SUPPORTING INFORMATION

Table 1S. ^{1}H and ^{13}C spectral assignment of 3.8 mM LL ditryptophan (LL-**1**) in 100 mM phosphate buffer, pD=5.8.

Type	**^{13}C δ (ppm)**	**^{1}H δ (ppm)**	**m**	**$J_{H\text{-}H}$(Hz)**
α	52.1	4.154	dd	6.8, 6.8
β	25.4	3.352; 3.308	dd	14.5, 6.8
2	124.1	7.218	bs	-
3	105.1	-	-	-
3a	125.5	-	-	-
4	116.8	7.559	d	7.7
5	118.2	7.157	dd	7.7, 7.7
6	120.9	7.267	dd	7.7, 7.7
7	110.8	7.512	d	8.3
7a	135.2	-	-	-
CO	167.3	-	-	-
α’	55.0	4.468	dd	7.4, 5.3
β’	26.2	3.318; 3.151	dd	14.9, 5.3; 14.9, 7.4
2’	122.9	7.110	bs	-
3’	109.0	-	-	-
3a’	126.0	-	-	-
4’	117.3	7.646	d	7.7
5’	118.1	7.139	dd	7.7, 7.7
6’	120.6	7.234	dd	7.7, 7.7
7’	110.6	7.488	d	8.1
7a’	134.9	-	-	-
CO_2^-	176.5	-	-	-

Table 2S. ^{1}H and ^{13}C spectral assignment of 3.8 mM DL ditryptophan (DL-**1**) in 100 mM phosphate buffer, pD=5.8.

Type	**^{13}C δ (ppm)**	**^{1}H δ (ppm)**	**m**	**J_{H-H}(Hz)**
α	52.6	4.191	dd	7.4, 5.9
β	25.6	3.062	dd	15.1, 7.4; 15.1, 5.9
2	124.0	6.846	-	-
3	105.1	-	-	-
3a	125.4	-	-	-
4	117.0	7.226	-	-
5	118.4	6.909	-	-
6	121.2	7.207	-	-
7	110.9	7.463	-	-
7a	135.2	-	-	-
CO	167.8	-	-	-
α’	55.0	4.444	dd	9.2, 4.8
β’	26.3	3.129; 2.989	dd	14.9, 3.9; 14.9, 8.7
2’	123.0	6.925	-	-
3’	-	-	-	-
3a’	125.7	-	-	-
4’	117.5	7.646	-	
5’	118.2	7.139	-	
6’	121.0	7.234	-	
7’	110.9	7.488	-	
7a’	135.1	-	-	-
CO_2^-	-	-	-	-

Table 3S. ^{1}H and ^{13}C spectral assignment of 3.8 mM LL ditryptophan (LL-**1**) in an aqueous buffered solution (100 mM phosphate buffer, pD=5.8) of 94 mM sodium-N-dodecanoyl-L-prolinate.

Type	**^{13}C δ (ppm)**	**^{1}H δ (ppm)**	**m**	**$J_{H\text{-}H}$(Hz)**
α	53.2	4.028	bt	
β	26.7	3.234	m	-
2	125.4	7.275	bs	-
3	106.7	-	-	-
3a	126.5	-	-	-
4	118.1	7.459	d	7.9
5	118.6	6.975	t	7.2, 7.9
6	121.1	7.072	t	7.2, 7.9
7	11.5	7.387	d	7.9
7a	136.4	-	-	-
CO	168.5	-	-	-
α’	57.0	4.401	bt	
β’	26.8	3.126	m	
2’	123.8	7.156	bs	-
3’	110.0			-
3a’	127.6	-	-	-
4’	117.7	7.300	d	7.9
5’	118.5	6.840	t	7.2, 7.8
6’	120.7	6.993	t	7.8, 7.2
7’	111.3	7.336	d	7.9
7a’	135.8	-	-	-
CO_2^-	177.4	-	-	-

Table 4S. ^{1}H and ^{13}C spectral assignment of 3.8 mM DD ditryptophan (DD-**1**) in an aqueous buffered solution (100 mM phosphate buffer, pD=5.8) of 94 mM sodium-N-dodecanoyl-L-prolinate.

