

SUPPORTING INFORMATION

for

Amyloid-Inspired Self-Assembled Peptide Nanofibers

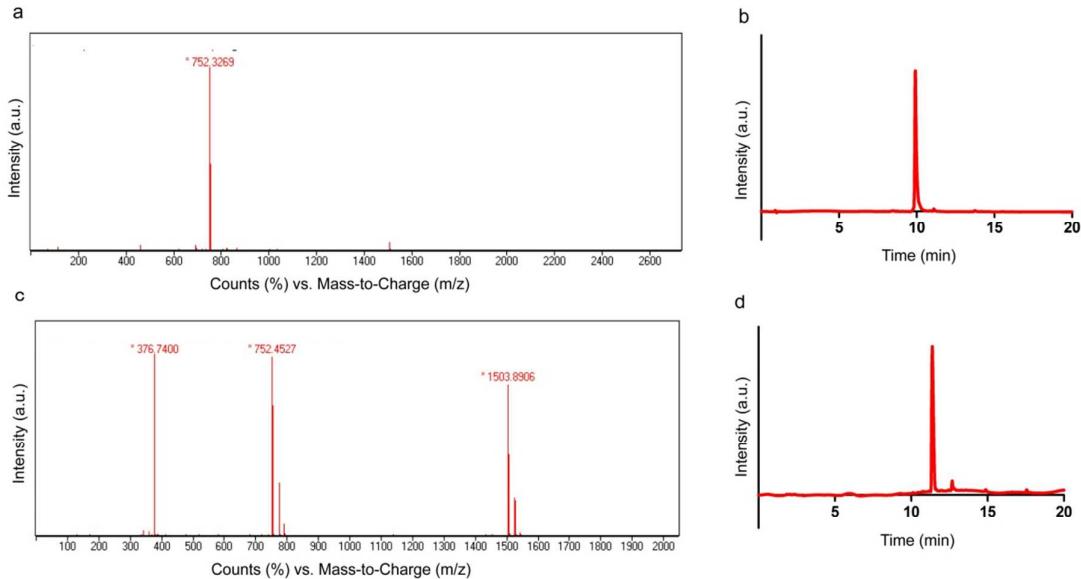


Figure S1. **a)** AIP-1; $[M-H]^-$ (calculated): 752.33, $[M-H]^-$ (observed): 752.33. **b)** RP-HPLC chromatogram of the AIP-1, the change of response units with respect to time at 220 nm. **c)** AIP-2; $[M+H]^+$ (calculated): 752.44, $[M+H]^+$ (observed): 752.45, $[2M+H]^+$ (calculated): 1503.88, $[2M+H]^+$ (observed): 1503.89, $[M/2+H]^+$ (calculated): 376.22, $[M/2+H]^+$ (observed): 376.74. **d)** RP-HPLC chromatogram of the AIP-2, the change of response units with respect to time at 220 nm.

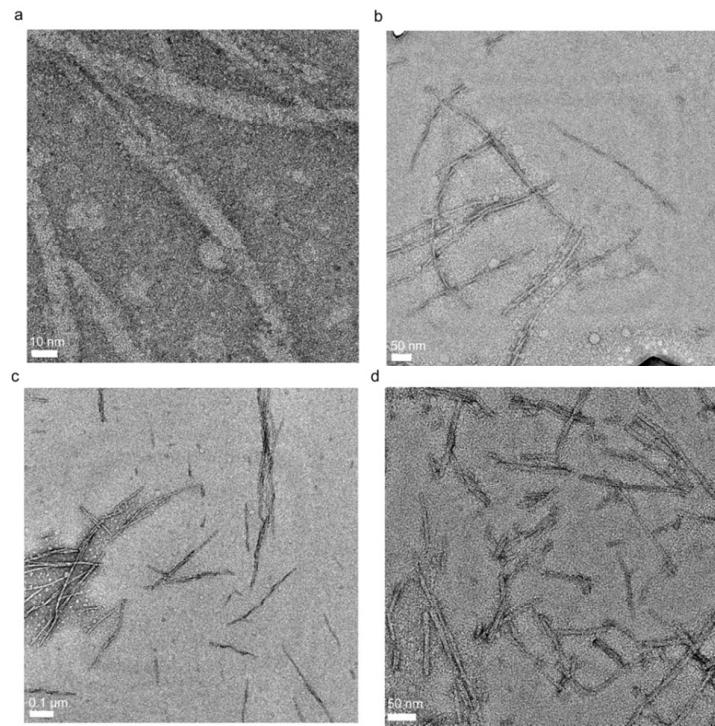


Figure S2. TEM images of AIP-1+2 nanofibers (scale bar 10 nm, 50 nm and 0.1 μ m) prepared by dilution of 2% (w/v) AIP-1+2 gel (**a**, **b** and **c**) and 3% (w/v) AIP-1+2 gel (**d**).

