

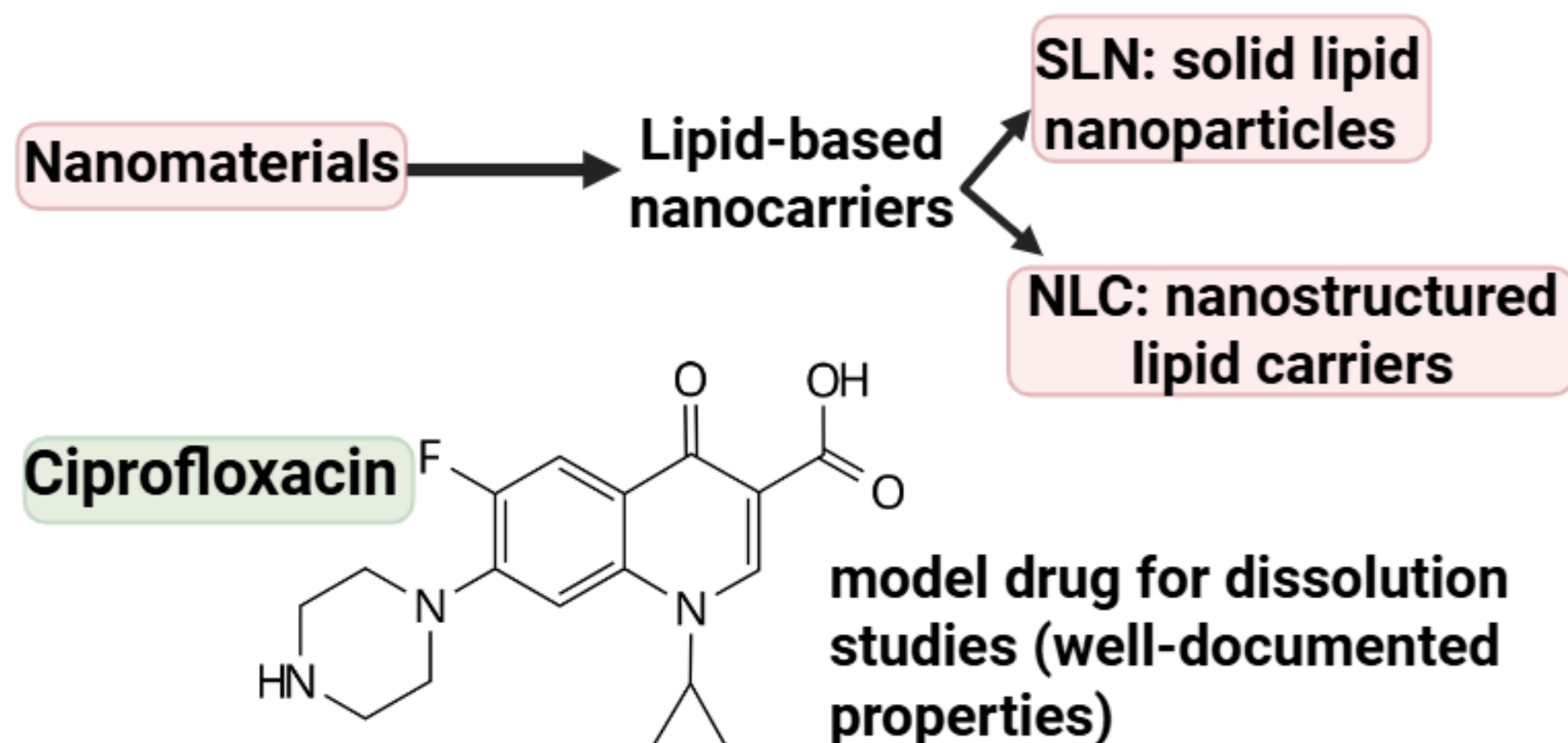
Predictive kinetic modeling of ciprofloxacin release from lipid-based nanocarriers for enhanced oral bioavailability

