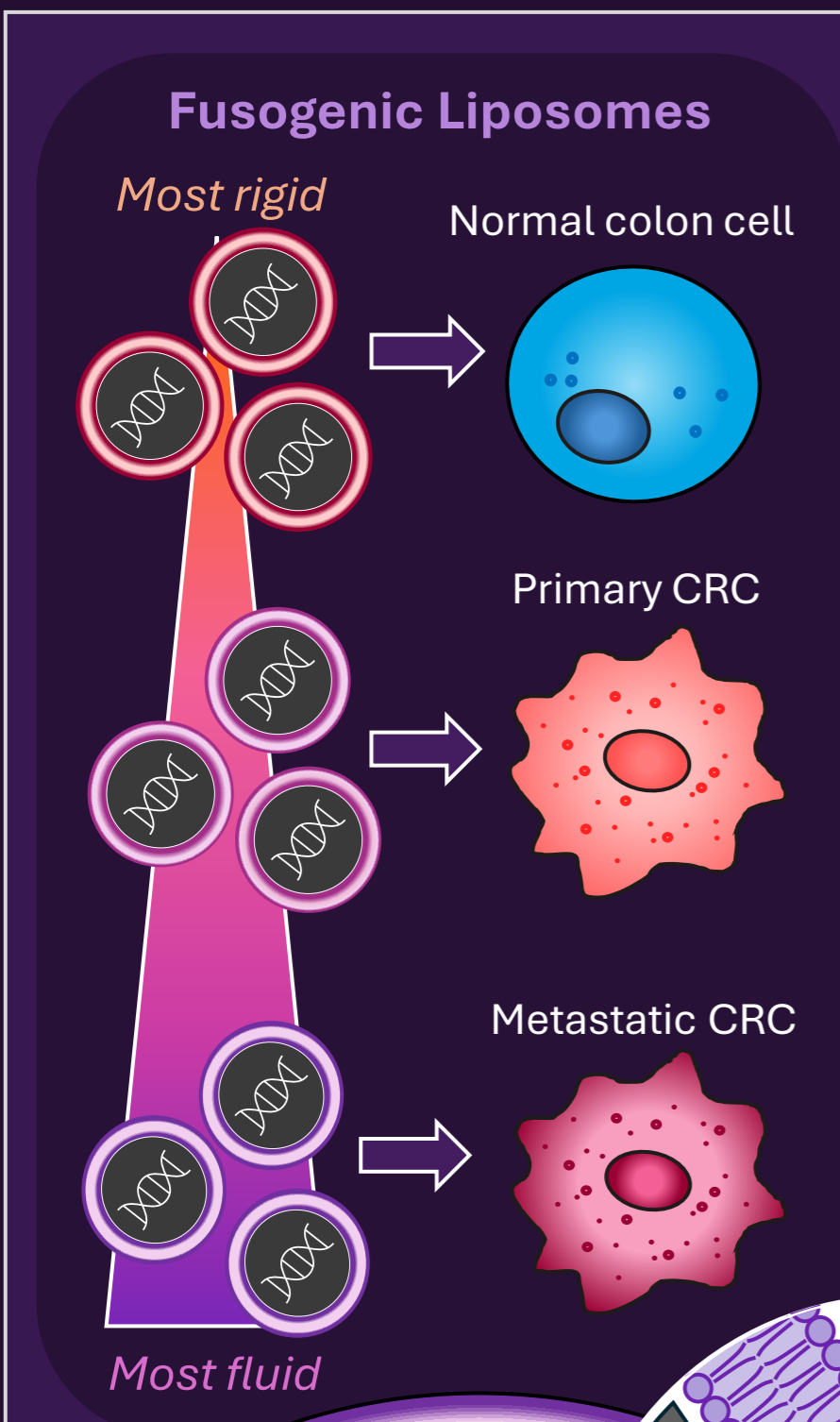
