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Supporting Information

Photophysical study of a π-stacked β-sheet nanofibril forming peptide bolaamphiphile hydrogel

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1. Non-linear least squares (NLLS) fitting decay parameters of time resolved fluorescence spectroscopy

Table S1. Decay parameters for hydrogel **1** at different concentration.

Hydrogel at different concentration	α_1	α_2	α_3	τ_1 (ns)	τ_2 (ns)	τ_3 (ns)	τ_a (ns)	χ 2
2 mmol L^{-1} (Solution)	0.16	0.04	0.80	0.68	3.15	1.05	0.32	1.00
10 mmol L^{-1}	0.28	0.10	0.62	1.19	4.76	0.24	0.94	1.07
15 mmol L^{-1}	0.39	0.17	0.44	1.25	4.19	0.32	1.35	1.12
25 mmol L^{-1}	0.20	0.14	0.66	0.96	3.60	0.08	0.75	1.18

τ_a The amplitude weighted average lifetime, Normalized amplitude of each component is given by α

Table S2. Decay parameters for hydrogel **1 (**10 mmol L^{-1}) at different time.

Hydrogel at different time	α_1	α_2	α_3	τ_1 (ns)	τ_2 (ns)	τ_3 (ns)	τ_a (ns)	χ 2
8 hours	0.27	0.09	0.64	1.12	4.60	0.22	0.87	1.03
1 day	0.31	0.10	0.58	1.14	4.60	0.22	0.97	1.09
2 days	0.31	0.11	0.58	1.26	4.74	0.26	1.05	1.07
4 days	0.31	0.10	0.59	1.39	5.39	0.26	1.12	1.09

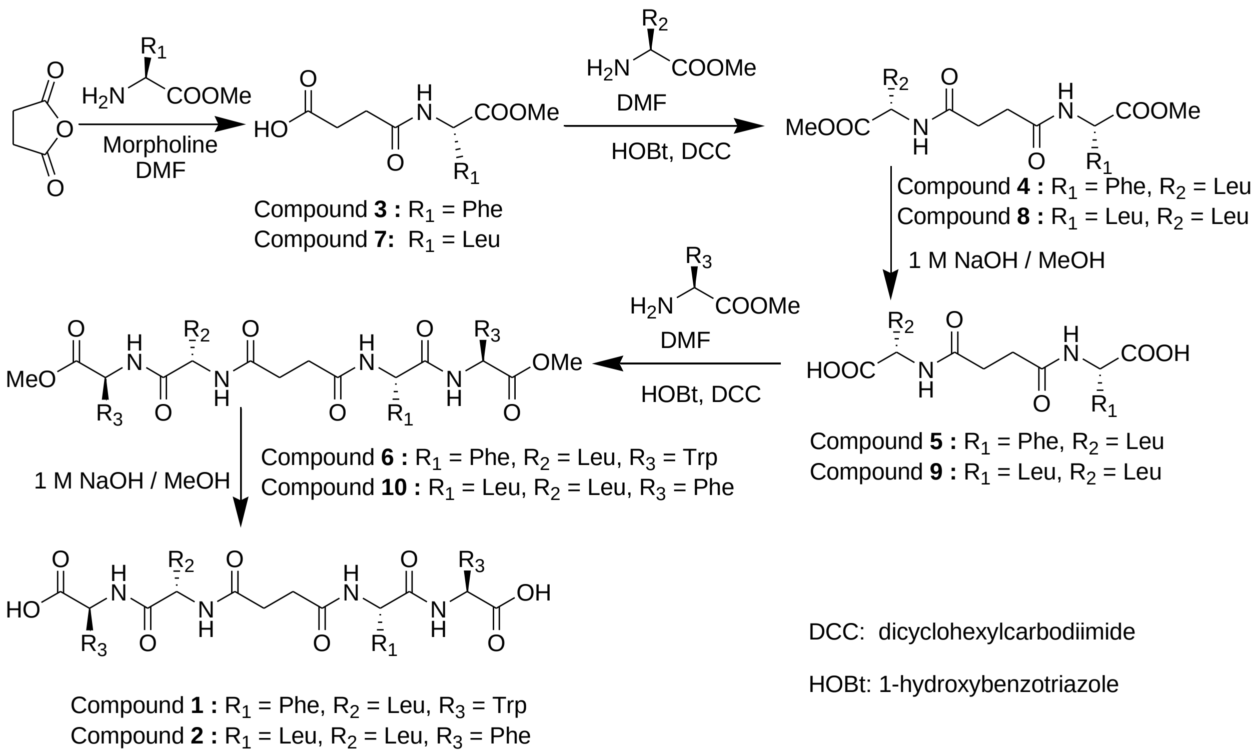
τ_a The amplitude weighted average lifetime, Normalized amplitude of each component is given by α

Table S3. Decay parameters for hydrogel **1** (10 mmol L^{-1}) at different temperature.

Hydrogel at different temperature	α_1	α_2	α_3	τ_1 (ns)	τ_2 (ns)	τ_3 (ns)	τ_a (ns)	$\chi 2$
15°C	0.35	0.19	0.46	1.26	4.04	0.22	1.30	1.10
30°C	0.36	0.16	0.48	1.27	4.11	0.22	1.23	1.10
40°C	0.33	0.14	0.53	1.25	3.93	0.21	1.06	1.06
50°C	0.30	0.15	0.55	0.93	3.13	0.17	0.84	1.11
60°C	0.29	0.10	0.61	0.99	3.28	0.17	0.73	1.09
70°C	0.30	0.09	0.61	0.93	3.08	0.16	0.66	1.19
80°C	0.10	0.03	0.87	0.83	4.00	0.12	0.31	1.17

τ_a The amplitude weighted average lifetime, Normalized amplitude of each component is given by α

2. Synthetic Scheme



ESI Fig. 1. The synthetic scheme to synthesis peptide bolaamphiphile molecules.

3. Synthesis of Precursors

HO-Suc-Phe(1)-OMe 3

0.75 g (7.5 mmol) succinic anhydride in 4 mL of DMF was cooled in an ice-water bath and H-Phe-OMe was isolated from 1.62 g (7.5 mmol) of the corresponding methyl ester hydrochloride by neutralization and subsequent extraction by ethyl acetate and the ethyl acetate extract was concentrated to 8 mL. It was then added to the reaction mixture, followed immediately by 0.76 g (7.5 mmol, 825 µL) of *N*-methyl morpholine. The reaction mixture was stirred for overnight. 50 mL ethyl acetate was added to the reaction mixture and the organic layer was washed with 1 M HCl (3 X 50 mL). The ethyl acetate part was dried over anhydrous Na_2SO_4 and was filtered. It was evaporated in vacuo to yield **3** as sticky compound. Purification was done by silica gel column (100-200 mesh) using chloroform-methanol as eluent.

Yield: 1.78 g (6.38 mmol, 85 %); FT-IR (KBr): γ = 3307 (s), 3085(m), 1731 (m), 1652 (s), 1540 (s) cm^{-1} ; ^1H NMR (300 MHz, DMSO-d_6, δ_{ppm}): 8.32 (d, *J* = 7.5 Hz, 1H, NH of Phe(1)), 7.15 - 7.26 (m, 5Hs, aromatic ring protons of Phe(1)), 4.43 - 4.36 (m, 1H, C^α H of Phe(1)), 3.62 (s, 3H, $COOC\underline{H}_3$), 2.99 (d, *J* = 5.7 Hz, 2H, C^β Hs of Phe(1)), 2.46 - 2.36 (m, 4H, -$C\underline{H}_2$- of Suc); $[\alpha]_D^{20}$ = +11.47 (*c* = 1 in CH_3OH); MS(ESI) (*m/z*): 279.0 $[M]^+$, 278.0 $[M - H]^+$, M_{calcd} = 279.

MeO-Leu(2)-Suc-Phe(1)-OMe 4

1.6 g (6 mmol) of HO-Suc-Phe(1)-OMe **3** in 5 mL of DMF was cooled in an ice-water bath and H-Leu-OMe was isolated from 2.15 g (12 mmol) of the corresponding methyl ester hydrochloride by neutralization and subsequent extraction with ethyl acetate and the ethyl acetate extract was concentrated to 8 mL. It was then added to the reaction mixture, followed immediately by 1.36 g (6.6 mmol) DCC and 0.91 g (6.6 mmol) of HOBt. The reaction mixture was stirred for overnight. The residue was taken up in ethyl acetate (50 mL) and the DCU was filtered off. The organic layer was washed with 1 M HCl (3 × 50 mL), brine (2 × 50 mL), 1 M sodium carbonate (3 × 50 mL), brine (2 × 50 mL), dried over anhydrous sodium sulfate and evaporated in vacuo to yield **4** as a white solid. Purification was done by silica gel column (100-200 mesh) using chloroform-methanol as eluent.

