

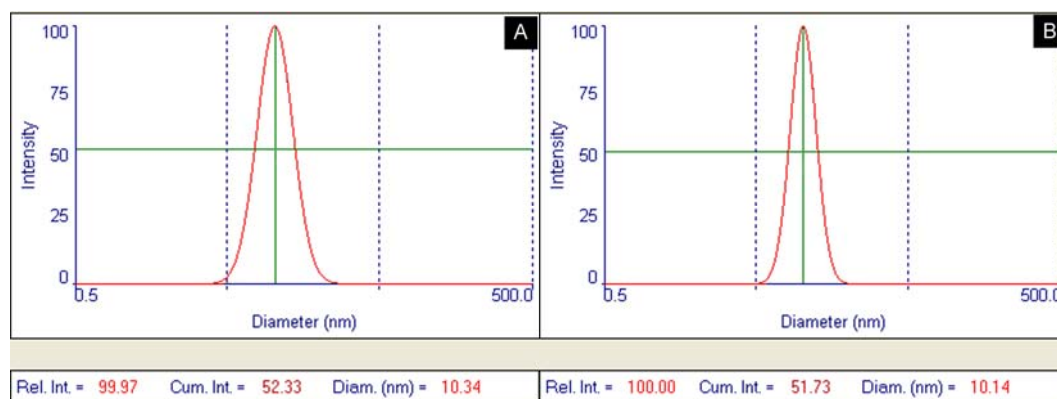
## Supporting data

### Experimental details of peptide nanoparticle fabrication:

60  $\mu\text{L}$  FPTP solution (5 mg/mL in nanopure water, pH = 7.4, adjusted by  $\text{NaCO}_3$ ) was mixed with about 15 U alkaline phosphatase. Next, 500  $\mu\text{L}$  heptane phase containing 200 mg/mL bis(2-ethylhexyl) sulfosuccinate sodium salt (AOT) was added into the mixed aqueous solution. After 1 min's vortex, the mixture was incubated at  $37^\circ\text{C}$  for 45 min then kept at room temperature for 3.5h.

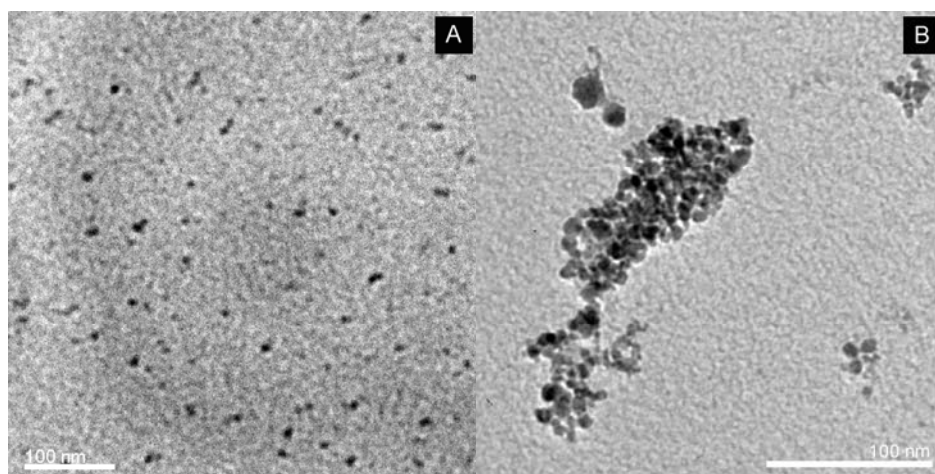
500  $\mu\text{L}$  Methanol and 500  $\mu\text{L}$  nanopure water were added into the mixture obtained above. A vortex was applied and then it was centrifuged at 8,000 rpm for 5 min. The upper heptane layer was firstly removed by pipette then by vacuum drier. The peptide nanoparticle solution was obtained after being dialyzed using 6,000-8,000 Da dialysis bag.

### DLS data:



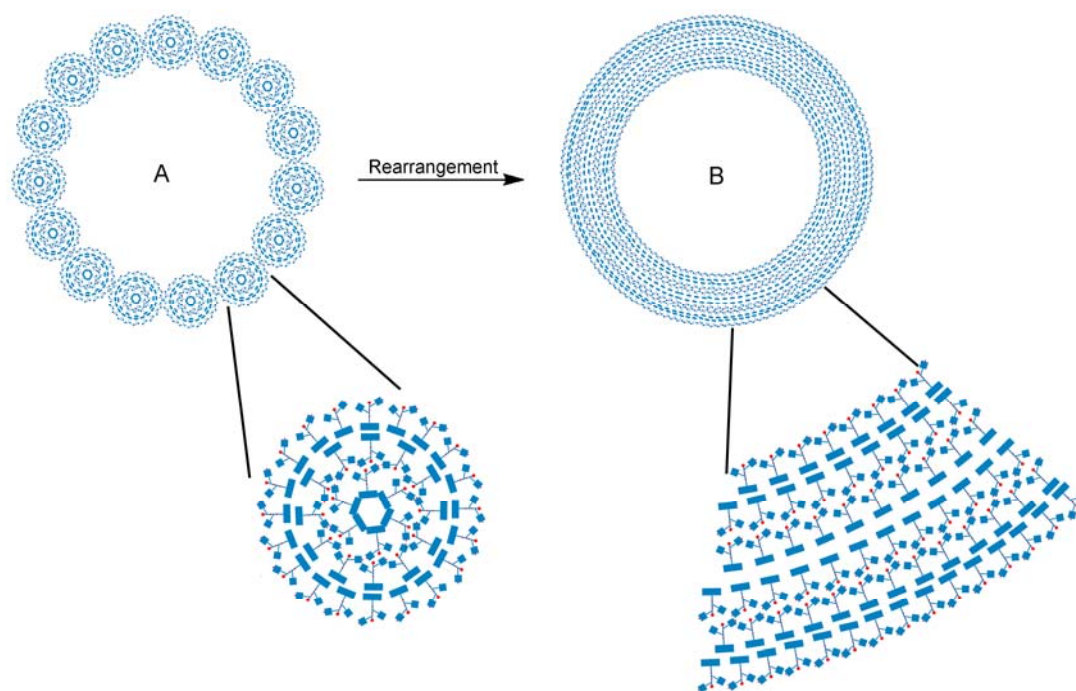
**Figure S1.** DLS measurement of reverse micelles just formed (A) and after 3.5 h incubation (B). The polydispersity of (A) and (B) is 0.075 and 0.039, respectively.

### TEM images:



**Figure S2.** TEM images of other batches of FPT nanoparticle solution. The diameters of nanoparticles are around 7.0 nm (A), and 6.3 nm (B). Scale bar: 100 nm

**Molecular model:**



**Figure S3.** Schematic illustration (cross section model) of possible nanostructural transformation from peptide nanoparticles to peptide nanotube.