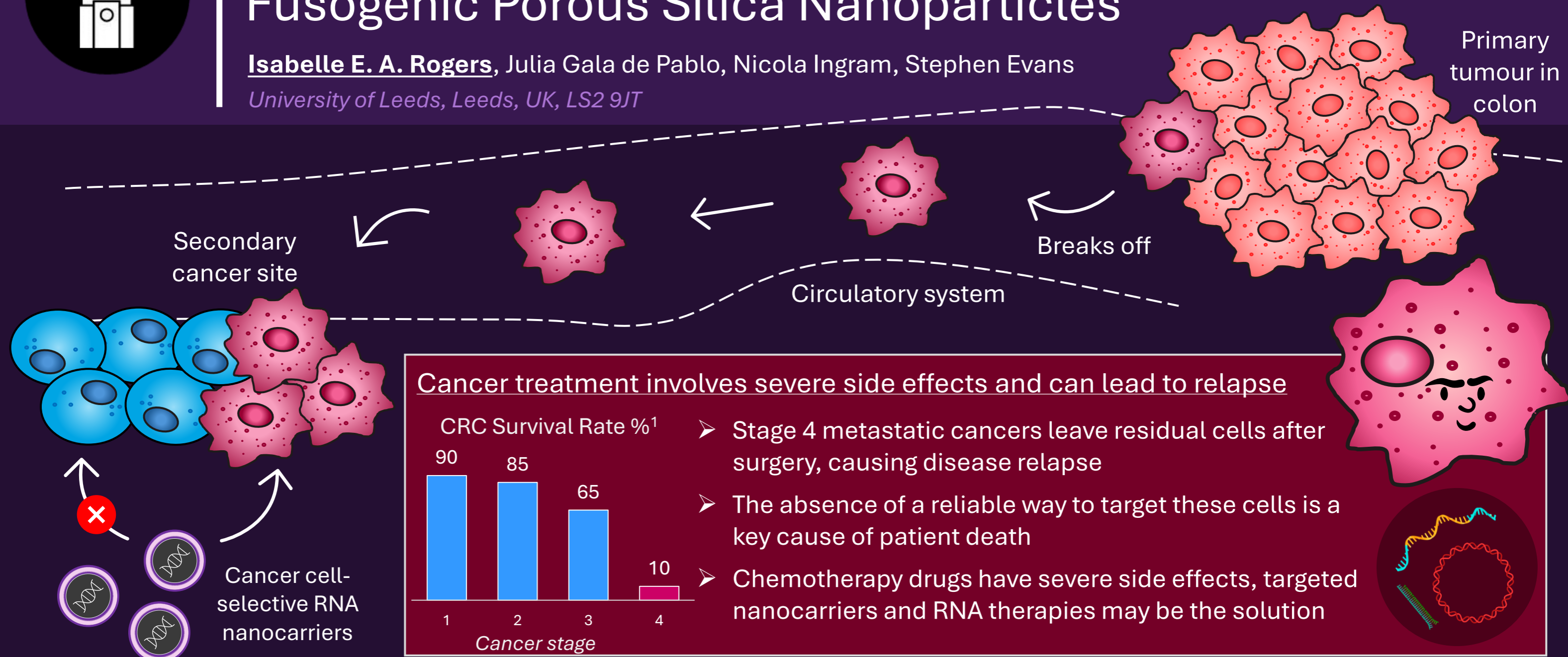