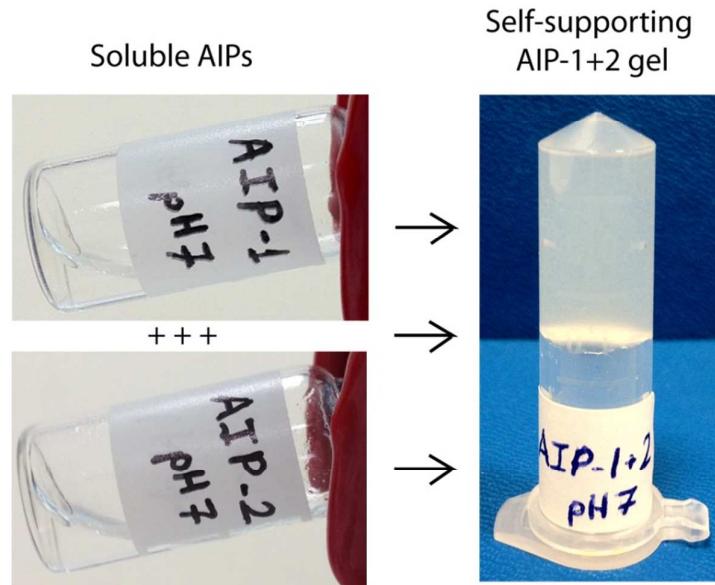


Figure S3. Self-supporting 2% (w/v) AIP-1+2 gel formed after mixing 2% (w/v) AIP-1 and AIP-2 solutions at pH 7 in water. The gel formation was studied with oscillatory rheology analysis, and above 2% (w/v) concentration, gels were self-supporting.

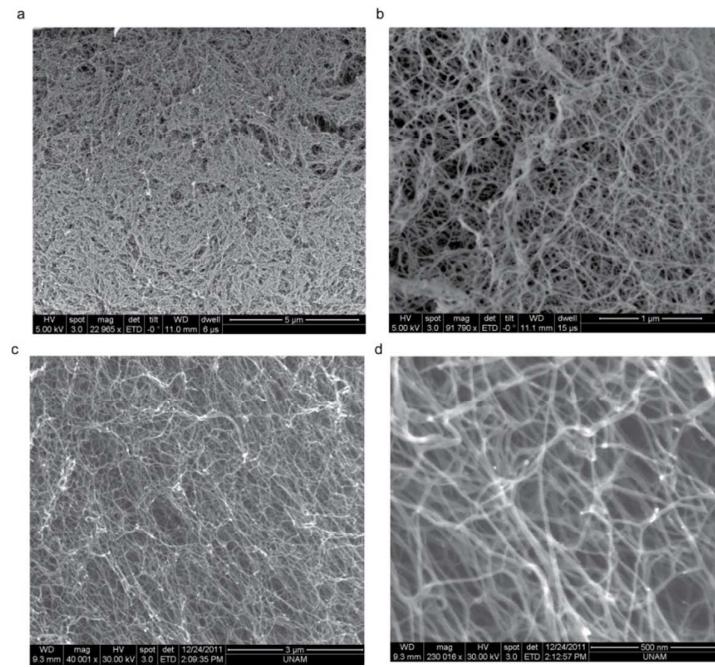


Figure S4. SEM images of AIP-1+2 self-assembled nanonetwork prepared by critical point dried 2% (w/v) AIP-1+2 gel (**a** and **b**) and 3% (w/v) AIP-1+2 gel (**c** and **d**).