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INTRODUCTION & AIM

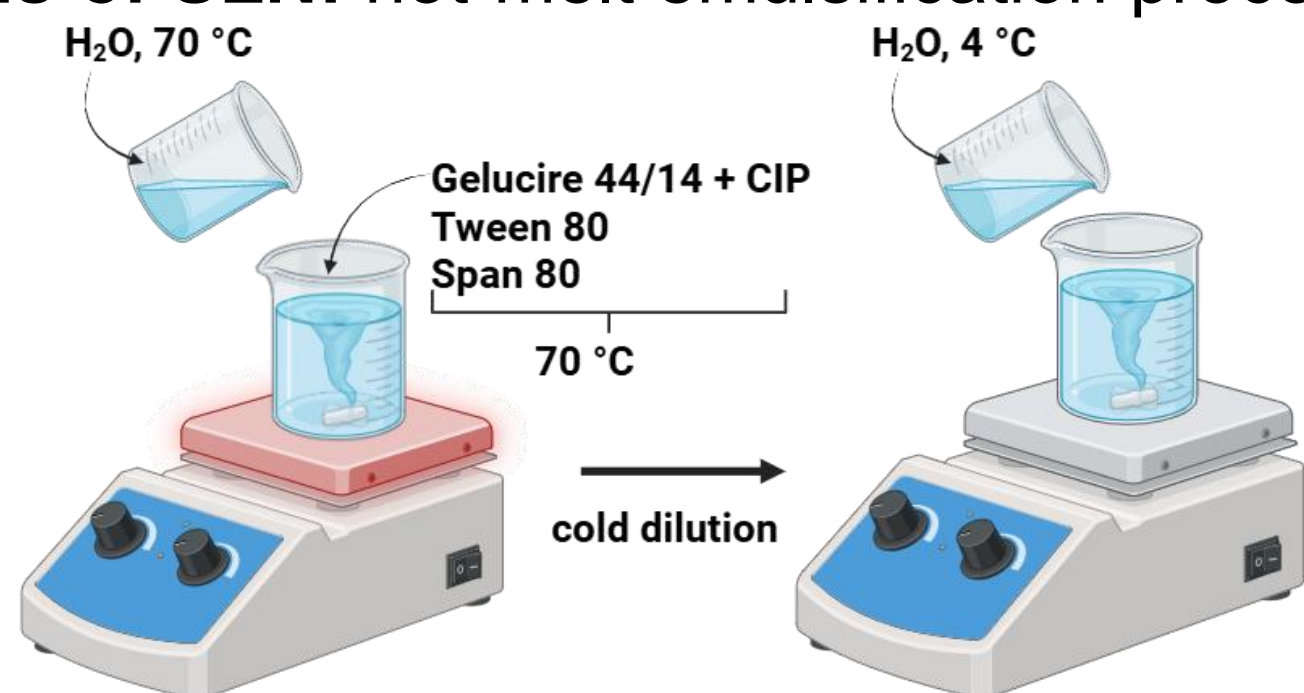
The development of efficient drug delivery systems remains a major challenge in pharmaceutical sciences.