Tumour Cell-Specific Delivery of RNA Therapies using Fusogenic Porous Silica Nanoparticles

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Selective uptake can be tailored using LNP membrane fluidity²

Structural phospholipids with different fluid-phase temperatures (T_f) control fluidity

POPC $T_f = -4^\circ\text{C}$

DMPC $T_f = 24^\circ\text{C}$

DSPC $T_f = 55^\circ\text{C}$

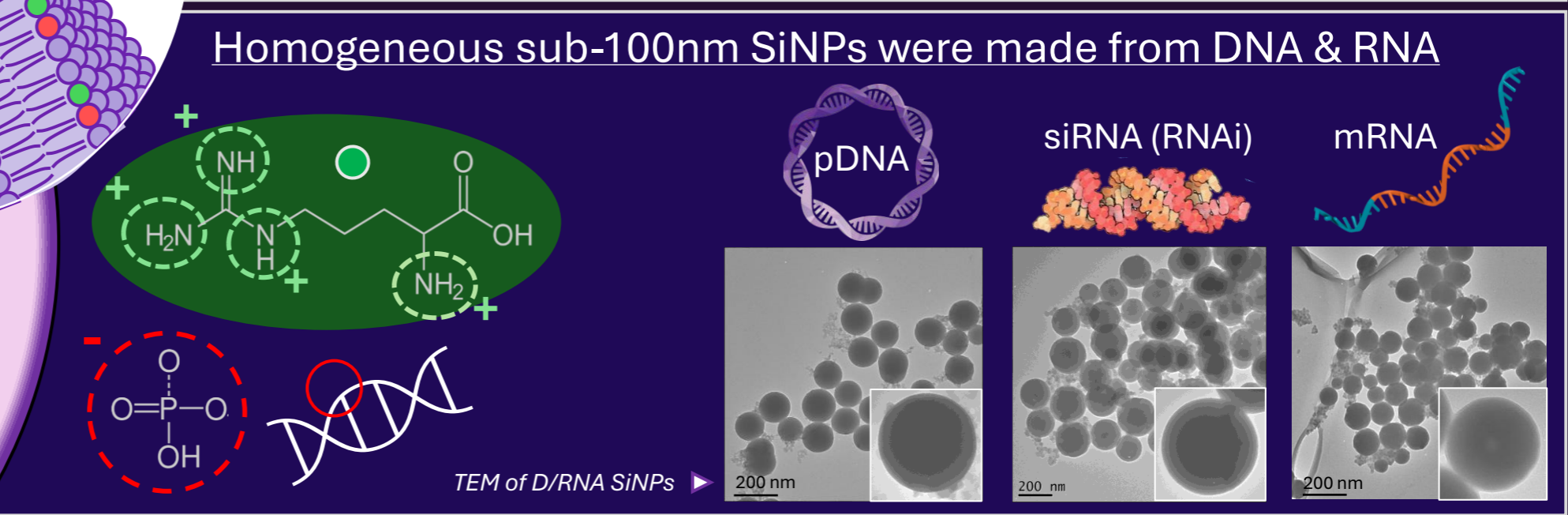