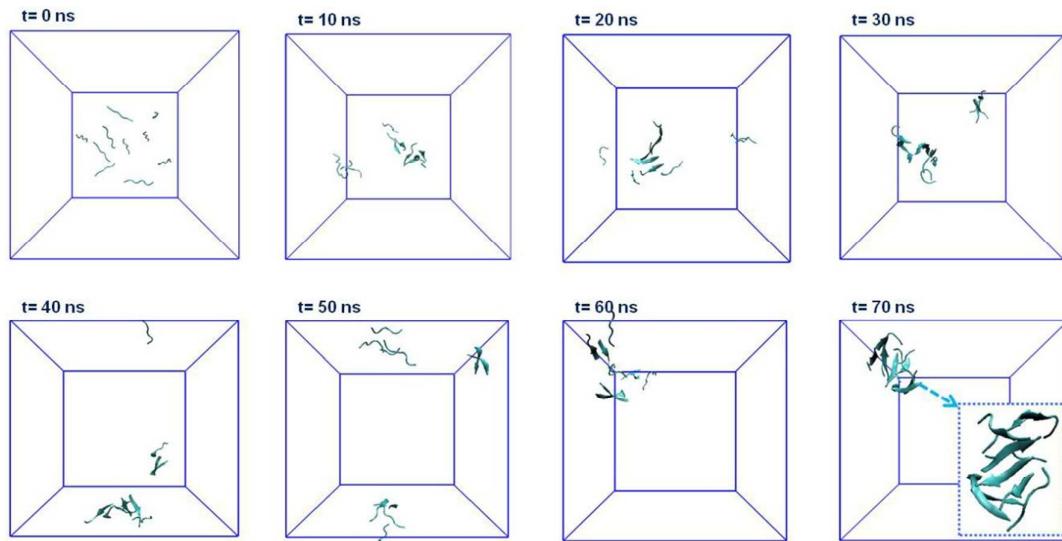


Figure S5. Selected snapshots of simulation of AIP-1 and AIP-2 peptides (five molecules per each peptide) taken from Molecular Dynamics Simulations.

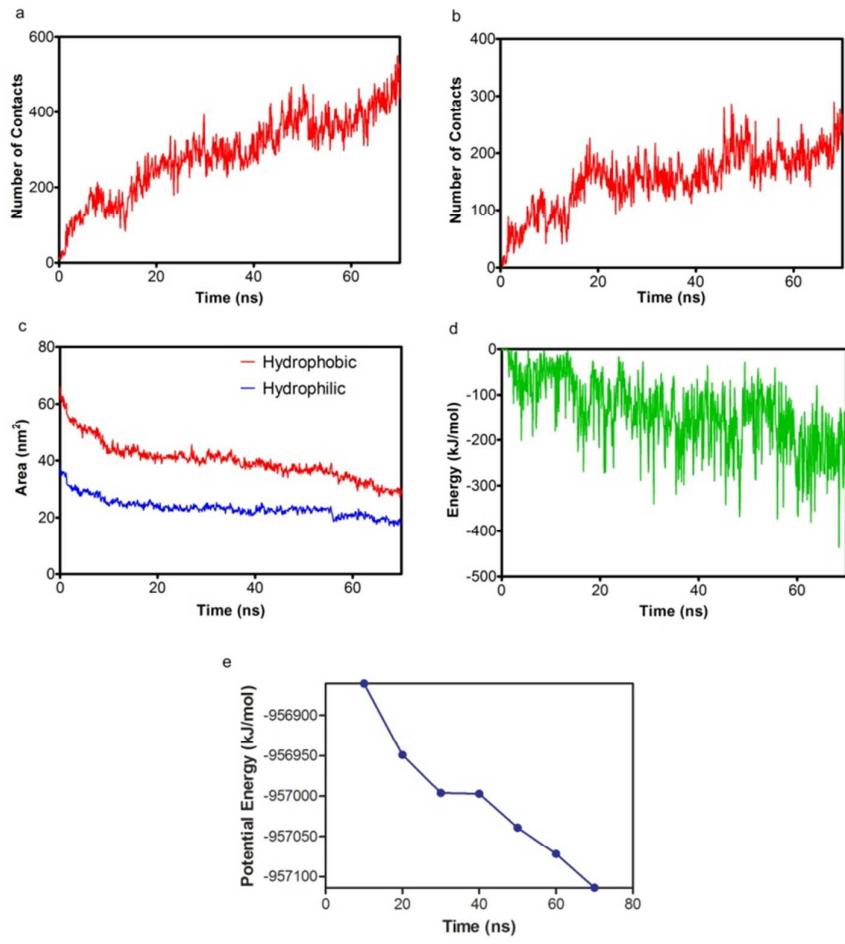


Figure S6. **a)** Hydrophobic core interactions (number of contacts) of AIP-1 and AIP-2 based on the residues of FFAA-FFAA. **b)** Aromatic group contacts (number of contacts) of AIP-1 and AIP-2 based on the residues of FF-FF. **c)** Solvent Accessible Surface Area (SASA). **d)** Coulomb interactions between Lys and Glu residues of AIP-1 and AIP-2. **e)** Potential energy change of the system during simulation.

