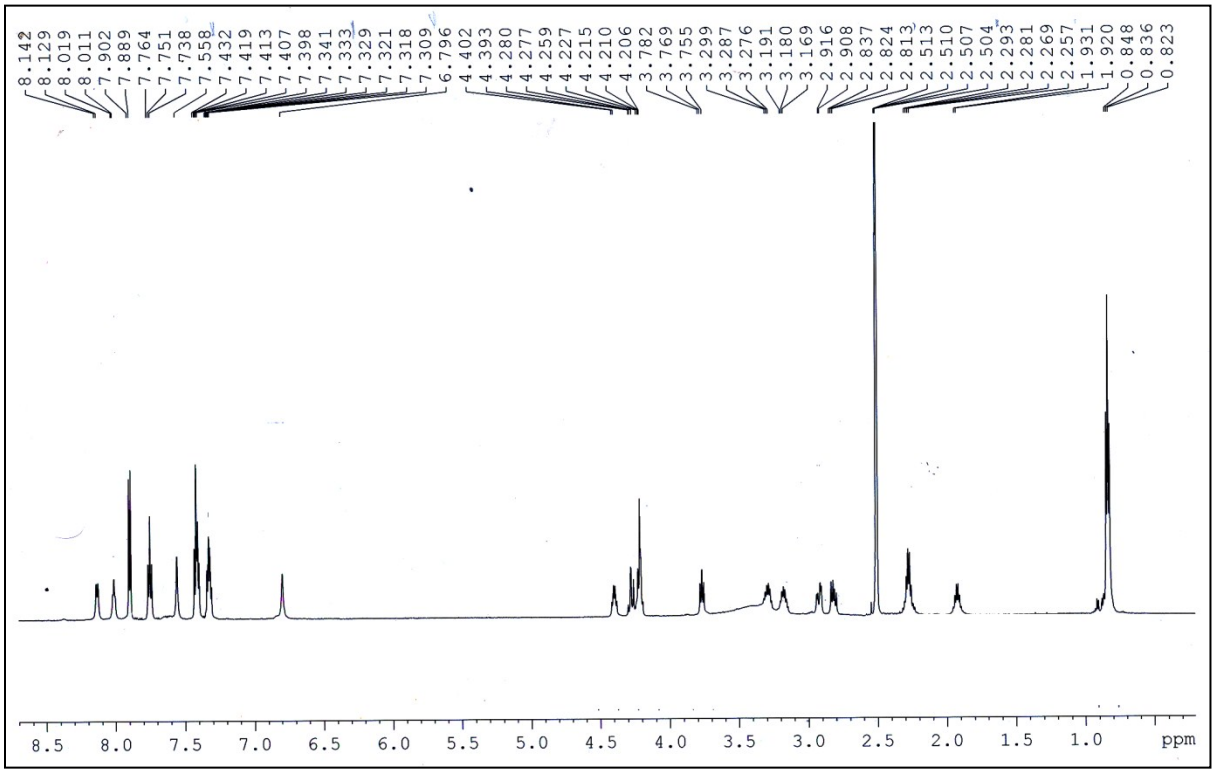


Fig. S1 ^{1}H-NMR spectrum of Fmoc-Val-Car (600 MHz) in DMSO-d_6 solvent.