Yield: 2.29 g (5.64 mmol, 94 %); FTIR (KBr): γ = 3328 (s), 3071 (m), 1736 (m), 1639 (s), 1546 (s), 1528 (s) cm^{-1}; ^1H NMR (300 MHz, DMSO-d_6, δ_{ppm}): 8.29 (d, *J* = 6.9 Hz, 1H, NH of Leu(2)), 8.14 (d, *J* = 7.5 Hz, 1H, NH of Phe(1)), 7.23 - 7.14 (m, 5H, ring protons of Phe(1)), 4.39 - 4.37 (m, 1H, C^αH of Phe(1)), 4.21 - 4.19 (m, 1H, C^αH of Leu(2)), 3.55 and 3.53 (s, 6H, -$COOC\underline{H}_3$), 2.98 (d, *J* = 5.7 Hz, 2H, C^βHs of Phe(1)), 2.45 (m, 4H,-$C\underline{H}_2$- of Suc), 1.54 -1.51 and 1.47-1.39 (m, 2H, C^βHs of Leu(2) and 1H, C^γH of Leu(2)), 0.84 - 0.76 (d, *J* = 6.3 Hz, 6H, C^δHs of Leu(2)); $[\alpha]_D^{20}$ = -16.44 (*c* = 0.5 in CH_3OH); MS(ESI) (*m/z*): 406.0 $[M]^+$, 405.0 $[M - H]^+$, M_{calcd} = 406.

HO-Leu(2)-Suc-Phe(1)-OH 5

2.03 g (5 mmol) of MeO-Leu(2)-Suc-Phe(1)-OMe **4** in 10 mL MeOH was taken in a round bottom flask and 2 M NaOH was added dropwise. The reaction was monitored by thin layer chromatography (TLC). The reaction mixture was stirred for overnight. 15 mL of distilled water was added to the reaction mixture and MeOH was removed under vacuo. The aqueous part was washed with diethyl ether (2 x 30 mL). Then it was cooled under ice water bath for 10 minute and then pH was adjusted to 1 by drop wise addition of 1 M HCl. It was extracted with ethyl acetate (3 x 50 mL) and then the ethyl acetate part was dried over anhydrous Na_2SO_4 and evaporated in vacuo to yield **5** as a white solid.

Yield: 1.82 g (4.8 mmol, 96 %); FTIR (KBr): γ = 3360 (s), 3031 (m), 1721 (m), 1614 (s), 1531 (s), 1513 (s) cm^{-1}. ^{1}H NMR (300 MHz, DMSO-$d_{6,}$ δ_{ppm}): 12.4 (s, 2H of –COO<u>H</u>), 8.15 (d, *J* =7.8 Hz,1H, NH of Leu(2)), 8.00 (d, *J* = 7.8 Hz, 1H, NH of Phe(1)), 7.25 - 7.18 (m, 5H, ring protons of Phe(1)), 4.39 - 4.31 (m, 1H, C^{α}H of Phe(1)), 4.18 - 4.10 (m, 1H, C^{α}H of Leu(2)), 3.02 (d, *J* = 5.1 Hz, 2H, C^{β}Hs of Phe(1)), 2.83 - 2.75 and 2.46 - 2.36 (m, 4H, -C<u>H</u>$_2$- of Suc), 1.79 and 1.59- 1.50 (m, 2H, C^{β}Hs of Leu(2), 1H, C^{γ}H of Leu(2)), 0.84 - 0.77 (d, *J* = 6.3 Hz, 6H, C^{δ}Hs of Leu(2)); $[\alpha]_D^{20}$ = +6 (*c* = 0.5 in CH_3OH); MS(ESI) (*m/z*): 378.1 $[M]^+$, 377.0 $[M - H]^+$, M_{calcd} = 378.1.

MeO-Trp(4)-Phe(3)-Suc-Leu(1)-Trp(2)-OMe 6

1.51 g (4 mmol) of HO-Phe(2)-Suc-Leu(1)-OH **5** in 3 mL of DMF was cooled in an ice–water bath and H-Trp-OMe was isolated from 4.06 g (16 mmol) of the corresponding methyl ester hydrochloride by neutralization and subsequent extraction with ethyl acetate and the ethyl acetate extract was concentrated to 8 mL. It was then added to the reaction mixture, followed immediately by 1.81 g (8.8 mmol) DCC and 1.18 g (8.8 mmol) of HOBt. The reaction mixture was stirred for overnight. The residue was taken up in ethyl acetate (50 mL) and the DCU was filtered off. The organic layer was washed with 1 M HCl (3 × 50 mL), brine (2 × 50 mL), 1 M sodium carbonate (3 × 50 mL), brine (2 × 50 mL), dried over anhydrous sodium sulfate and evaporated in vacuo to yield **6** as a white solid. Purification was done by silica gel column (100-200 mesh) using chloroform-methanol as eluent.

Yield: 2.64 g (3.4 mmol, 85 %); FT - IR (KBr): $\tilde{\upsilon}$ = 3330 (s), 1740 (s), 1649 (s), 1537 (s), 1438 (m) cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_{3,}$ δ_{ppm}): 8.77 (d, *J* = 12.8 Hz, 2H, ring -NH- of Trp(2) and Trp (4)), 7.55 (d, *J* = 8 Hz, 2H, ring protons of Trp(2) and Trp(4)), 7.45 (d, *J* = 6.0 Hz, 2H, ring protons of Phe(3)), 7.30 (d, *J* = 8 Hz, 1H, -NH- of Phe(3)), 7.26 (d, *J* = 8 Hz,1H, -NH- of Leu(1)), 7.15 (t, *J* = 7.6 Hz, 4H, ring protons of Phe(3)), 7.10 and 7.06 (d, *J* = 6.8 Hz, 2H, ring protons of Trp(2) and Trp(4)), 6.99 (t, *J* = 7.6 Hz, 4H, ring protons of Trp(2) and Trp(4)), 6.91 (d, *J* = 4.8 Hz, 2H, ring protons of Trp(2) and Trp(4)), 5.83 (d, *J* = 9.6 Hz, 1H, -NH- of Trp(2)), 5.69 (d, *J* = 9.2 Hz, 1H, -NH- of Trp(4)), 4.87 (m, 2H, C^{α} Hs Trp(2) and Trp(4)), 4.67 (m, 1H, C^{α} Hs Phe(3)), 4.50 (m, 1H, C^{α} Hs Leu(1)), 3.59 and 3.57 (s, 6H, -COOC<u>H</u>$_3$), 3.34 and 3.12 (d, *J* = 4.4 Hz, *J* = 5.6 Hz, 4H, C^{β} Hs of Trp(2) and Trp(4)), 3.08 and 2.97 (d, *J* = 7.6 Hz, and *J* = 6 Hz, 2H, C^{β} Hs of Phe(3)), 2.43 and 2.31 (m, 4H, -C<u>H</u>$_2$- of Suc), 1.49 (m, 2H, C^{β} Hs of Leu(1)), 1.38

(m, 1H, C^{γ} H of Leu(1)), 0.78 (d, *J* = 6.4 Hz, 6H, C^{δ} Hs of Leu(1)); $[\alpha]_D^{20}$ = -30.96 (*c* = 0.31 in CH_3OH); HRMS (ESI, *m/z*) : 801.3512 $[M + Na]^+$, M_{Calcd} for $C_{43}H_{50}N_6O_8Na$ = 801.3588.

HO-Trp(4)-Phe(3)-Suc-Leu(1)-Trp(2)-OH 1

1.94 g (2.5 mmol) of MeO-Trp(4)-Phe(3)-Suc-Leu(1)-Trp(2)-OMe **6** in 10 mL MeOH was taken in a round bottom flask and 2M NaOH was added to it dropwise. The reaction was monitored by thin layer chromatography (TLC). The reaction mixture was stirred for overnight. 15 mL of distilled water was added to the reaction mixture and MeOH was removed under vacuo. The aqueous part was washed with diethyl ether (2 x 30 mL). Then it was cooled under ice water bath for 10 minute and then pH was adjusted to 1 by drop wise addition of 1M HCl. It was extracted by ethyl acetate (3 x 50 mL) and then the ethyl acetate part was dried over anhydrous Na_2SO_4 and evaporated in vacuo to yield **1** as a white solid.

