

## Supporting Information

### Generation of cell-sized liposome using laser-induced microjets

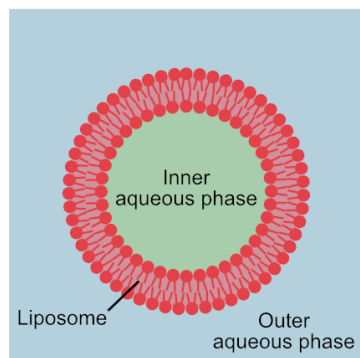
Jiajue Ji, <sup>a‡</sup> Shuma Kawai, <sup>b‡</sup> Rina Takagi, <sup>a</sup> Keiichiro Koiwai, <sup>c</sup> Ryuji Kawano, <sup>\*a</sup> and Yoshiyuki Tagawa <sup>\*b</sup>

<sup>a</sup>Department of Biotechnology and Life Science, Tokyo University of Agriculture and Technology, Koganei, Japan.

<sup>b</sup>Mechanical Systems Engineering, Tokyo University of Agriculture and Technology, Koganei, Japan.

<sup>c</sup>Laboratory of GENOME Science, Tokyo University of Marine Science and Technology, Minato, Japan.

Correspondence: [tagawayo@cc.tuat.ac.jp](mailto:tagawayo@cc.tuat.ac.jp), [rjkawano@cc.tuat.ac.jp](mailto:rjkawano@cc.tuat.ac.jp)



Phase	Solution	Osmolality (mmol/kg)
Inner	500 mM Sucrose	597.3 ± 4.0
Outer	500 mM Glucose	559.6 ± 5.1

Figure S1. Solution compositions and osmolality of the liposome inner and outer phases.

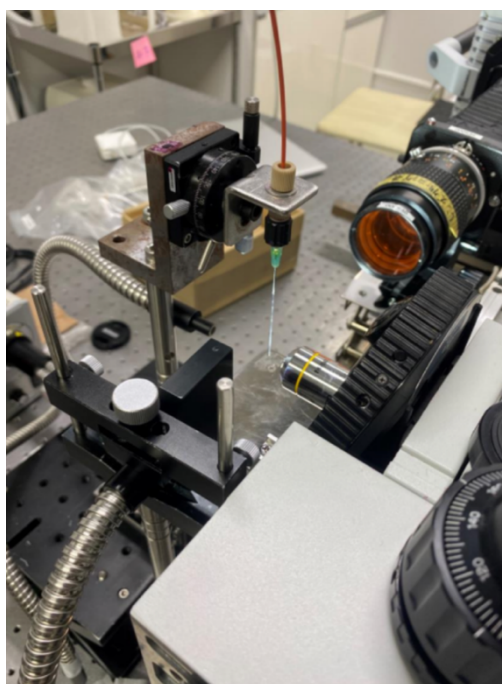


Figure S2. Experimental setup for the liposome generation.

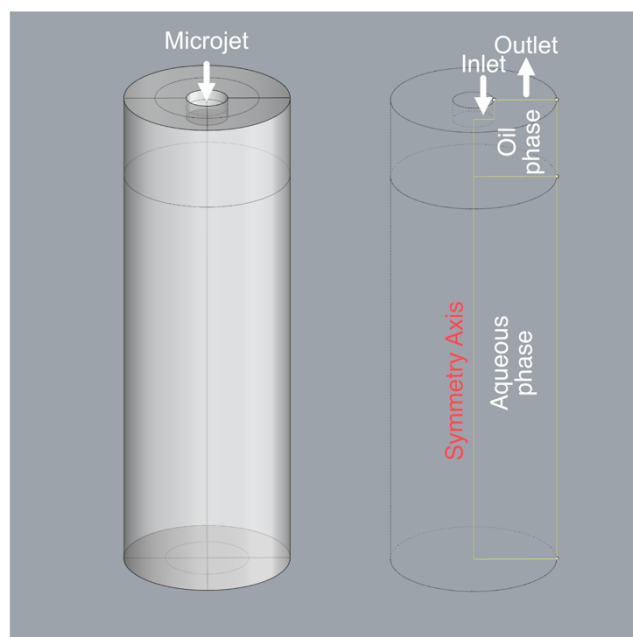


Figure S3. Schematic view of the geometry for numerical analysis. Left: Ghosted view providing a transparent depiction of the components; Right: Boundary conditions of the computational domain.