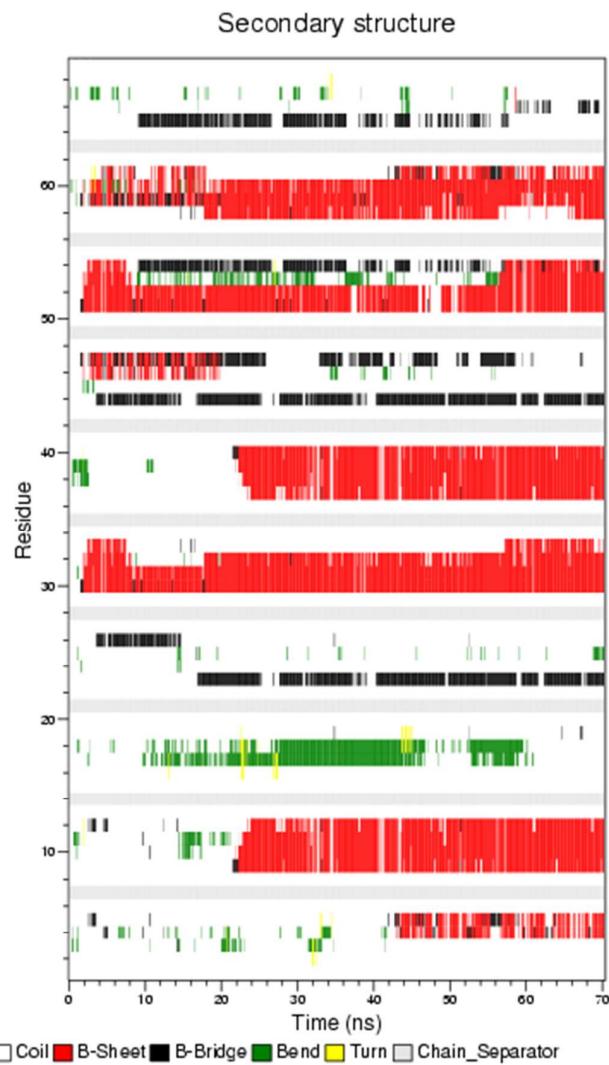


Figure S7. Residue based secondary structure change of peptides during simulation trajectory.

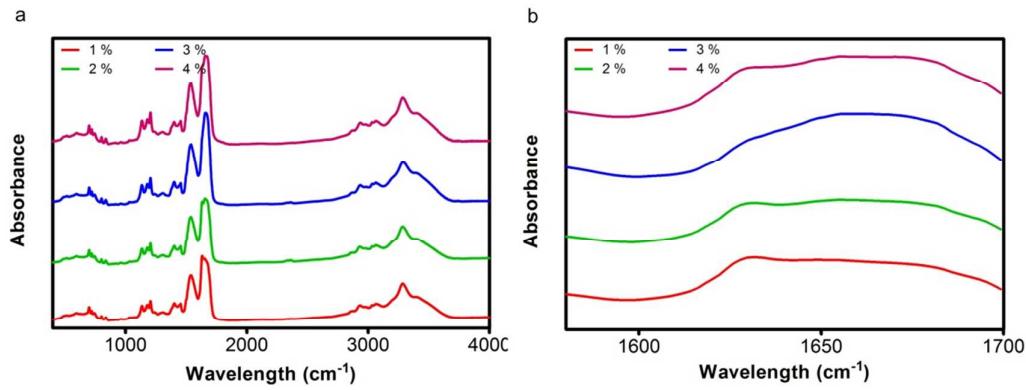


Figure S8. **a)** Secondary structure analysis of AIP-1+2 nanofibers at various concentrations of dried AIP-1+2 gels with FT-IR. **b)** Detailed analysis of Amide I region ($1600\text{-}1700\text{ cm}^{-1}$).

	A (height of the peak)	Mu (μ)	Sigma (σ)
Fit-1	1.1859	1632	13.9407
Fit-2	1.2557	1662	40.1168

Table S1. Gaussian fitting parameters of FT-IR data of AIP-1+2 self-assembled peptide nanofibers (see Figure 3c) obtained from MATLAB fitting program.