Yield: 1.72 g (2.3 mmol, 92%); FT - IR (KBr): $\tilde{\upsilon}$ = 3394 (s), 3305 (m), 1717 (m), 1637 (s), 1526 (m), 1455 (s) cm^{-1}; ^1H NMR (400 MHz, DMSO-d_6, δ_{ppm}): 12.59 (s, 2H, -COO$\underline{H}$), 10.90 (d, *J* = 6.4 Hz, 2H, ring -NH- of Trp(2) and Trp (4)), 8.29 (d, *J* = 7.6 Hz, 1H, -NH- of Phe(3)), 8.12 and 8.08 (d, *J* = 7.6 Hz, 2H, -NH- of Trp(2) and Trp(4)), 7.98 (d, *J* = 8 Hz,1H, -NH- of Leu(1)), 7.60 (t, *J* = 8.4 Hz, 2H, ring protons of Phe(3)), 7.40 (d, *J* = 4 Hz, 2H, ring protons of Trp(2) and Trp(4)), 7.28 (d, *J* = 3.6 Hz, 2H, ring protons of Trp(2) and Trp(4)),7.22 (d, *J* = 2.0 Hz, 3H, ring protons of Phe(3)), 7.12 and 7.04 (m, 4H, ring protons of Trp(2) and Trp(4)), 4.61 (m, 1H, C^{α} Hs Phe(3)), 4.54 – 4.49 (m, 2H, C^{α} Hs Trp(2) and Trp(4)), 4.38 (m, 1H, C^{α} Hs Leu(1)), 3.24 and 3.14 (d, *J* = 4.8 Hz and *J* = 7.2 Hz, 4H, C^{β} Hs of Trp(2) and Trp(4)), 3.05 and 2.76 (d, *J* = 4 Hz, 2H, C^{β} Hs of Phe(3)), 2.56 (m, 4H, -C$\underline{H}_2$- of Suc), 1.61(m, 1H, C^{γ} H of Leu(1)), 1.45 (m, 2H, C^{β} Hs of Leu(1)), 0.91 and 0.87 (d, *J* = 6.4 Hz and *J* = 6.8 Hz, 6H, C^{δ} Hs of Leu(1)); ^{13}C NMR (100 MHz, DMSO-d_6, δ_{ppm}): 173.13, 172.11, 171.97, 171.25, 137.91, 136.02, 129.14, 127.90, 127.16, 126.12, 123.63, 120.57, 118.31, 118.10, 111.32, 109.65, 59.71, 53.59, 52.80, 50.70, 37.44, 30.75, 26.92, 24.06, 23.01, 21.57; $[\alpha]_D^{20}$ = -27.55 (*c* = 0.5 in CH_3OH); HRMS (ESI, *m/z*): 773.3226 $[M + Na]^+$, M_{Calcd} for $C_{41}H_{46}N_6O_8Na$ = 773.3275.

HO- Suc-Leu(1)-OMe 7

1.51 g (15 mmol) succinic anhydride in 6 mL of DMF was cooled in an ice-water bath and H-Leu-OMe was isolated from 2.71 g (15 mmol) of the corresponding methyl ester hydrochloride by neutralization and subsequent extraction by ethyl acetate and the ethyl acetate extract was concentrated to 8 mL. It was then added to the reaction mixture, followed immediately by 1.52 g (15 mmol, 1 ml 650 µL) *N*-methyl morpholine. The reaction mixture was stirred for overnight. 50 mL ethyl acetate was added to the reaction mixture and the organic layer was washed with 1M HCl (3 X 50 mL.). The ethyl acetate part was dried over anhydrous Na_2SO_4 and was filtered. It was evaporated in vacuo to yield **7** as sticky compound. Purification was done by silica gel column (100-200 mesh) using chloroform-methanol as eluent.

Yield: 3.12 g (12.73 mmol, ~85 %); FTIR (KBr): $\tilde{\upsilon}$ = 3232 (s), 3059 (m), 1731 (m), 1648 (s), 1558 (s), 1524 (s) cm^{-1}; ^1H NMR (300 MHz, DMSO-d_6, δ_{ppm}): 8.16 (d, *J* = 7.5 Hz, 1H of NH of Leu(1)), 4.26 - 4.21 (m, 1H, C^{α}H of Leu(1)), 3.52 (s, 3H, COOC$\underline{H}_3$), 2.46 - 2.36 (m, 4H, -C$\underline{H}_2$-

of Suc), 1.59 - 1.50 and 1.48 - 1.40 (m, 2H, C^{β}Hs of Leu(1), 1H, C^{γ}H of Leu(1)), 0.85 - 0.82 (d, *J* = 6.6 Hz, 6H, C^{δ}Hs of Leu(1)); $[\alpha]_D^{20}$ = - 6.08 (*c* = 1 in CH_3OH); MS(ESI) (*m/z*): 244.0 [*M* - H]$^+$, M_{calcd} = 245.

MeO-Leu(2)-Suc-Leu(1)-OMe 8

2.74 g (11.25 mmol) of HO-Suc-Leu(1)-OMe **7** in 6 mL of DMF was cooled in an ice-water bath and H-Leu-OMe was isolated from 4.08 g (22.50 mmol) of the corresponding methyl ester hydrochloride by neutralization and subsequent extraction with ethyl acetate and the ethyl acetate extract was concentrated to 8 mL. It was then added to the reaction mixture, followed immediately by 2.55 g (12.37 mmol) DCC and 1.66 g (12.37 mmol) of HOBt. The reaction mixture was stirred for overnight. The residue was taken up in ethyl acetate (50 mL) and the DCU was filtered off. The organic layer was washed with 1 M HCl (3 × 50 mL), brine (2 × 50 mL), 1 M sodium carbonate (3 × 50 mL), brine (2 × 50 mL), dried over anhydrous sodium sulfate and evaporated in vacuo to yield **8** as a white solid. Purification was done by silica gel column (100-200 mesh) using chloroform-methanol as eluent.

Yield: 3.76 g (10.12 mmol, 90 %); FT-IR (KBr): ῡ = 3252, 3076 (s), 1745 (m), 1644 (m), 1548 (s) cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$, δ_{ppm}): 6.62 (d, *J* = 8.0 Hz, 2H, NH of Leu(1) and Leu(2)), 4.61 - 4.56 (m, 2H, C^{α}H of Leu(1) and Leu(2)), 3.74 (s, 6H, COOC$\underline{H}_3$), 2.62 - 2.52 (m, 4H, -C$\underline{H}_2$- of Suc), 1.69 - 1.64 and 1.62 - 1.58 (m, 4H, C^{β}Hs of Leu(1) and Leu(2), 2H, C^{γ}Hs of Leu(1) and Leu(2)), 0.96 (d, *J* = 6.4 Hz, 12H, C^{δ}Hs of Leu(1) and Leu(2)); $[\alpha]_D^{20}$ = -35.1 (*c* = 1 in CH_3OH); HRMS (ESI, *m/z*): [*M* + Na]$^+$ Calcd for $C_{18}H_{32}N_2O_6Na$ = 395.2158; found 395.2180.

HO-Leu(2)-Suc-Leu(1)-OH 9

3.34 g (9 mmol) of MeO-Leu(2)-Suc-Leu(1)-OMe **8** in 10 mL MeOH was taken in a round bottom flask and 2 M NaOH was added to it dropwise. The reaction was monitored by thin layer chromatography(TLC). The reaction mixture was stirred for overnight. 15 mL of distilled water was added to the reaction mixture and MeOH was removed under vacuo. The aqueous part was washed with diethyl ether (2 x 30 mL). Then it was cooled under ice-water bath for 10 minute and then pH was adjusted to 1 by drop wise addition of 1M HCl. It was extracted with ethyl acetate (3 x 50 mL) and then the ethyl acetate part was dried over anhydrous Na_2SO_4 and evaporated in vacuo to yield **9** as a white solid.

Yield: 2.94 g (8.55 mmol, 95 %); FT - IR (KBr): ῡ = 3338 (s), 1706 (ms), 16173(s), 1568 (s), 1530 (w) cm^{-1}; ^{1}H NMR (400 MHz, DMSO-d_6, δ_{ppm}): 12.46 (s, 2H, -COO$\underline{H}$), 8.10 (d, *J* = 7.6 Hz, 2H, NH of Leu(1) and Leu(2)), 4.22 - 4.17 (m, 2H, C^{α}H of Leu(1) and Leu(2)), 2.40 - 2.30 (m, 4H, -C$\underline{H}_2$- of Suc), 1.62 - 1.60 and 1.50 - 1.49 (m, 4H, C^{β}Hs of Leu(1) and Leu(2), 2H, C^{γ}Hs of Leu(1) and Leu(2)), 0.89 and 0.84 (d, *J* = 6.4 Hz, 12H, C^{δ}Hs of Leu(1) and Leu(2)); $[\alpha]_D^{20}$ = -27.8 (*c* = 0.5 in CH_3OH); HRMS (ESI, *m/z*): [*M* + Na]$^+$ Calcd for $C_{16}H_{28}N_2O_6Na$ = 367.1845; found 367.1835.

