

Supporting information for

# Axial Growth and Fusion of Liposome Regulated by Macromolecular Crowding and Confinement

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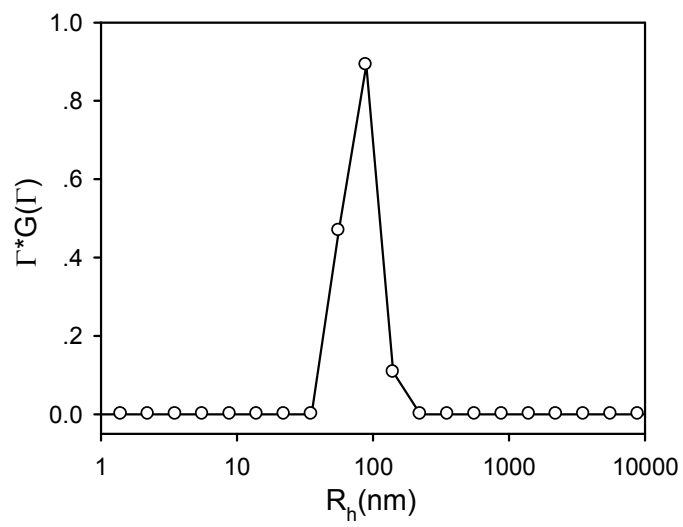


Figure S1. Size distribution of 20  $\mu\text{mol/L}$  liposomes of DPPC:DPPG (1:1) at 30°. Temperature: 50°C.

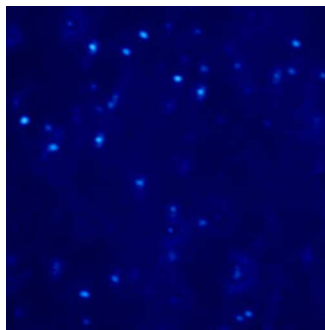


Figure S2. Snapshot of liposomes composed of DPPC/DPPG 1:1 at 25°C in 0.5% PAM

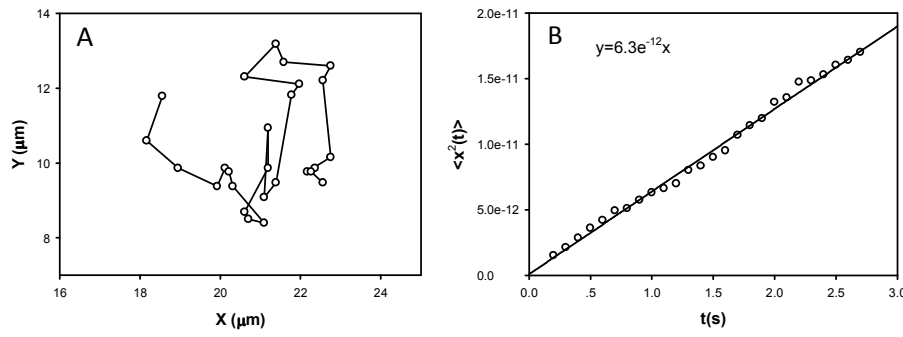


Figure S3 (A) The trajectory of liposome (DPPC/DPPG 1:1) at 25°C in 0.5% PAM, (B) The mean square displacement versus time for the corresponding liposome. The mean square displacement is linear with time and passes the origin, suggesting that the movement of liposome in PAM follows Brownian motions.

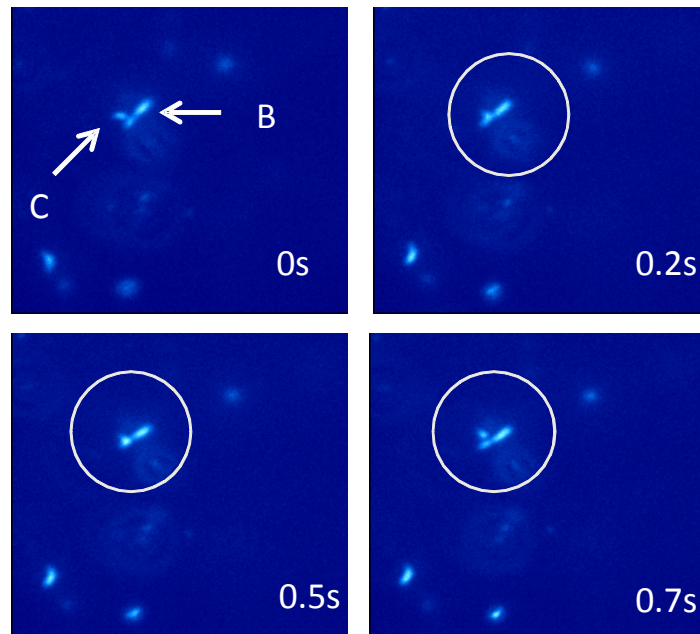


Figure S4. Snapshot of liposome of DPPC/DPPG (1/1) in 1.0% PAM at 50°C. The peptide to lipid molar ratio is 1.56. The number in each panel denotes the time order of the snapshots. Particle A does not connect to fiber B even though they collide with each other.

