Electronic Supplementary Information (ESI)

Structural effects of the dispersing agent Polysorbate 80 on liquid crystalline nanoparticles of soy phosphatidylcholine and glycerol dioleate

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Figure ESI:1. Size distribution of 50/50 SPC/GDO nanoparticles dispersed by 5 (red), 10 (blue) or 15 (green) % dP80 measured by dynamic light scattering at 25 $^{\circ}$ C.

The polydispersity (PD) of the nanoparticle cores was defined in the Sasview software as

$$PD = \frac{\sigma}{x_{mean}}$$

where x_{mean} and σ are the averaged core size and its standard deviation, respectively. σ and x_{mean} were also calculated by fitting a Gaussian function

$$f(x) = \frac{1}{Norm}e^{-\frac{(x - x_{mean})^2}{2\sigma^2}}$$

to the size distribution curves measured by DLS (Figure ESI:1). Estimated values of PD was then calculated to be 0.20 for the nanoparticles dispersed by 5 % d-P80 and 0.24 for the 10 and 15 % d-P80 nanoparticles. These are similar to the fitted values of the core polydispersity.

Table ESI 1. The theoretical effect of increasing the fraction of d-P80 and solvent in the lipid matrix and the SPC/GDO ratio on the SLD of the nanoparticle core. The SLD was calculated varying a single parameter at the time and using 0 % d-P80, 12 % solvent¹ and 50/50 SPC/GDO as standard. The effect of d-P80 was considered assuming a homogenous distribution of the d-P80, used to disperse the sample, throughout the whole particle.

| | d-P80 (%) | | | | Solvent (%) | | | SPC/GDO | | |
|-------------------------|-----------|------|------|------|-------------|------|------|---------|-------|-------|
| | 0 | 5 | 10 | 15 | 5 | 10 | 15 | 50/50 | 25/75 | 0/100 |
| SLD of core H2O | 0.11 | 0.27 | 0.44 | 0.60 | 0.16 | 0.12 | 0.09 | 0.11 | 0.09 | 0.08 |
| SLD of core 1:4 H2O:D2O | 0.77 | 0.94 | 1.10 | 1.27 | 0.44 | 0.68 | 0.92 | 0.77 | 0.76 | 0.75 |

1. Tiberg, F.; Johnsson, M.; Jankunec, J.; Barauskas, J., *Chem. Lett.* **2012**, *41*, 1090-1092.