MeO-Phe(4)-Leu(3)-Suc-Leu(1)-Phe(2)-OMe 10

1.72 g (5 mmol) of HO-Leu(2)-Suc-Leu(1)-OH **9** in 6 mL of DMF was cooled in an ice-water bath and H-Phe-OMe was isolated from 4.31 g (20 mmol) of the corresponding methyl ester hydrochloride by neutralization and subsequent extraction with ethyl acetate and the ethyl acetate extract was concentrated to 8 mL. It was then added to the reaction mixture, followed immediately by 2.26 g (11 mmol) DCC and 1.48 g (11 mmol) of HOBt. The reaction mixture was stirred for overnight. The residue was taken up in ethyl acetate (50 mL) and the DCU was filtered off. The organic layer was washed with 1 M HCl (3 × 50 mL), brine (2 × 50 mL), 1 M sodium carbonate (3 × 50 mL), brine (2 × 50 mL), dried over anhydrous sodium sulfate and evaporated in vacuo to yield **10** as a white solid. Purification was done by silica gel column (100–200 mesh) using chloroform–methanol as eluent to get white solid as product.

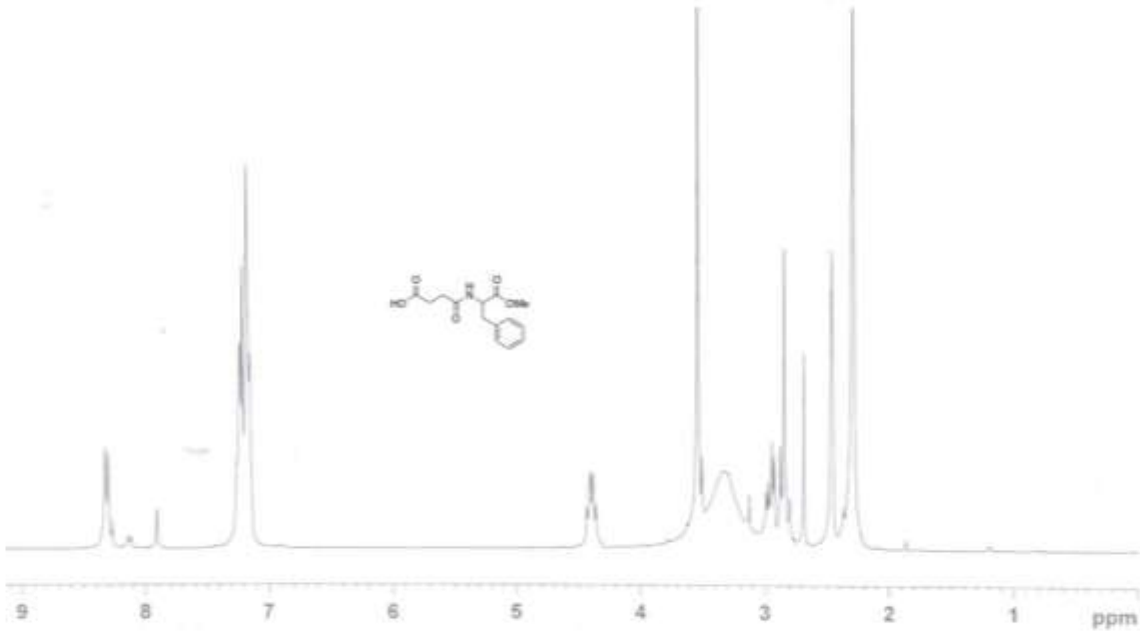
Yield: 2.66 g (4 mmol, 80 %); ^{1}H NMR (400 MHz, $CDCl_3$, δ_{ppm}): 7.28 and 7.16 (m, 10 H, ring protons of Phe (2) and Phe (4)), 6.97 (d, J = 8.0 Hz, 2H, -NH of Leu(1) and Leu(3)), 6.43 (d, J = 7.6 Hz, 2H, -NH of Phe (2) and Phe (4)), 4.88 (m, 2H, C^{α}Hs of Phe (2) and Phe (4)), 4.42 (m, 2H , C^{α}Hs of Leu (1) and Leu(3)), 3.67 (s, 6H, -COOC$\underline{H}_3$), 3.13 and 3.07 (d, J = 5.6 Hz, J = 6.8 Hz, 4H , C^{β}Hs of Phe (1) and Phe (4)), 2.48 (m, 4H, -C$\underline{H}_2$- of Suc), 1.59 and 1.39 (m, 4H, C^{β}Hs of Leu(1) and Leu(3), 2H, C^{γ}Hs of Leu(1) and Leu(3)); 0.90 and 0.87 (d, J = 5.2 Hz, J = 5.6 Hz, 12H, C^{δ}Hs of Leu (1) and Leu(3)); ^{13}C NMR (100MHz , $CDCl_3$, δ_{ppm}): 172.34, 172.21, 172.13, 156.90, 135.99, 129.37, 128.52, 127.06, 53.21,52.33, 52.25, 42.19, 40.65, 37.91, 31.79, 23.49, 22.85, 21.88; $[\alpha]_D^{20}$ = -26.8 (c = 0.3 in CH_3OH); HRMS (ESI, m/z): $[M + Na]^+$ Calcd for $C_{36}H_{50}N_4O_8Na$, 689.3526; found 689.3293.

HO-Phe(4)-Leu(3)-Suc-Leu(1)-Phe(2)-OH 2

2.33 g (3.5 mmol) of MeO-Phe(4)-Leu(3)-Suc-Leu(2)-Phe(1)-OMe **10** in 50 mL MeOH was taken in a round bottom flask and 2 M NaOH was added to it dropwise. The reaction was monitored by thin layer chromatography (TLC). The reaction mixture was stirred for overnight. 15 mL of distilled water was added to the reaction mixture and MeOH was removed under vacuo. The aqueous part was washed with diethyl ether (2 x 30 mL). Then it was cooled under ice-water bath for 10 minute and then pH was adjusted to 1 by drop wise addition of 1M HCl. It was extracted with ethyl acetate (3 x 50 mL) and then the ethyl acetate part was dried over anhydrous Na_2SO_4 and evaporated in vacuo to yield **2** as a white solid.

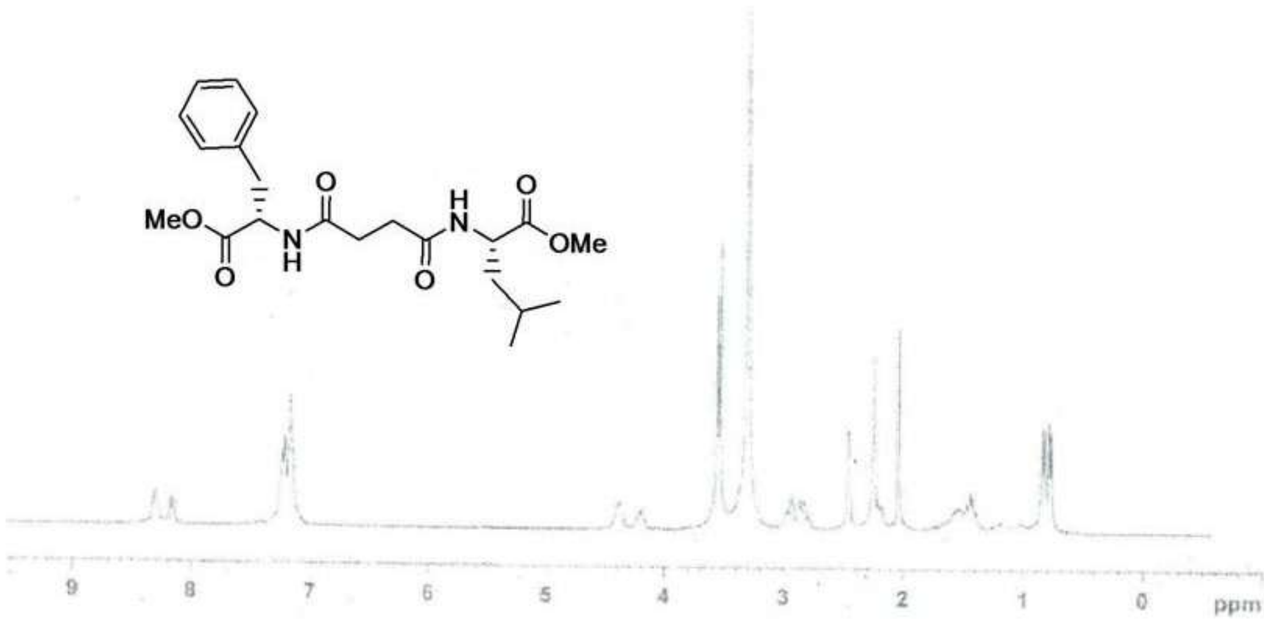
Yield: 2.05 g (3.22 mmol, 92%); ^{1}H NMR (400 MHz, DMSO-d_6, δ_{ppm}): 8.08 (d, J = 7.6 Hz, 2H, -NH of Leu(1) and Leu(3)), 7.99 (d, J = 7.6 Hz, 2H, -NH of Phe (2) and Phe (4)), 7.31 - 7.27 (m, 10 H, ring protons of Phe (2) and Phe (4)), 4.43 (m, 2H, C^{α}Hs of Phe (2) and Phe (4)), 4.34 (m, 2H , C^{α}Hs of Leu (1) and Leu(3)), 3.08 and 2.99 (d, J = 4.4 Hz, 4H , C^{β}Hs of Phe (1) and Phe (4)), 2.36 (m, 4H, -C$\underline{H}_2$- of Suc), 1.60 and 1.43 (m, 2H, C^{γ}Hs of Leu(1) and Leu(3), 4H, C^{β}Hs of Leu(1) and Leu(3)); 0.92 and 0.87 (d, J = 6.4 Hz, J = 6.4 Hz, 12H, C^{δ}Hs of Leu (1) and Leu(3)); ^{13}C NMR (100MHz , DMSO-d_6 , δ_{ppm}): 172.79 , 171.95 , 171.22 , 137.59, 129.14, 128.05, 126.28, 53.45, 50.73, 36.58, 30.75, 24.04, 22.98, 21.57; $[\alpha]_D^{20}$ = - 32.00 (c = 0.3 in CH_3OH); HRMS (ESI, m/z): $[M + Na]^+$ Calcd for $C_{34}H_{46}N_4O_8Na$, 661.3213; found 661.3195.