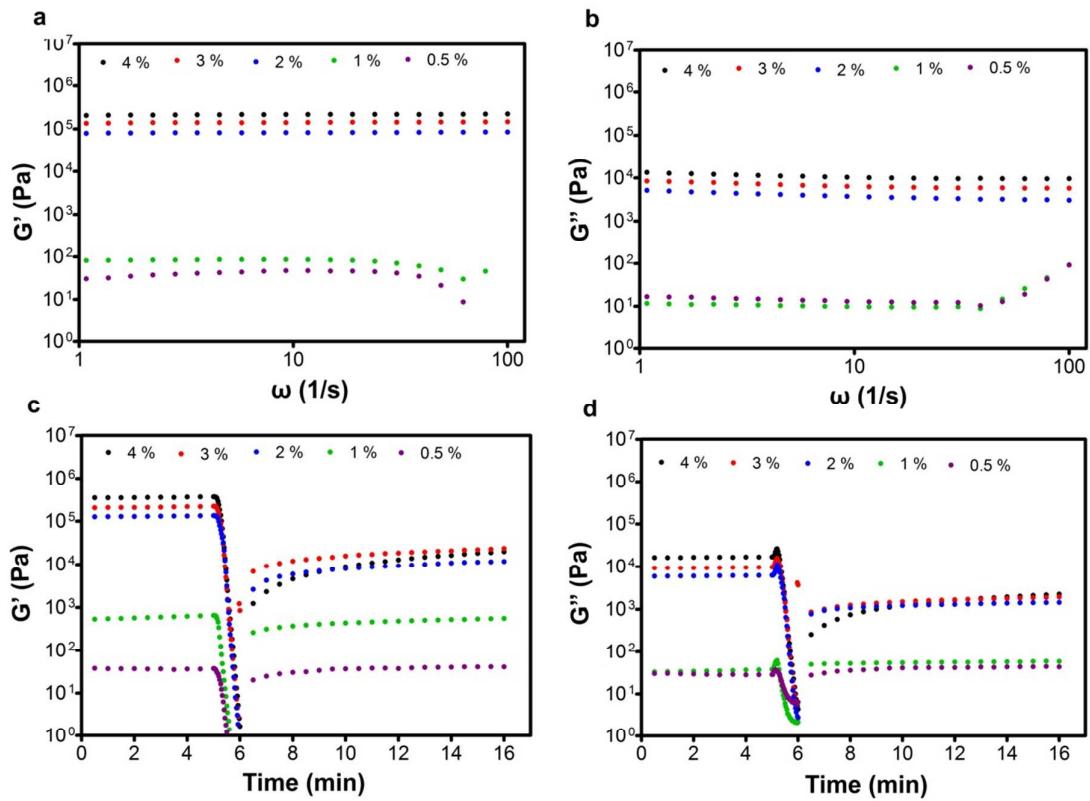


Figure S9. **a, b)** Frequency Sweep analyses of AIP-1+2 peptide gels at pH 7. **c, d)** Thixotropic analyses of AIP-1+2 peptide gels at pH 7 for different concentrations (G' : Storage Modulus, G'' : Loss Modulus, w : Angular Frequency)

	G' (Storage Modulus)	G' (Storage Modulus)	Recovery
	at $t= 300\text{ s}$	at $t= 960\text{ s}$	(%)
0.5% (w/v)	38	41	107.9
1% (w/v)	658	563	85.6
2% (w/v)	134117	11836	8.8
3% (w/v)	219833	23647	10.8
4% (w/v)	363500	19987	5.5

Table S2. Recovery of 4, 3, 2, 1 and 0.5% (w/v) AIP-1+2 gels after disruption of gels with increased strain.