Type	**^{13}C δ (ppm)**	**^{1}H δ (ppm)**	**m**	**$J_{H\text{-}H}$(Hz)**
α	53.6	4.028	bt	
β	26.9	3.30-3.11	m	-
2	125.5	7.254	bs	-
3	107.1	-	-	-
3a	126.8	-	-	-
4	118.1	7.481	d	7.8
5	118.9	6.987	t	-
6	121.3	7.075	t	-
7	111.7	7.382	d	7.8
7a	136.6	-	-	-
CO	168.8	-	-	-
α’	57.4	4.393	bt	
β’	26.9	3.30-3.11	m	
2’	123.9	7.159	bs	-
3’	110.4	-		-
3a’	127.8	-	-	-
4’	117.90	7.291	d	7.2
5’	118.7	6.824	t	7.2, 7.8
6’	120.7	6.987	t	-
7’	111.4	7.334	d	7.2
7a’	136.1	-	-	-
CO_2^-	177.5	-	-	-

Table 5S. ^{1}H and ^{13}C spectral assignment of 3.8 mM DL ditryptophan (DL-**1**) in an aqueous buffered solution (100 mM phosphate buffer, pD=5.8) of 94 mM sodium-N-dodecanoyl-L-prolinate.

Type	**^{13}C δ (ppm)**	**^{1}H δ (ppm)**	**m**	**J_{H-H}(Hz)**
α	53.8	4.215	bt	
β	27.1	3.17-3.03	m	-
2	125.1	7.100	bs	-
3	106.6	-	-	-
3a	127.2	-	-	-
4	118.3	7.332	d	7.8
5	118.9	6.895	t	7.2, 7.8
6	121.3	7.048	t	7.2, 7.8
7	111.7	7.355	d	7.8
7a	136.2	-	-	-
CO	169.2	-	-	-
α’	56.7	4.477	bt	
β’	27.1	3.17-3.03	m	
2’	124.1	7.152	bs	-
3’	110.0.	-		-
3a’	127.9	-	-	-
4’	118.4	7.455	d	7.8
5’	118.8	6.946	t	7.2, 7.8
6’	121.0	7.020	t	7.2, 7.8
7’	111.7	7.348	d	7.8
7a’	136.1	-	-	-
CO_2^-	178.1	-	-	-

Table 6S. ^{1}H and ^{13}C spectral assignment of 20 mM LD ditryptophan (LD-**1**) in an aqueous buffered solution (100 mM phosphate buffer, pD=5.8) of 94 mM sodium-N-dodecanoyl-L-prolinate.

Type	**^{13}C δ (ppm)**	**^{1}H δ (ppm)**	**m**	**J_{H-H}(Hz)**
α	53.8	4.212	bt	
β	26.9	3.092	m	-
2	125.2	7.106	bs	-
3	106.4	-	-	-
3a	126.9	-	-	-
4	118.3	7.316	d	7.8
5	118.9	6.877	t	7.2, 7.8
6	121.2	7.044	t	7.2, 7.8
7	111.5	7.367	d	7.8
7a	136.1	-	-	-
CO	169.1	-	-	-
α’	56.9	4.489	bt	
β’	27.2	3.140	m	
2’	124.3	7.167	bs	-
3’	109.8	-		-
3a’	127.8	-	-	-
4’	118.3	7.451	d	7.8
5’	118.8	6.936	t	7.2, 7.8
6’	121.0	7.020	t	7.2, 7.8
7’	111.6	7.359	d	7.8
7a’	135.8	-	-	-
CO_2^-	178.0	-	-	-

Table 7S. Chemical shift values and chemical shift variations (in brackets) of the resolved proton signals of sodium 0.094 M N-dodecanoyl prolinate in the absence and in the presence of 3.8 mM ditriptophan isomers.