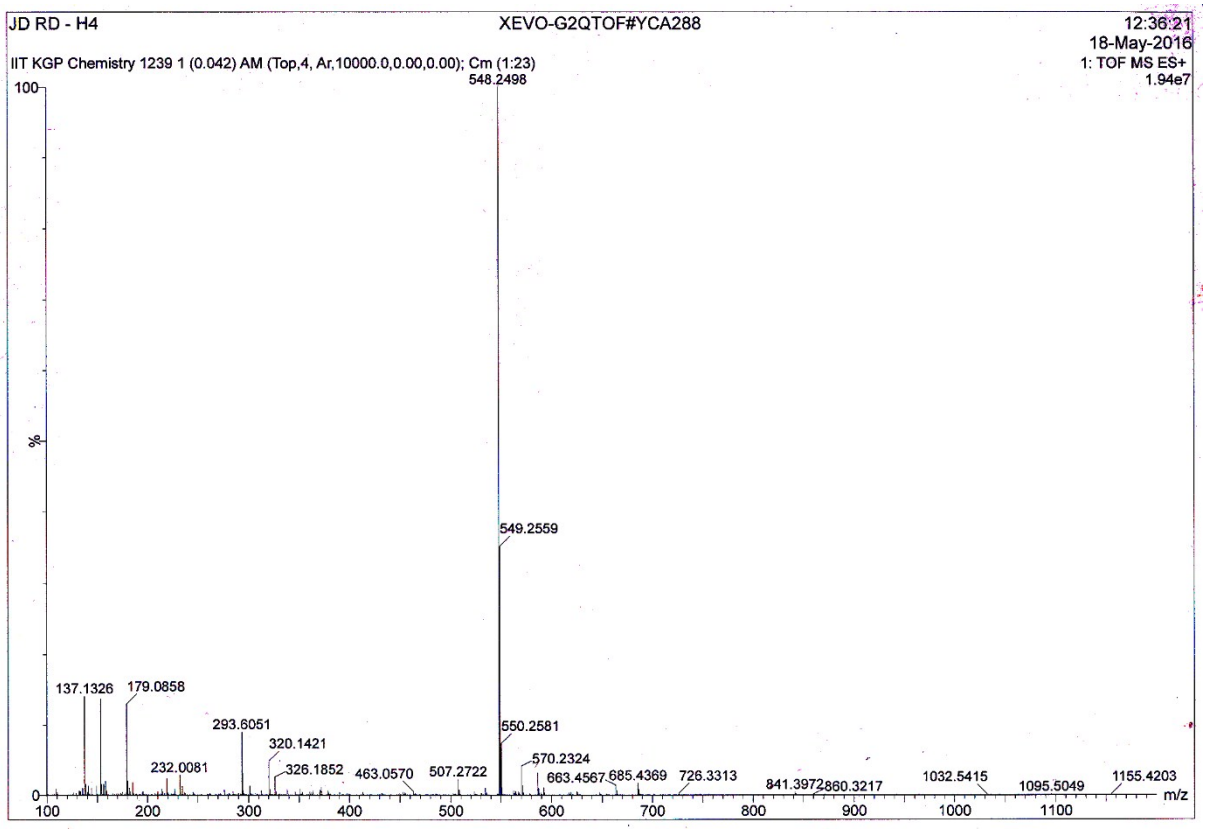


Fig. S2 HRMS spectrum of Fmoc-Val-Car.

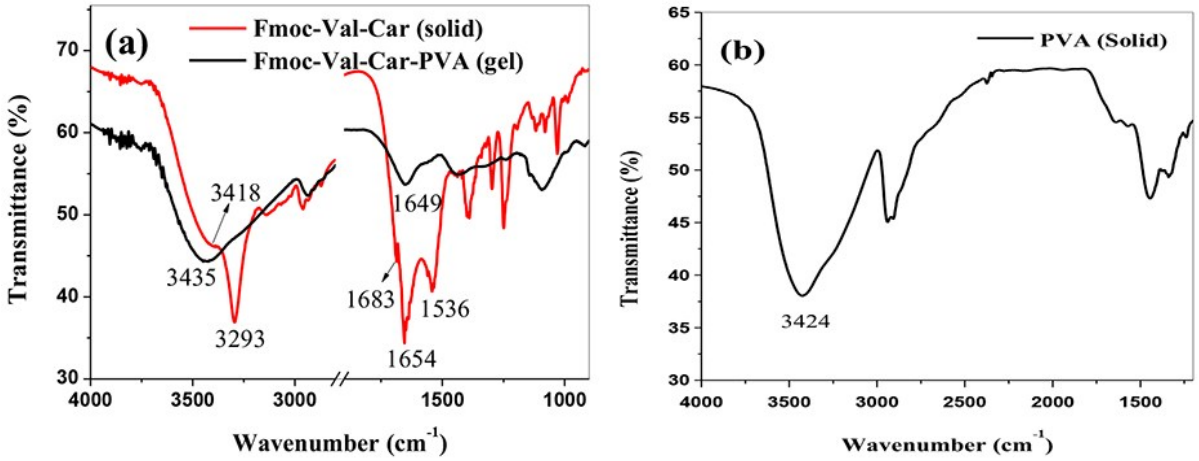


Fig. S3 FTIR spectra of (a) Fmoc-Val-Car in solid state and Fmoc-Val-Car/PVA (1 %) in the xerogel state, and (b) PVA in solid state.

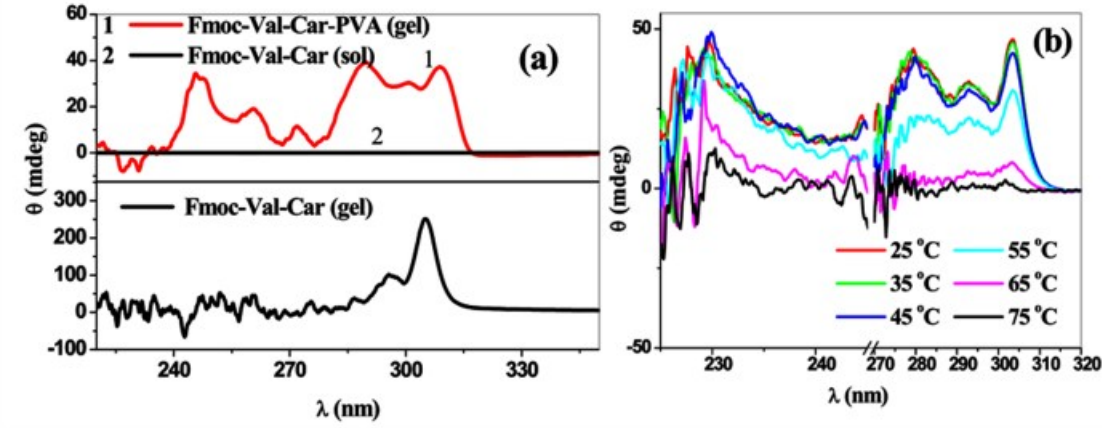


Fig. S4 CD spectra of Fmoc-Val-Car in buffer at pH 7.4: (a) top: 10^{-4} M in solution and in gel state in the presence of 1% w/v PVA; bottom: gel in the absence of PVA, and (b) CD spectra of the Fmoc-Val-Car/PVA gel containing 1% PVA at different temperatures. The hydrogels were prepared at their respective CGC values [Fmoc-Val-Car] = 3.7 mg/mL. The path length of the cell was 1 mm.