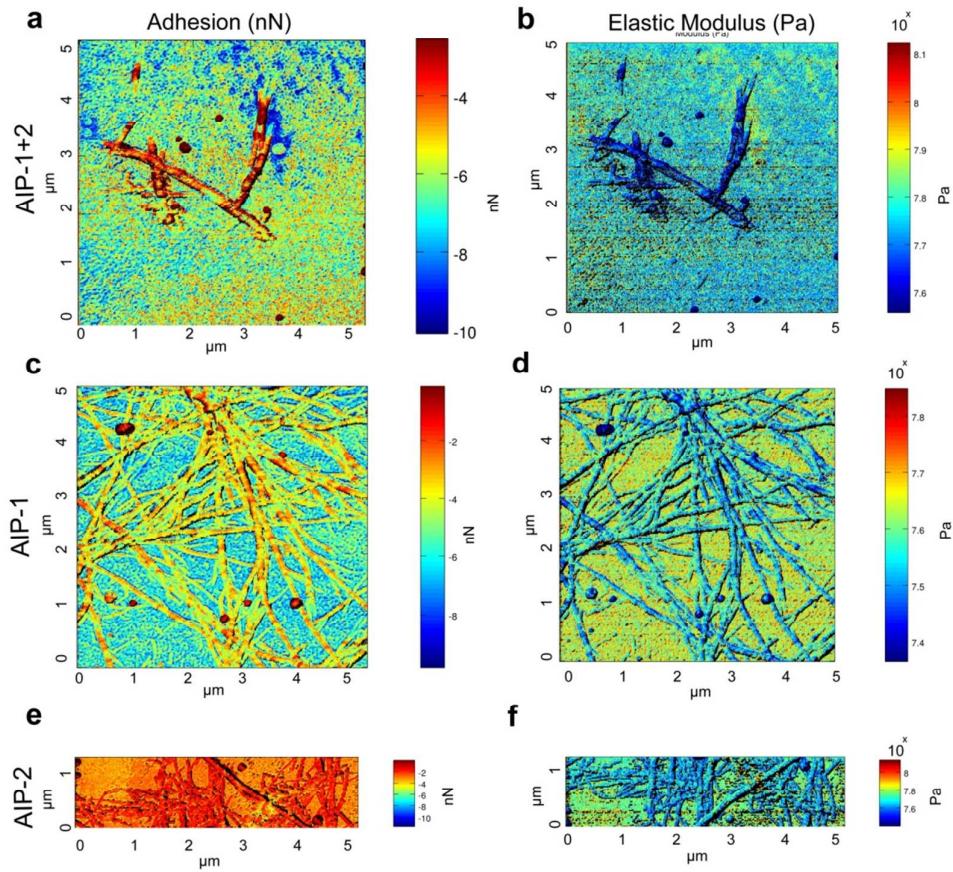


Figure S10. **a, c, e)** Adhesion force maps of AIP-1+2, AIP-1 and AIP-2. Data represents maximum adhesion force during approach. **b, d, f)** Elastic modulus maps of AIP-1+2, AIP-1 and AIP-2 calculated from the slope of the force-distance curves (Modulus, Pa) during approach. Although not clearly seen in the topography images, a submonolayer coverage peptide layer is present on the substrate.

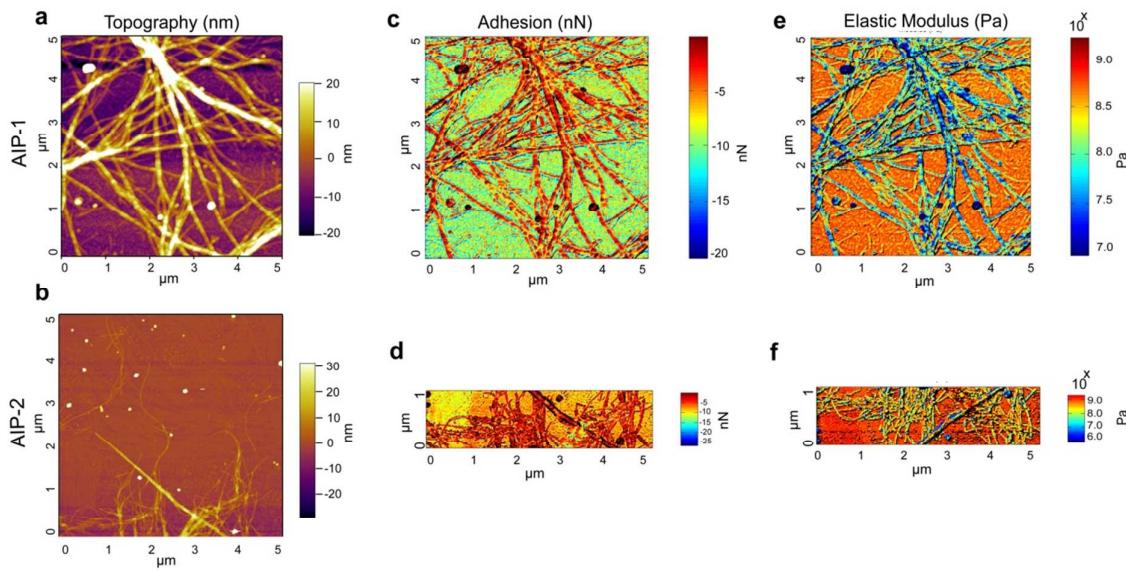


Figure S11. **a, b)** Representative AFM topography images of AIP-1 and AIP-2 nanofiber network on silicon substrate, prepared at pH 7. **c, d)** Adhesion force maps of AIP-1 and AIP-2. Data represents maximum adhesion force during retraction. **e, f)** Elastic modulus maps of AIP-1 and AIP-2 calculated from the slope of the force-distance curves (Modulus, Pa) during retraction.

