

**Fig. S2**

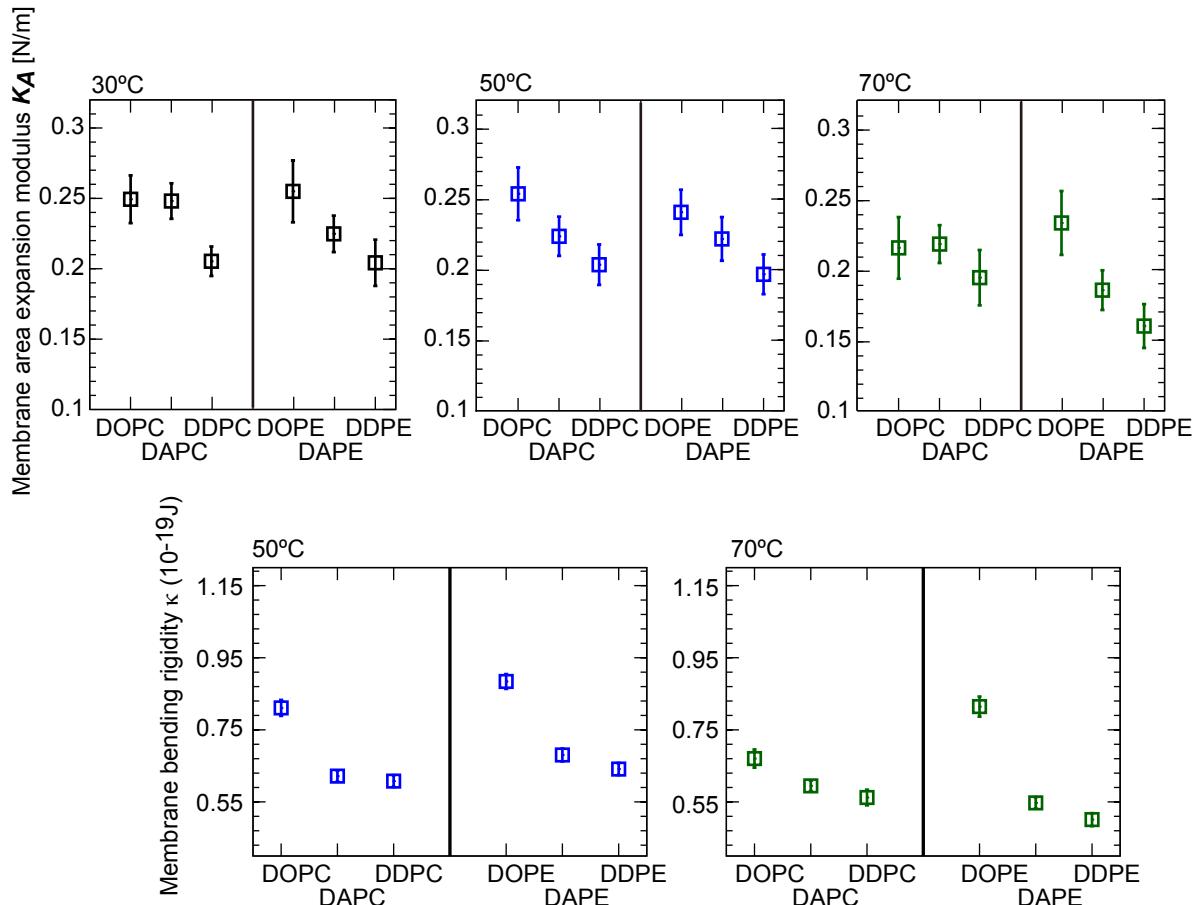


Fig. S2. Area expansion modulus and membrane bending rigidity at 50°C and 70°C.

The area expansion modulus  $K_A$  at 30°C, 50°C, and 70°C, and membrane bending rigidity  $\kappa$  at 50°C and 70°C were calculated by MD simulations. Although the differences at 50°C and 70°C were smaller than at 30°C (Fig. 2C), the lowest values were observed in DDPC. Effect of double bond number in fatty acids on  $\kappa$  and  $K_A$  value decreased at higher temperatures. DDPE also showed similar results with those of DDPC. Statistical errors are estimated using the block average method (1).

(1) Allen, M.P., & Tildesley, D.J. (1989) Computer simulation of liquids. Oxford university press.