4. Compound Characterisation

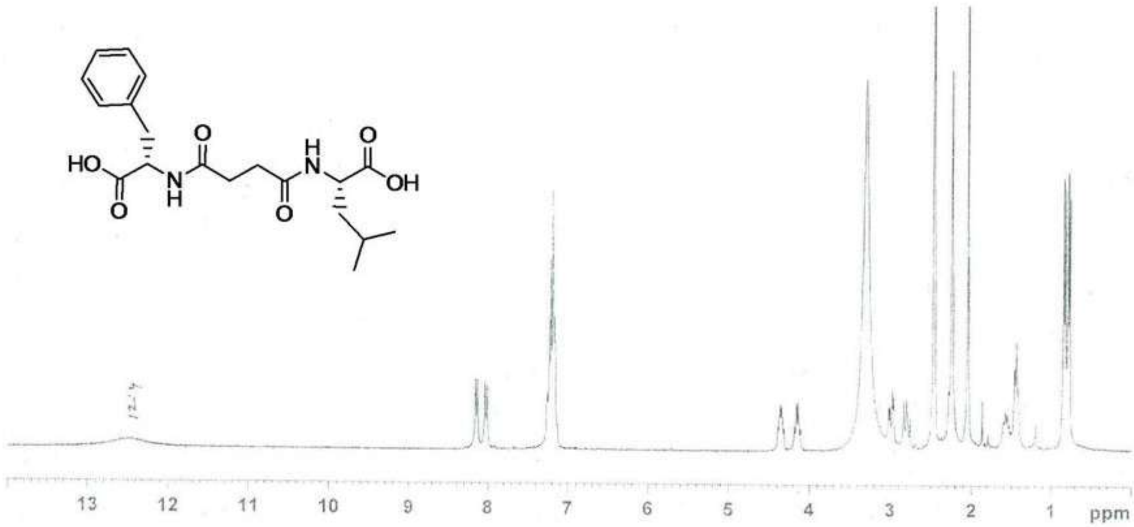


ESI Fig. 2. ^{1}H NMR spectrum (300 MHz, DMSO-d_6) of HO-Suc-F-OMe **3**.

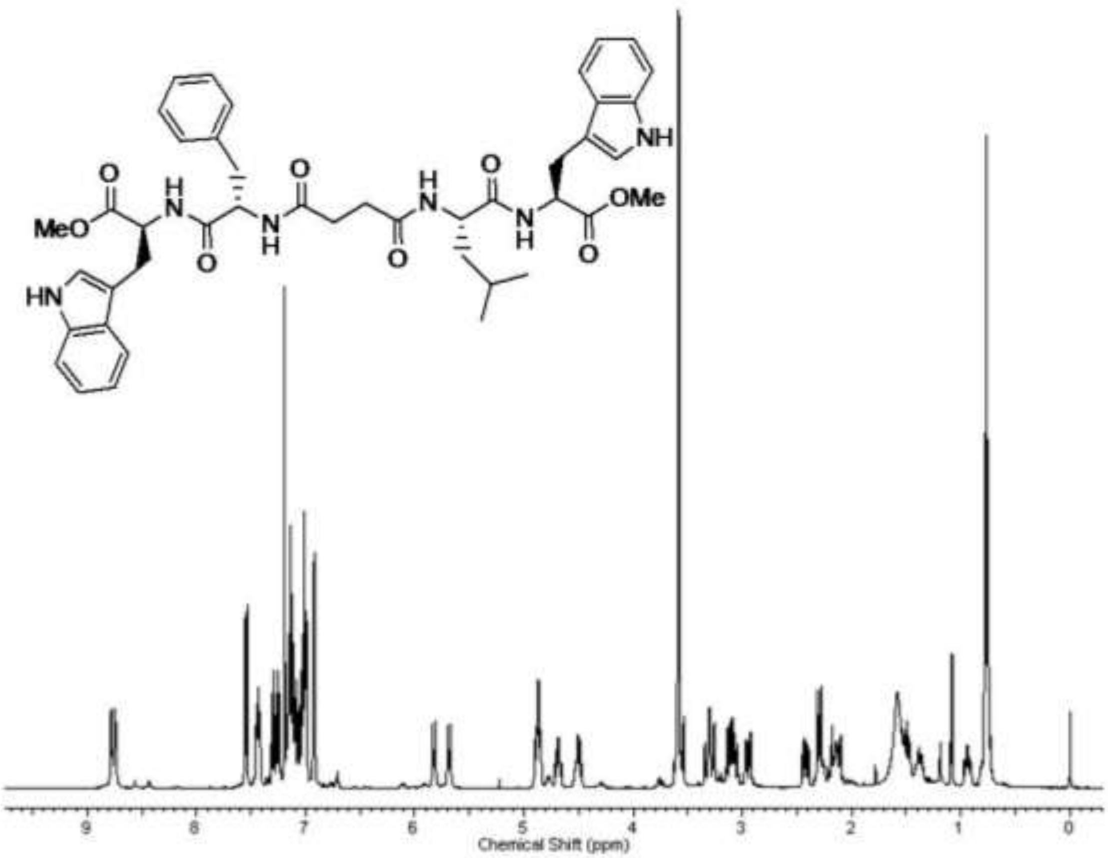
Electronic Supplementary Material (ESI) for New Journal of Chemistry



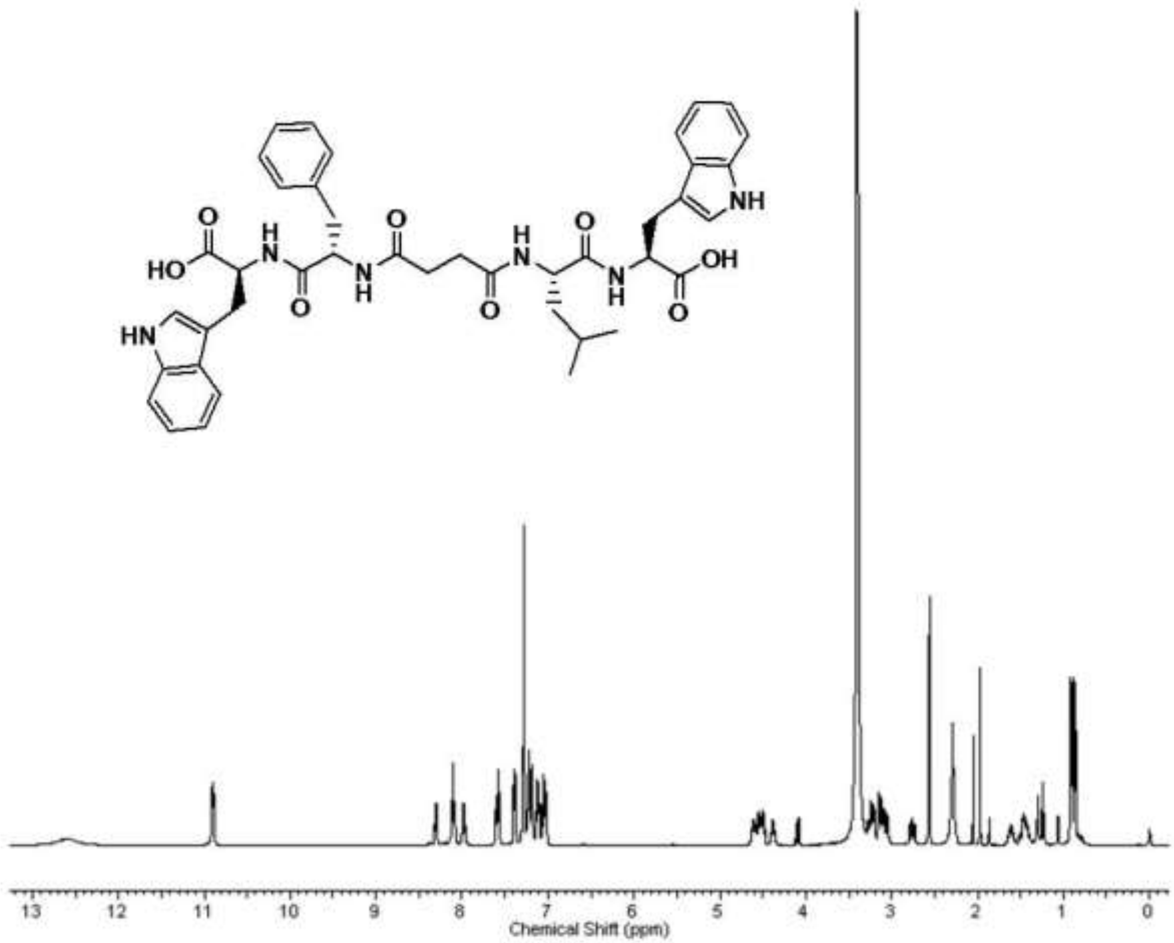
ESI Fig. 3. [1]H NMR spectrum (300 MHz, $CDCl_3$) of MeO-L-Suc-F-OMe **4**.