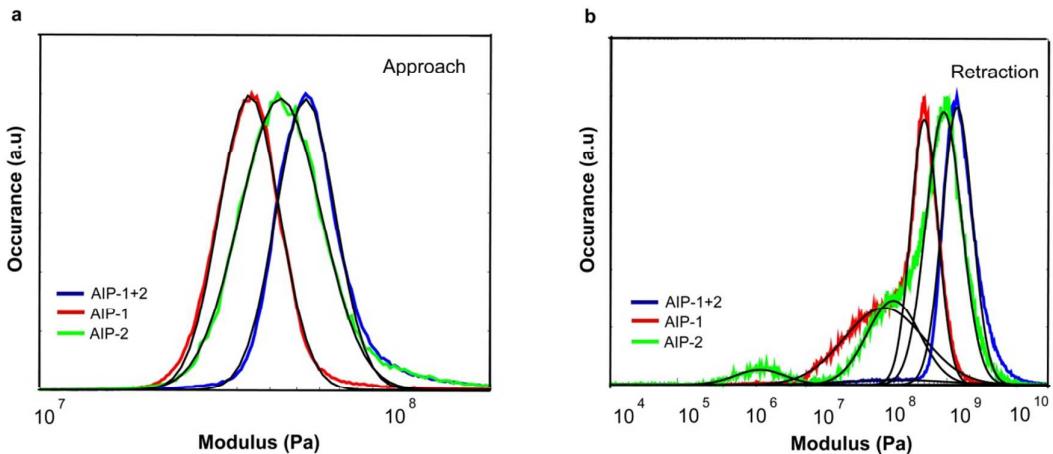


Figure S12. Modulus (Pa) histograms of AIP-1+2 at pH 7, AIP-1 at pH 5, and AIP-2 at pH 10 nanofibers; **a)** approach and **b)** retraction of AFM tip (—: Gaussian fittings).

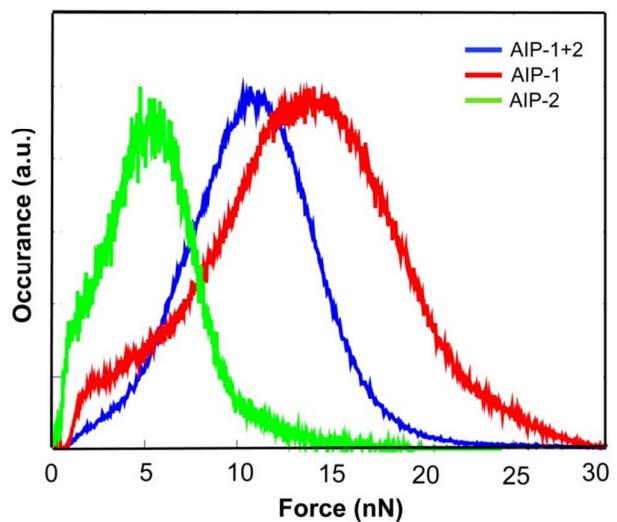


Figure S13. Maximum force histogram of AIP-1+2 at pH 7, AIP-1 at pH 5, and AIP-2 at pH 10 nanofibers applied by AFM tip during nanomechanical characterization.