	α	**δ_Z^{anti}**	**δ_E^{syn}**	**δ_E^{anti}**	**δ_Z^{syn}**	**1-CH_2**	**2-CH_2**	**Chain**	**11-CH_3**
SDP	4.267	3.706	3.561	3.461	3.431	2.355	1.595	1.293	0.885
SDP + LD-**1**	4.254 (0.013)	3.690 (0.016)	3.562 (-0.001)	3.440 (0.021)	3.395 (0.036)	2.320 (0.035)	1.579 (0.016)	1.283 (0.010)	0.880 (0.005)
SDP + DL-**1**	4.250 (0.017)	3.682 (0.024)	3.562 (-0.001)	3.438 (0.023)	3.387 (0.044)	2.318 (0.037)	1.578 (0.017)	1.282 (0.011)	0.879 (0.006)
SDP + DD-**1**	4.240 (0.027)	3.657 (0.049)	3.557 (0.004)	3.427 (0.034)	3.364 (0.067)	2.305 (0.050)	1.572 (0.023)	1.290 (0.003)	0.890 (-0.005)
SDP + LL-**1**	4.245 (0.022)	3.664 (0.042)	3.556 (0.005)	3.430 (0.031)	3.371 (0.060)	2.312 (0.043)	1.574 (0.021)	1.292 (0.001)	0.889 (-0.004)

Table 8S: Torsional angles of low energy conformer of the four ditryptophan stereoisomers obtained from Molecular Mechanics calculation.

Dipeptide	ψ	ϕ	ω	χ_1	χ_2	χ'_1	χ'_2
			Dipeptides in SDP micelles				
LL-**1**	-115.2	-169.0	178.0	-168.4	-111.8	51.0	80.0
DD-**1**	-58.1	153.0	175.7	-54.5	-99.0	54.1	79.1
LD-**1**	-48.6	163.9	179.3	60.8	-89.9	-47.7	-82.3
DL-**1**	48.6	-164.0	-179.3	-60.8	89.9	47.7	82.2
			Dipeptides in water				
LL-**1**	-103.2	-166.5	1792	-74.7	60.7	52.7	78.8
DL-**1**	138.3	-161.7	179.7	-58.5	67.7	50.1	85.5
			Dipeptides in SDSR micelles				
LL-**1**	-115.3	-169.1	-179.6	-168.4	-11.8	51.0	80.0
DL-**1**	-65.6	-146.6	-178.8	179.9	118.9	-53.9	111.8

ψ = H_3N^+-C^{α}-C(O)-NH ; ϕ = C(O)-NH-$C^{\alpha'}$-CO_2^-; ω = O-C(O)-N-H; χ_1 = H_3N^+-C^{α}-C^{β}-C^3; χ_2 = C^{α}-C^{β}-C^3-C^2; χ'_1 = HN-$C^{\alpha'}$-$C^{\beta'}$-$C^{3'}$; χ'_2 = $C^{\alpha'}$-$C^{\beta'}$-$C^{3'}$-$C^{2'}$

Table 9S. Ditryptophan and SDSR aggregates parameters obtained by NMR diffusion experiments.

$D_{mic} = 0.79 \pm 0.01\ 10^{-10}\ m^2\ s^{-1}$

	D_{free} (10^{-10} m^2 s^{-1})	D_{obs} (10^{-10} m^2 s^{-1})	x_b	D_{obs}(SDSR) (10^{-10} m^2 s^{-1})	x_{mic}	*p*	K (M^{-1})
SDSR ([SDSR]<cmc)	4.68 ± 0.06						
SDSR ([SDSR]>cmc)				0.88 ± 0.02	0.977		
LL-**1**	4.43 ± 0.08	0.89 ± 0.01	0.973 ± 0.004	0.84 ± 0.02	0.985	1326 ± 202	387 ± 59
DL-**1**	4.43 ± 0.08	0.84 ± 0.01	0.986 ± 0.004	0.85 ± 0.02	0.985	2591 ± 751	756 ± 219

Table 10S. Interproton distance obtained from ROESY experiments on aqueous solutios of 20 mM LL-**1** and DL-**1** in 94 mM SDSR and used as restrains in the Molecular Mechanics Calculation.

	LL-**1**	DL-**1**
β-4	3.0	2.8
β'-4'	3.3	2.7
α-4	2.8	3.0
α'-4'	3.6	3.2

Figure 1S. Stick representation of the minimum energy conformer, obtained by an unrestrained conformational search, of (a) LL-**1**, (b) DL-**1**.