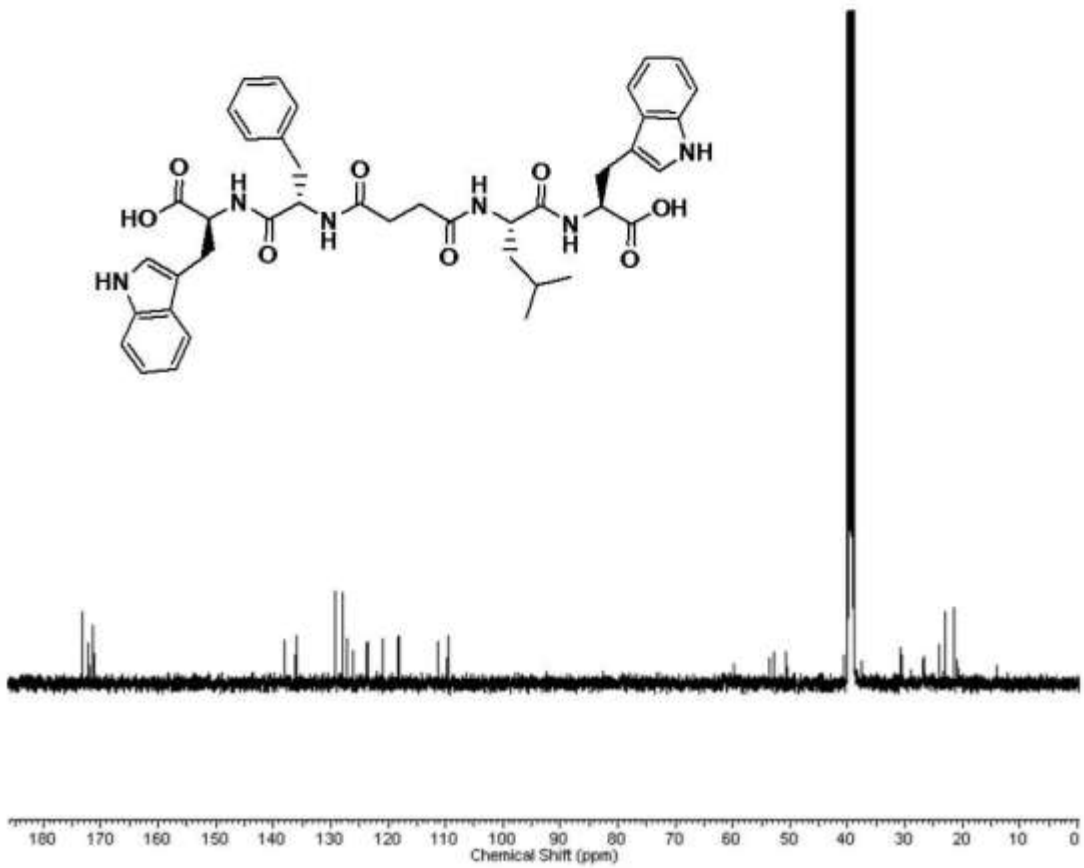
ESI Fig. 4. ^{1}H NMR spectrum (300 MHz, DMSO-d_6) of HO-L-Suc-F-OH **5**.



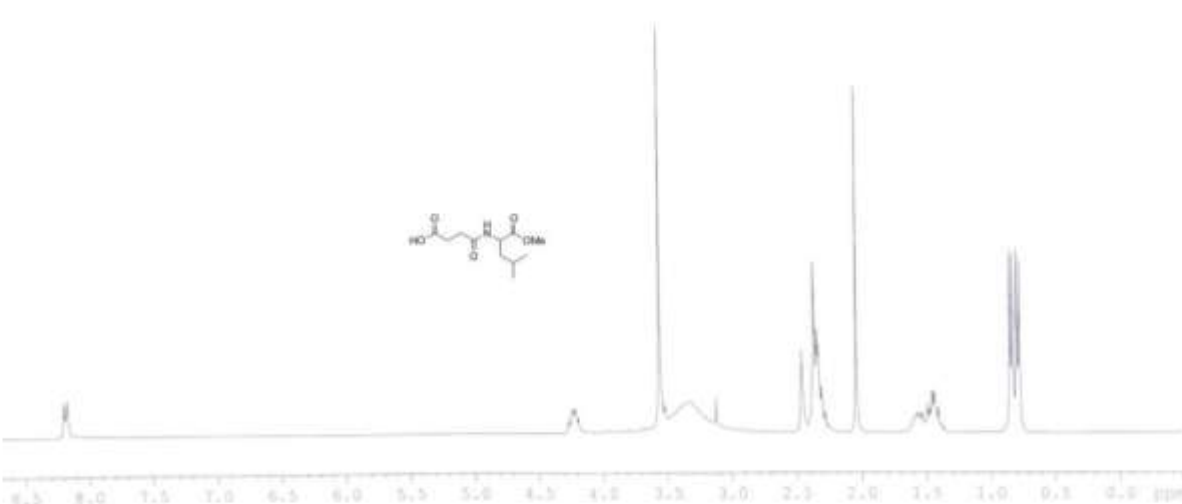
ESI Fig. 5. [1]H NMR spectrum (400 MHz, $CDCl_3$) of MeO-W-L-Suc-F-W-OMe **6**.



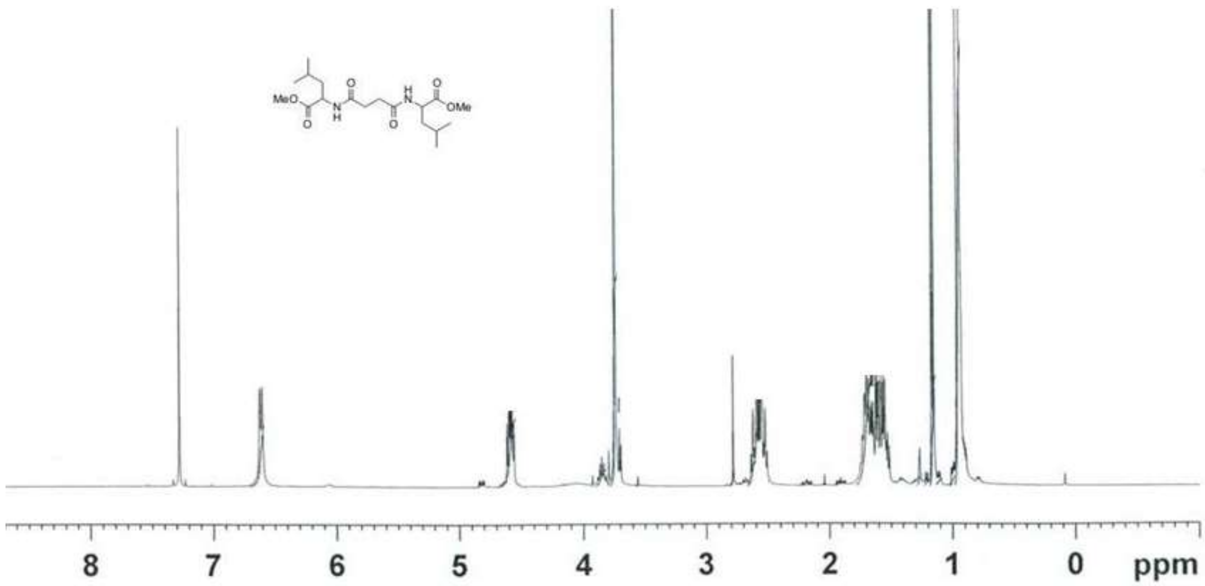
ESI Fig. 6. ^{1}H NMR spectrum (400 MHz, DMSO-d_6) of HO-W-L-Suc-F-W-OH **1**.