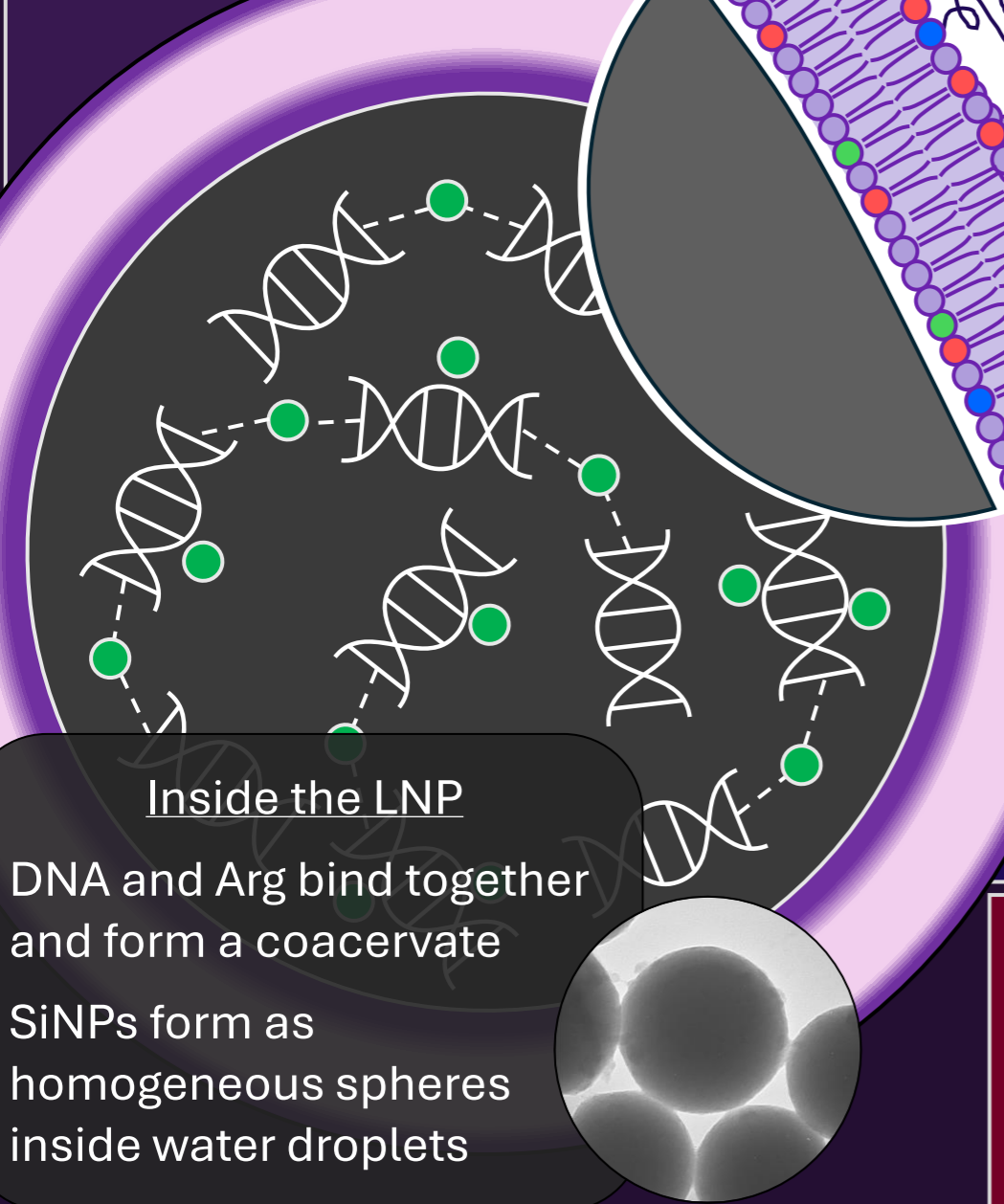
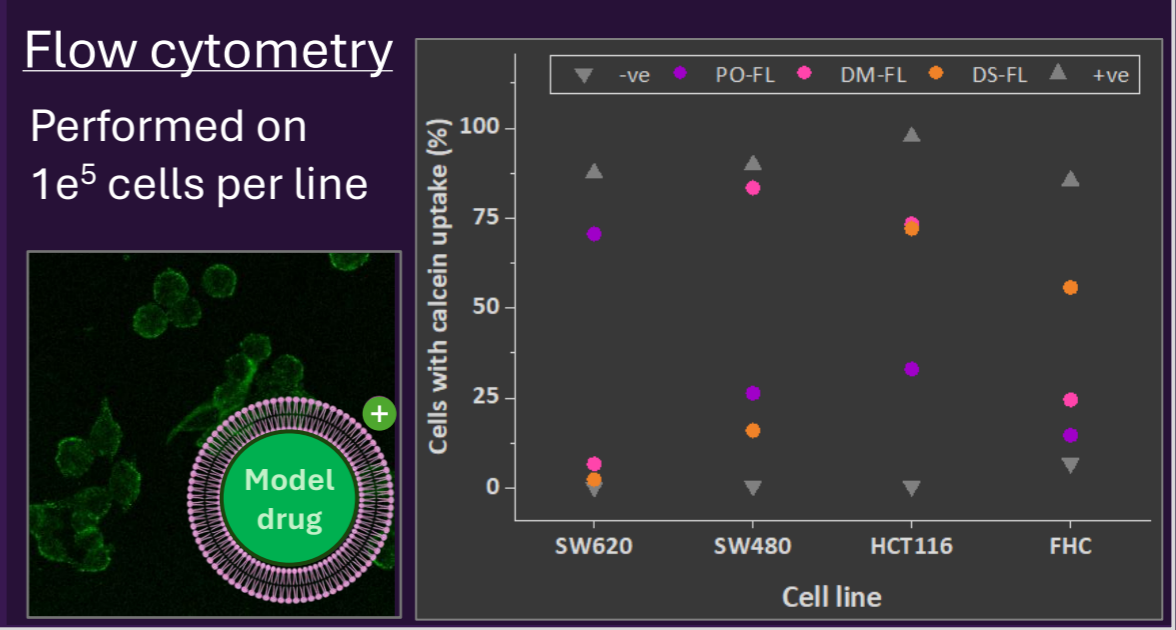
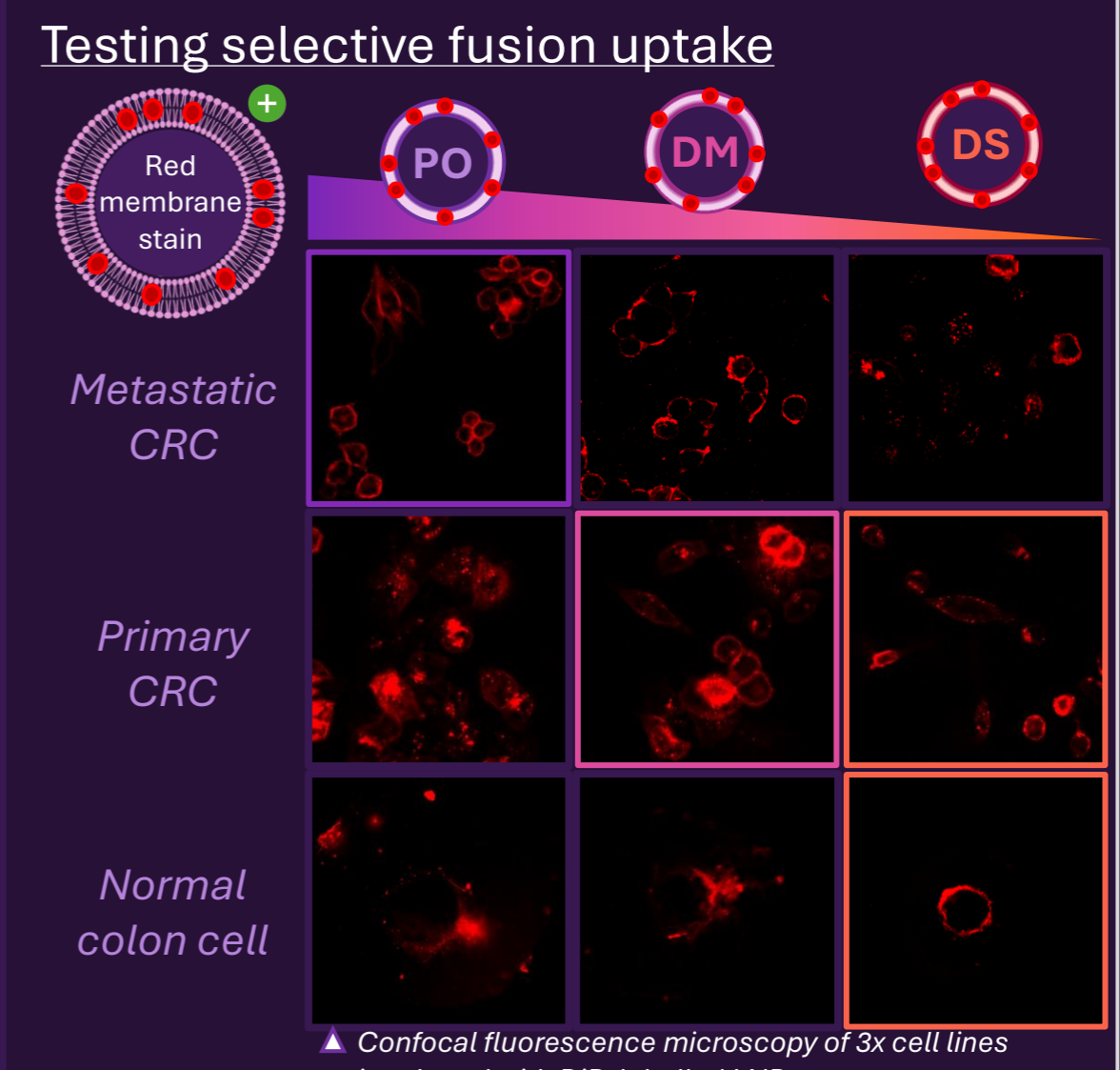
RNA needs cytoplasmic delivery

Including 20% DOPE to disrupt the cell membrane²

PEGylated lipids dehydrate the gap between membranes⁴

DOTAP is a +ve lipid which attracts -ve cell membrane

The final F-LNPs combine these lipids to create a fusogenic nanocarrier



Conclusions and Future

- Selective targeting of primary and metastatic cancer cells is possible using LNP fluidity
- Delivery of lipid coated RNA-SiNPs and herringbone microfluidic chip for FLNP-SiNP synthesis

1. Cancer Research UK (2026), 2. Bompard, J. et al., (2020), *Langmuir*, 36 (19), p. 5134, 3. Kim, B. et al., (2019), *Adv. Mat.*, 31, p.1902952, 4. Navarro-Becerra, J., (2024), *ACS Bio*, 10, p.3331.