DNA that is dispersed in the liquid crystalline phases of phospholipids is actively transcribed

Confluent *E. coli* DH5α competent cells were transfected with T7 luciferase plasmid (4316 bp carrying the β-lactamase gene). The plasmid was linearised (position 2632bp) using restriction enzyme Xmn1. Restricted plasmid was purified using the QIAGEN MaxiPrep protocol. Liquid crystal phases were prepared from dried DOPE at the standard 50wt% composition using nuclease-free isotonic (0.15M) saline solution. The lipid (2.5 to 3mg) was weighed into a nuclease-free 2.0 ml micro-centrifuge tube. 1µg of the linearised T7 DNA was added in nuclease-free water (typically 13µl), the sample was freeze-dried and then the liquid crystal phase was formed by adding the equivalent volume of isotonic saline. After mixing with a glass rod or pipette tip, samples were centrifuged to collect the maximum amount to the phase at the bottom of the tube. Control samples of DNA were freeze dried and suspended in isotonic saline prior to use in the transcription experiments. Transcription was assayed using the Megascript kit following the standard Megascript protocol. RNA gels were run at 4 V cm^{-1} using precast Agarose gels. RNA was denatured at 65ºC with glyoxal buffer and the gels were stained with SybrII green stain and visualised using a UV transilluminator.

To obtain naked nuclei, two solutions using HBSS (w/o calcium, magnesium) were prepared; solution A, sucrose (30% w/v), Triton X100 or Beta-decylmaltopyranoside at (0.5 w/v) and EDTA-Na 400mM and Solution B, Triton X100 or Beta-decylmaltopyranoside (0.5% w/v) and EDTA-Na 400mM. Whole HeLa cells were trypsinised and washed with phosphate buffered saline (w/o

magnesium, calcium), solution B (0.5 ml) was added and the cells were vortexed and placed on ice for fifteen minutes. Ice-cold solution A (0.4 ml) was added to screw top 1 ml microcentrifuge tubes and after fifteen minutes on ice the cells in solution B were carefully layered on to the microcentrifuge tube containing solution A. Samples were centrifuged (9000 rpm, 3 minutes). Supernatant and cellular debris was removed with a pipette to leave the naked nuclei pellet at the bottom of the microcentrifuge tube. The nuclei were washed by vortexing in HBSS (1ml), centrifuged (9000 rpm, 3 minutes) and lyophilised.