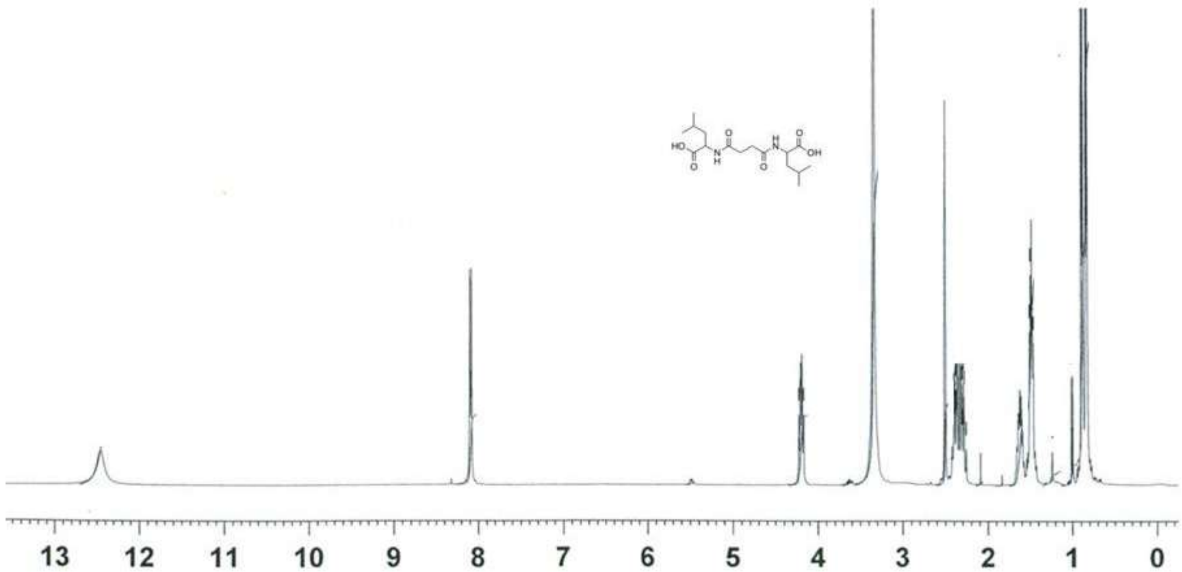
ESI Fig. 7. ^{13}C NMR spectrum (100 MHz, DMSO-d_6) of HO-W-L-Suc-F-W-OH **1**.



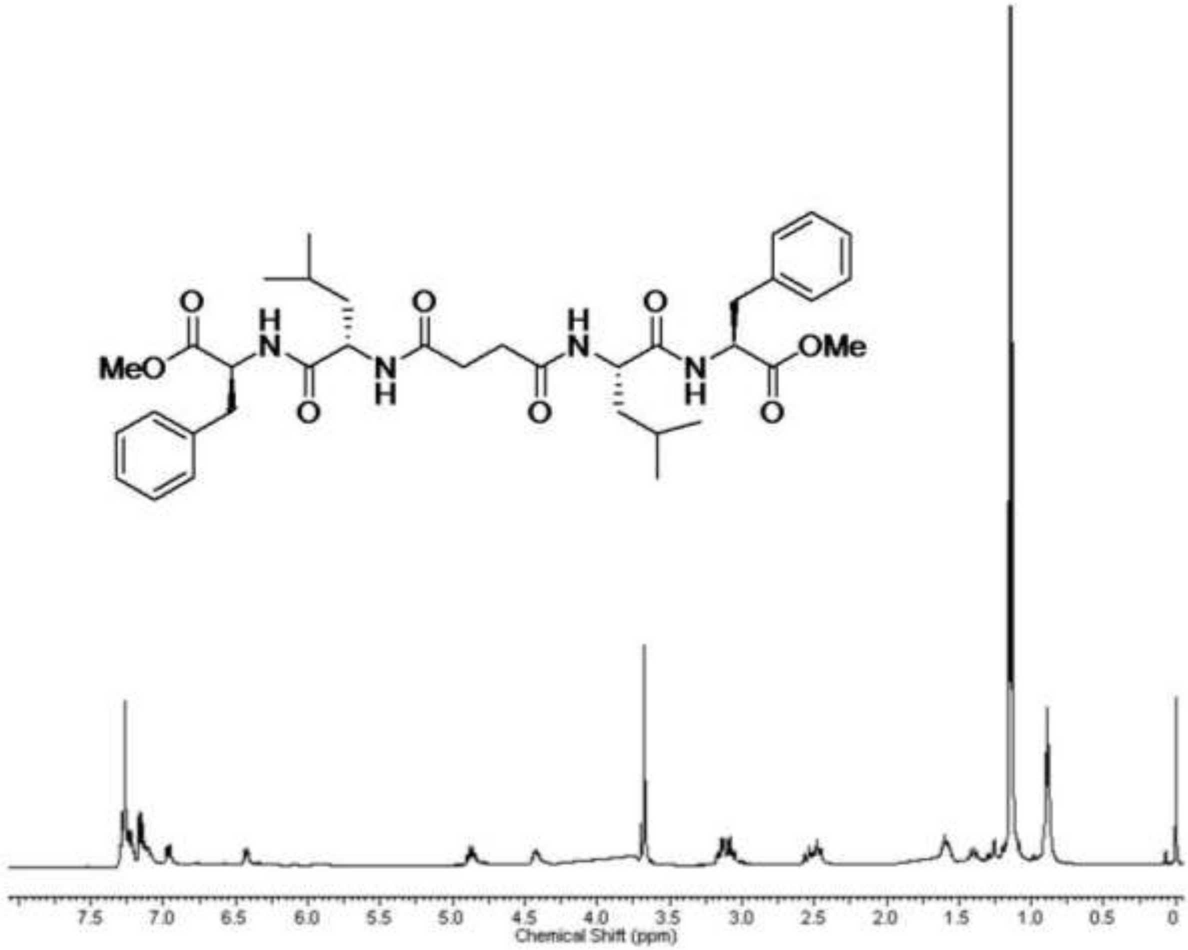
ESI Fig. 8. ^{1}H NMR spectrum (300 MHz, DMSO-d_6) of HO-Suc-L-OMe **7**.



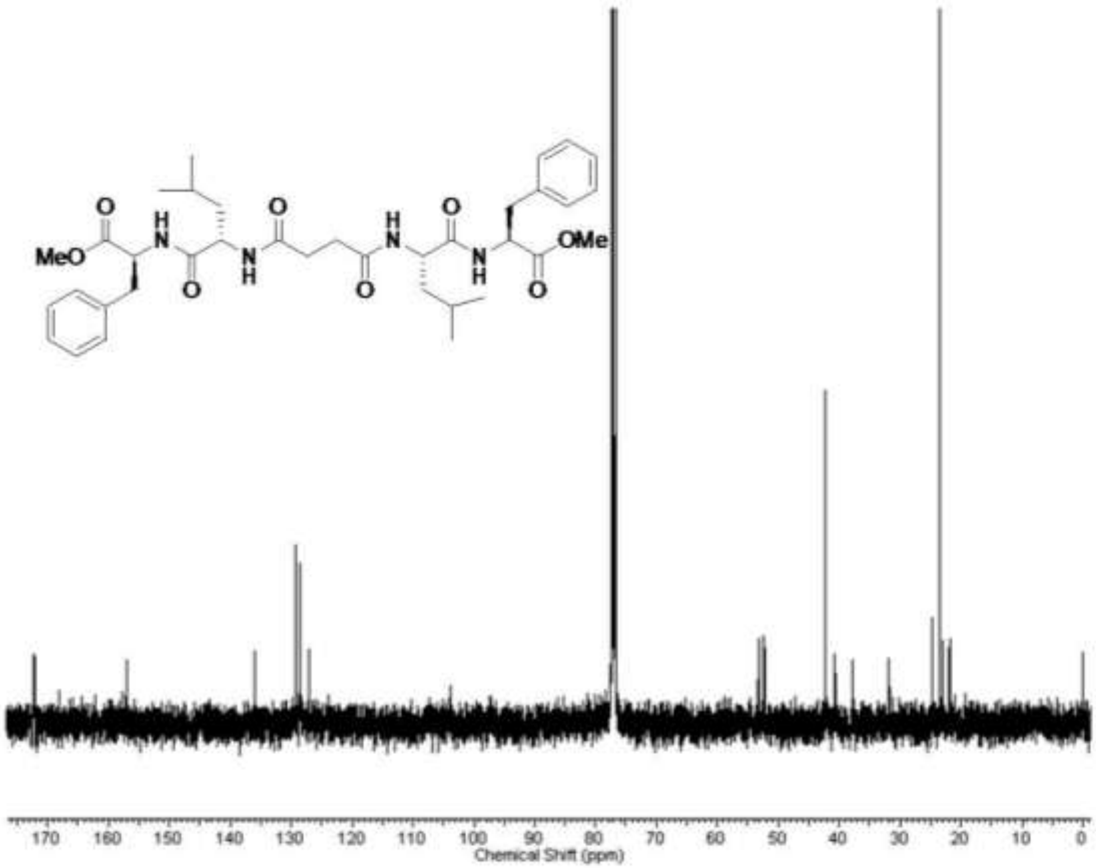
ESI Fig. 9. [1]H NMR spectrum (400 MHz, $CDCl_3$) of MeO-L-Suc-L-OMe **8**.