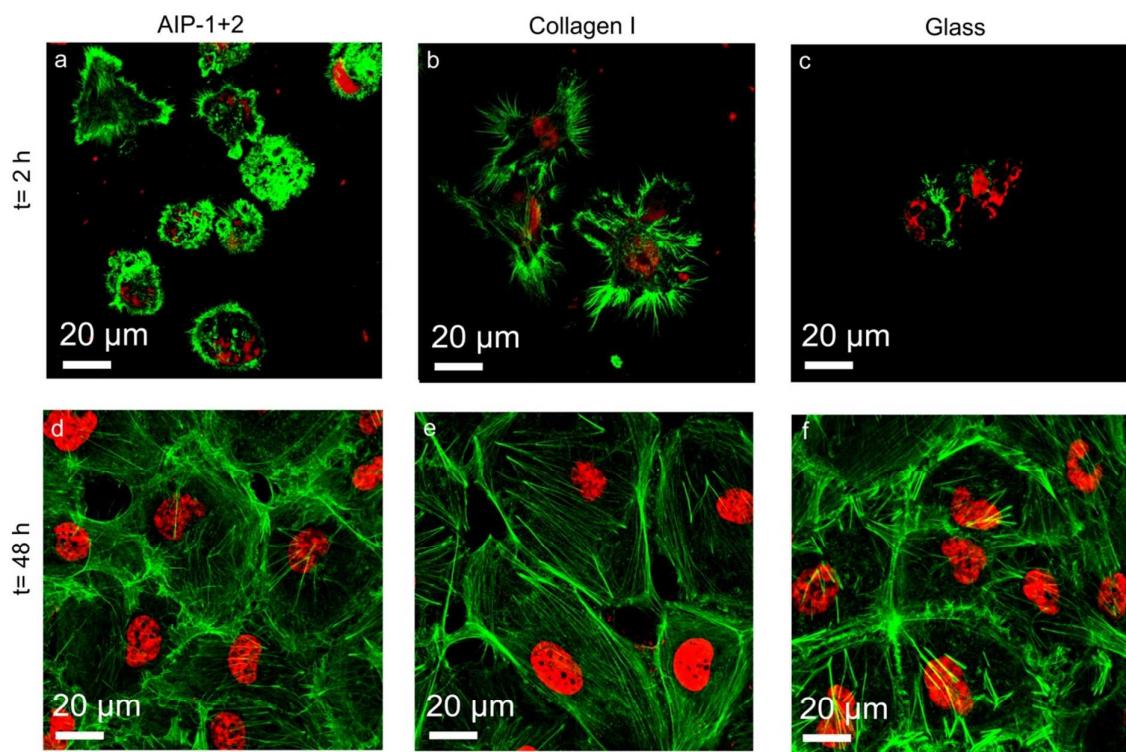


Figure S14. Confocal images of HUVECs on **a)** AIP-1+2, **b)** Collagen I and, **c)** Glass after 2 h. Confocal images of HUVECs on **d)** AIP-1+2, **e)** Collagen and, **f)** Glass after 48 h.

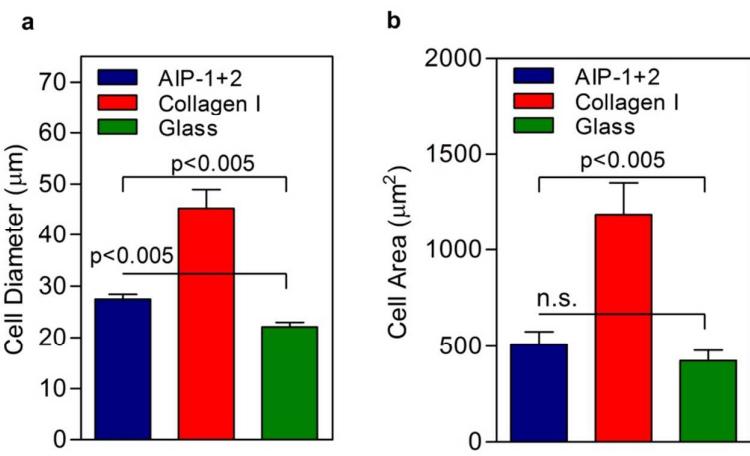


Figure S15. Spreading of HUVECs on AIP-1+2, collagen and glass after 2 h based on **a)** cell diameter **b)** cell area (n.s.: Not significant).

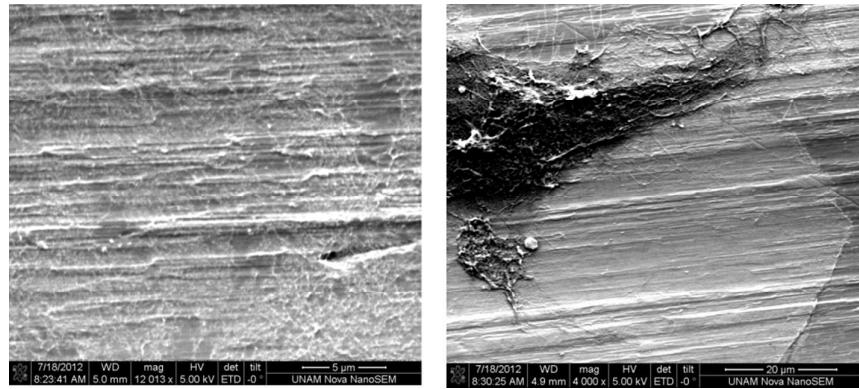


Figure S16. Amyloid-inspired peptide coated surfaces incubated with cells under standard cell culture conditions (37 °C, 5% CO₂) for 24 h were investigated using SEM. A nanofibrous layer was clearly identified.

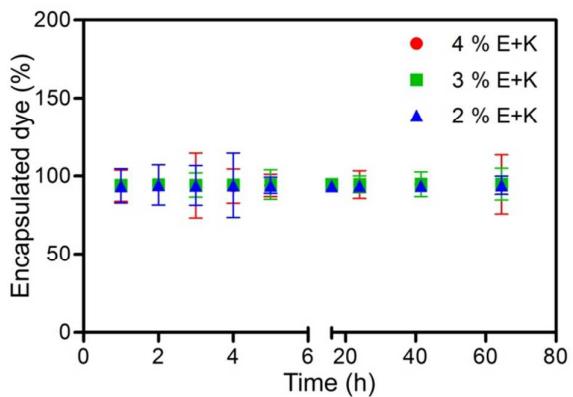


Figure S17. Release profile of encapsulated zwitterionic dye (Rhodamine B) from 4%, 3%, and 2% (w/v) AIP-1+2 peptide gels at pH 7 over a period of 80 h.