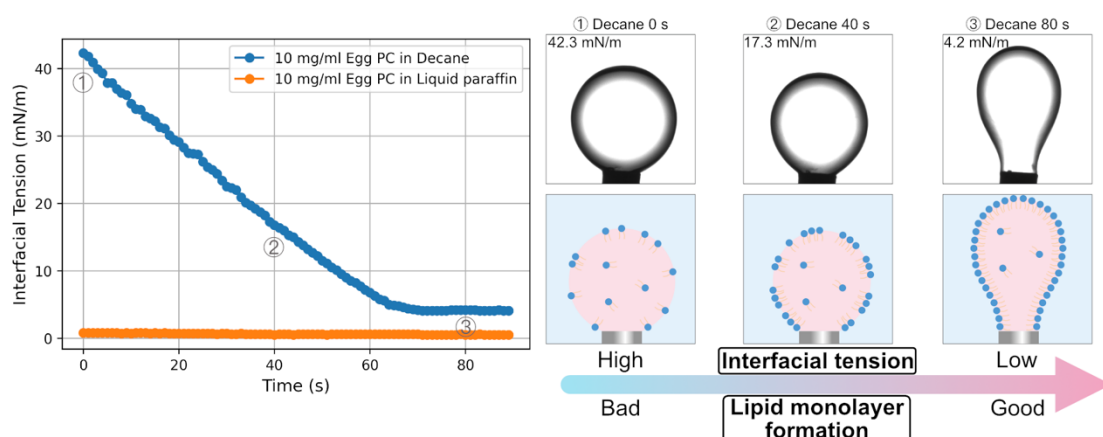


Figure S4. Temporal variation of the interfacial tension between water and oil phase (with 10 mg/mL Egg PC). When liquid paraffin is used as the oil phase, lipids rapidly assemble at the interface to form a monolayer, causing the interfacial tension to immediately drop to a minimum of  $0.6 \pm 0.1$  mN/m. In contrast, with decane as the oil phase, the interfacial tension takes over one minute to reach its minimum, indicating a slow lipid monolayer formation.

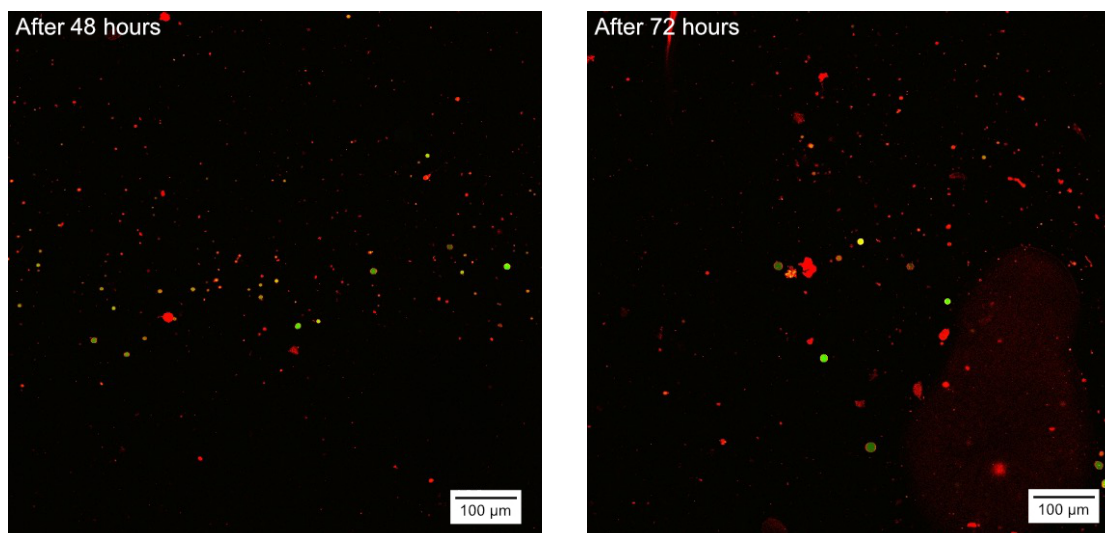


Figure S5. Fluorescence microscopy captured images of liposomes generated using microjet. Liposome interiors and bilayers were fluorescently labeled with 20  $\mu\text{M}$  Alexa 488 (green) and 0.1 mol% Rhod-PE (red) respectively. The liposomes remain clearly observable even after 72 hours.

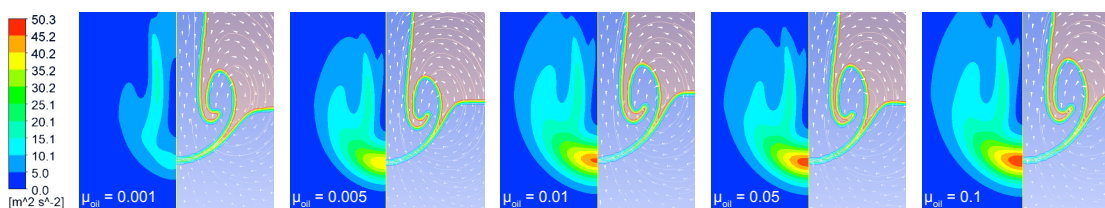


Figure S6. Turbulent kinetic energy of the microjet as it traverses an oil layer with different viscosities of the oil phase. Unit:  $\text{Pa}\cdot\text{s}$