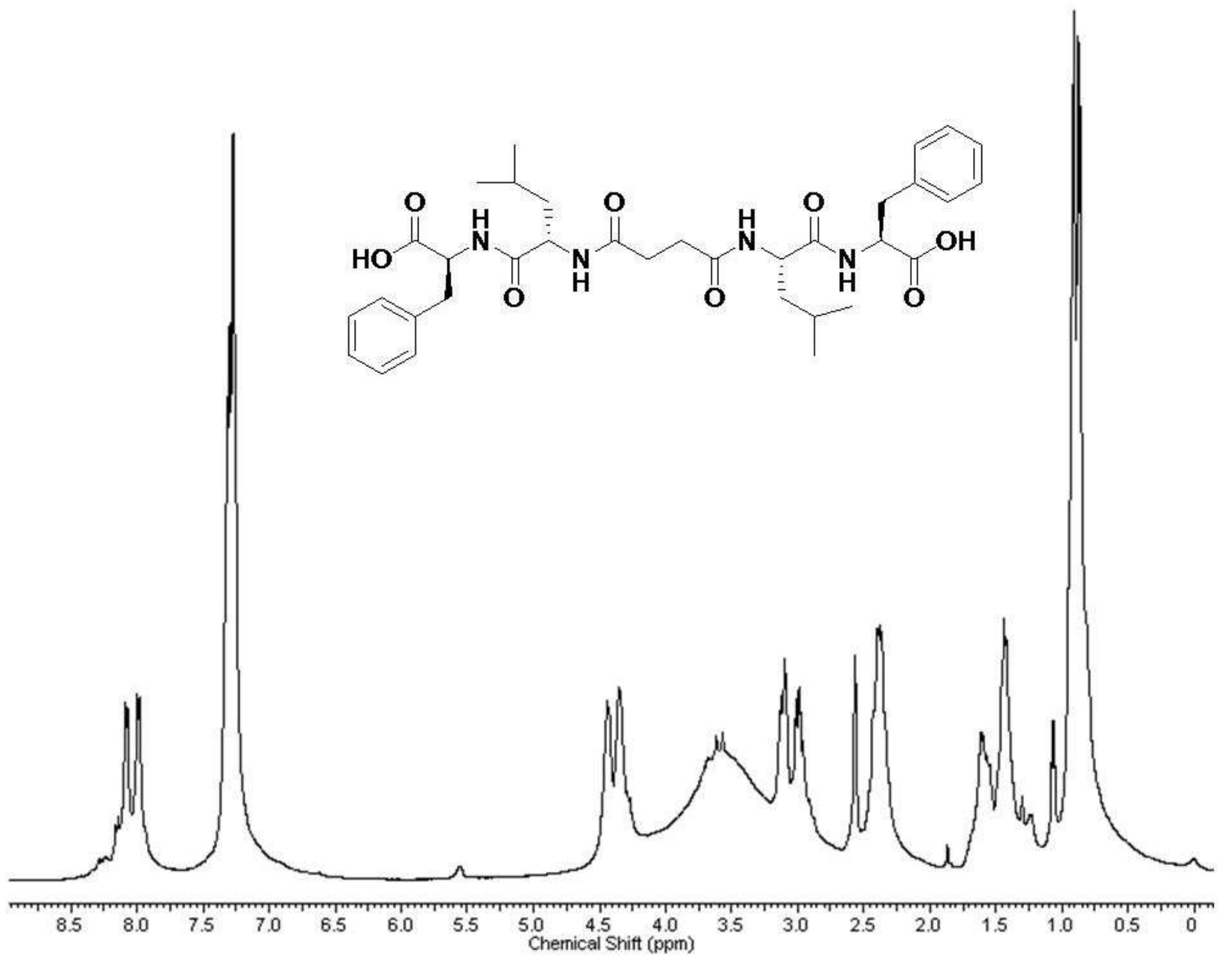
ESI Fig. 10. ^{1}H NMR spectrum (400 MHz, DMSO-d_6) of HO-L-Suc-L-OH **9**.



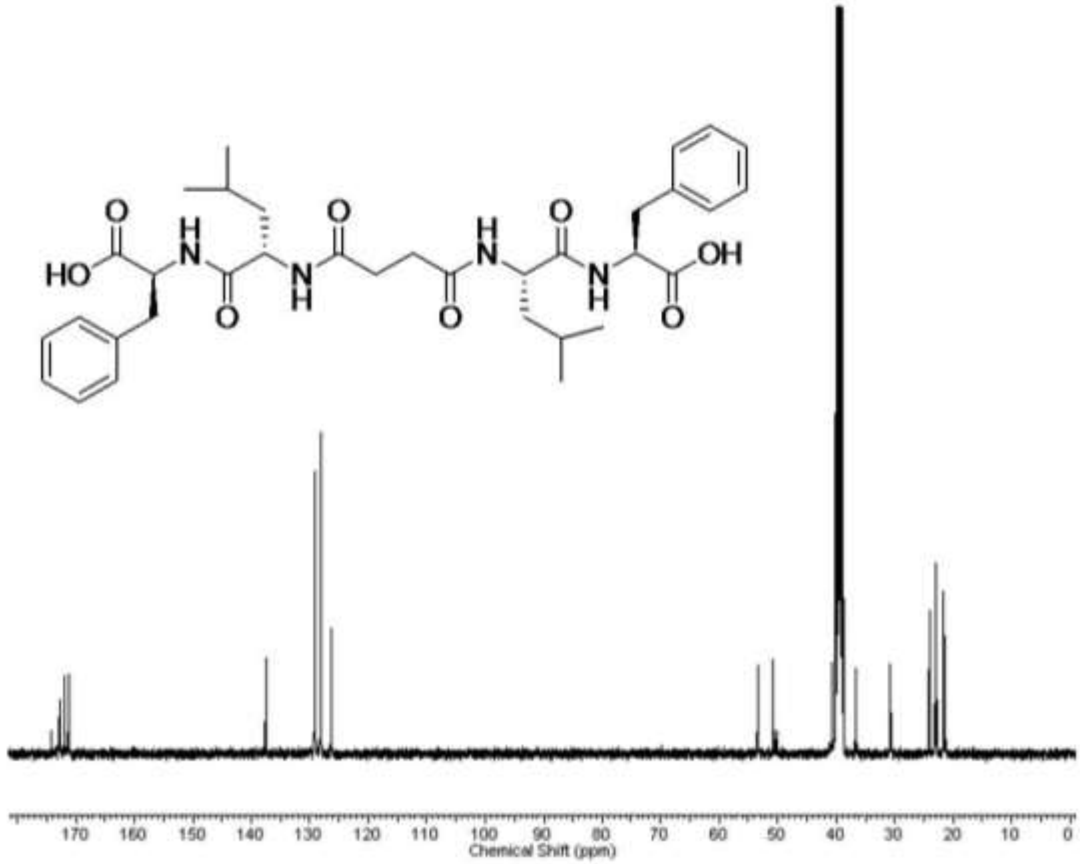
ESI Fig. 11. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of MeO-F-L-Suc-L-F-OMe **10**.



ESI Fig. 12. ^{13}C NMR spectrum (100 MHz, $CDCl_3$) of MeO-F-L-Suc-L-F-OMe **10**.



ESI Fig. 13. [1]H NMR spectrum (400 MHz, DMSO-d_6) of HO-F-L-Suc-L-F-OH **2**.



ESI Fig. 14. ^{13}C NMR spectrum (100 MHz, DMSO-d_6) of HO-F-L-Suc-L-F-OH **2**.