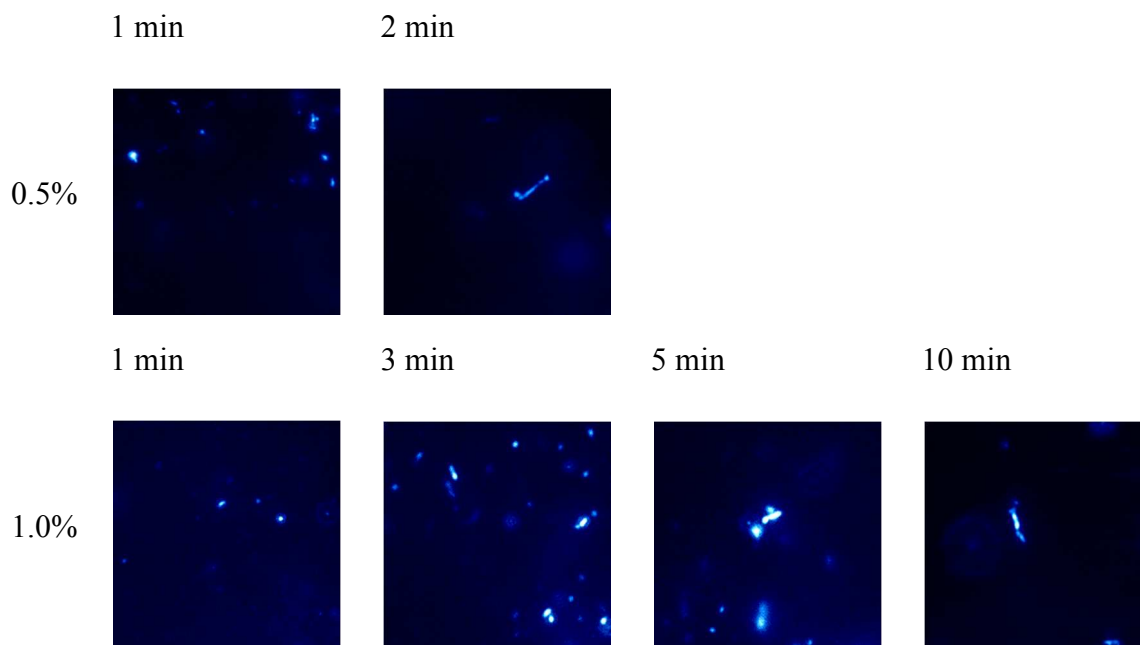


Figure S5. Snapshot of liposome of DPPC/DPPG (1/1) in 0.5% PAM (top panels) and 1.0% PAM (bottom panels) at 50°C. The peptide to lipid molar ratio is 1.56. The dimension of each panel is 20  $\mu\text{m}$   $\times$  20  $\mu\text{m}$ .

Table S1: Name and sequence of the peptides

Peptide name	Sequence
K <sub>3</sub> L <sub>8</sub> K <sub>3</sub>	Ac-KKK LLLL LLLL KKK-amide
KKK	Ac-KKK KKKK KKKK KKK-amide
KLL	Ac-KLLK LLKK LLK LLK-amide
KL	Ac-KKK KKK LLLL LLLL-amide
KLK28	Ac-KKK KKK LLLL LLLL LLLL LLLL KKK KKK-amide

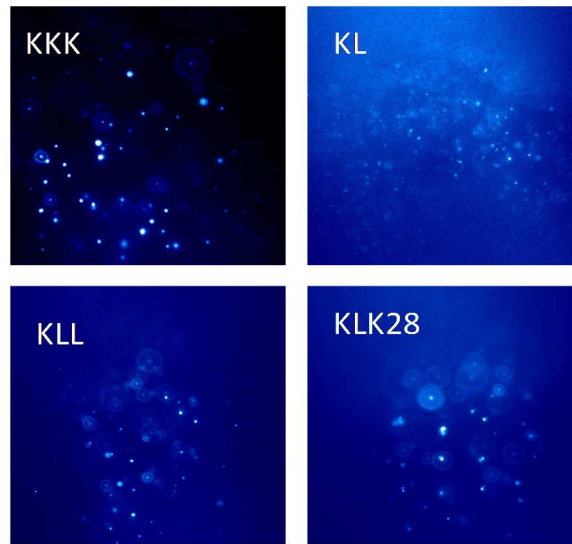


Figure S6: Snapshot of liposome of DPPC/DPPG (1/1) in 1.0% PAM at 50 °C for 10 min in the presence of different peptides. The peptide/lipid ratio is fixed at 1.56. The dimension of each panel is 50  $\mu\text{m}$   $\times$  50  $\mu\text{m}$ .

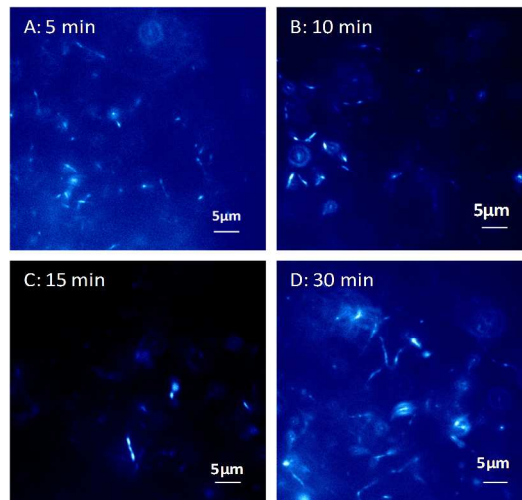


Figure S7: Snapshot of liposome of DPPC/DPPG (1/1) in 0.05% hyaluronic acid at 50 °C. The peptide/lipid ratio is fixed at 1.2.