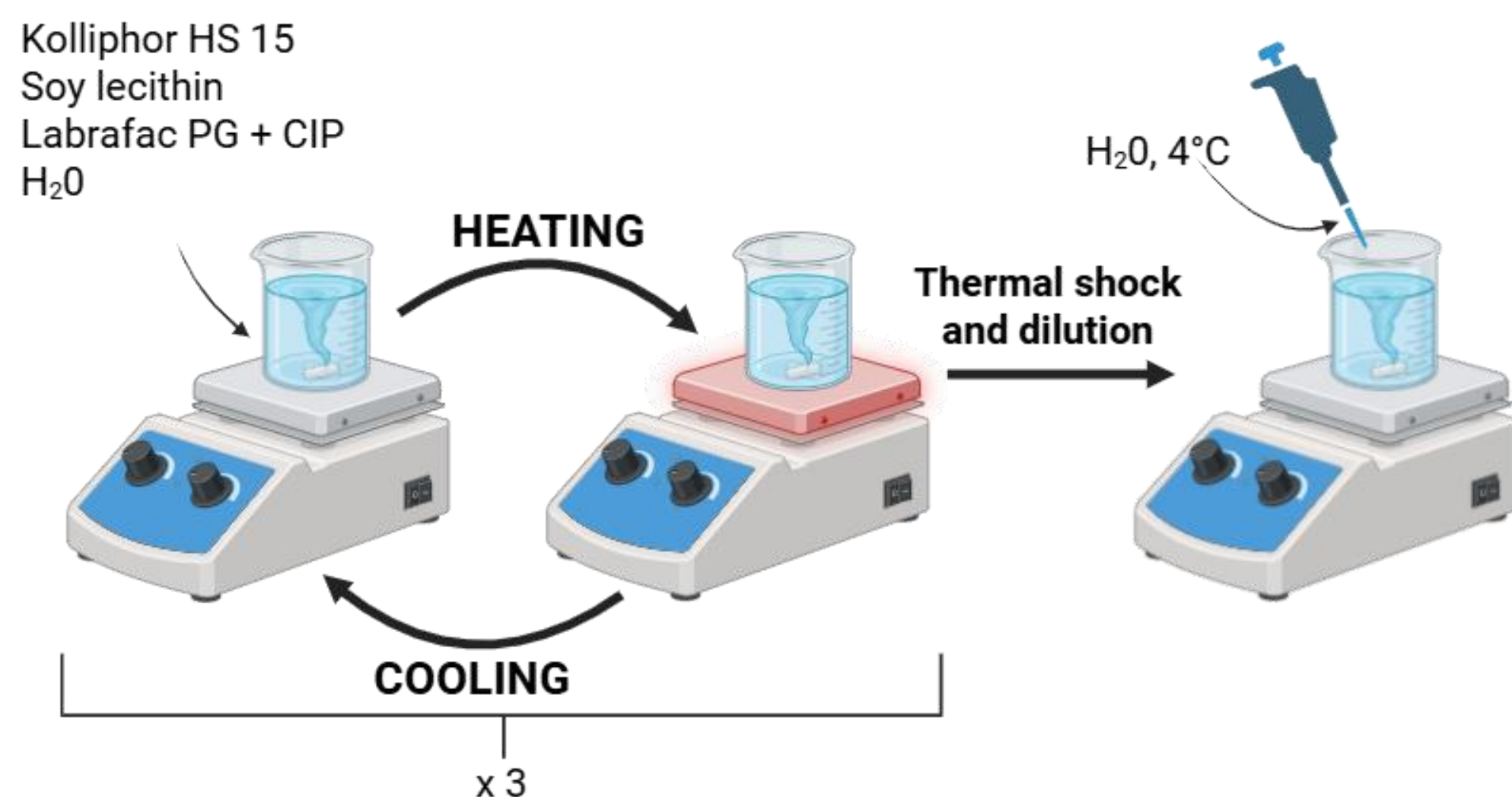
AIM: To design and characterize lipid nanocarriers (SLN and NLC) for oral ciprofloxacin delivery, evaluating their release profiles through predictive kinetic modelling.

METHOD

✓ **Synthesis of SLN:** hot-melt emulsification process.



✓ **Synthesis of NLC:** phase inversion technique.



✓ **Characterization:**

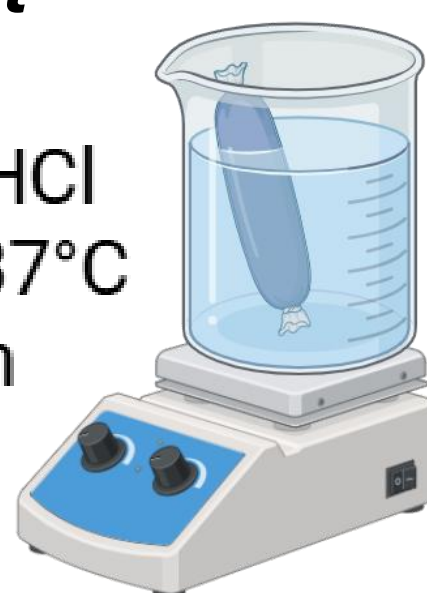
Dynamic light scattering



Particle size
Polydispersity index
Zeta potential

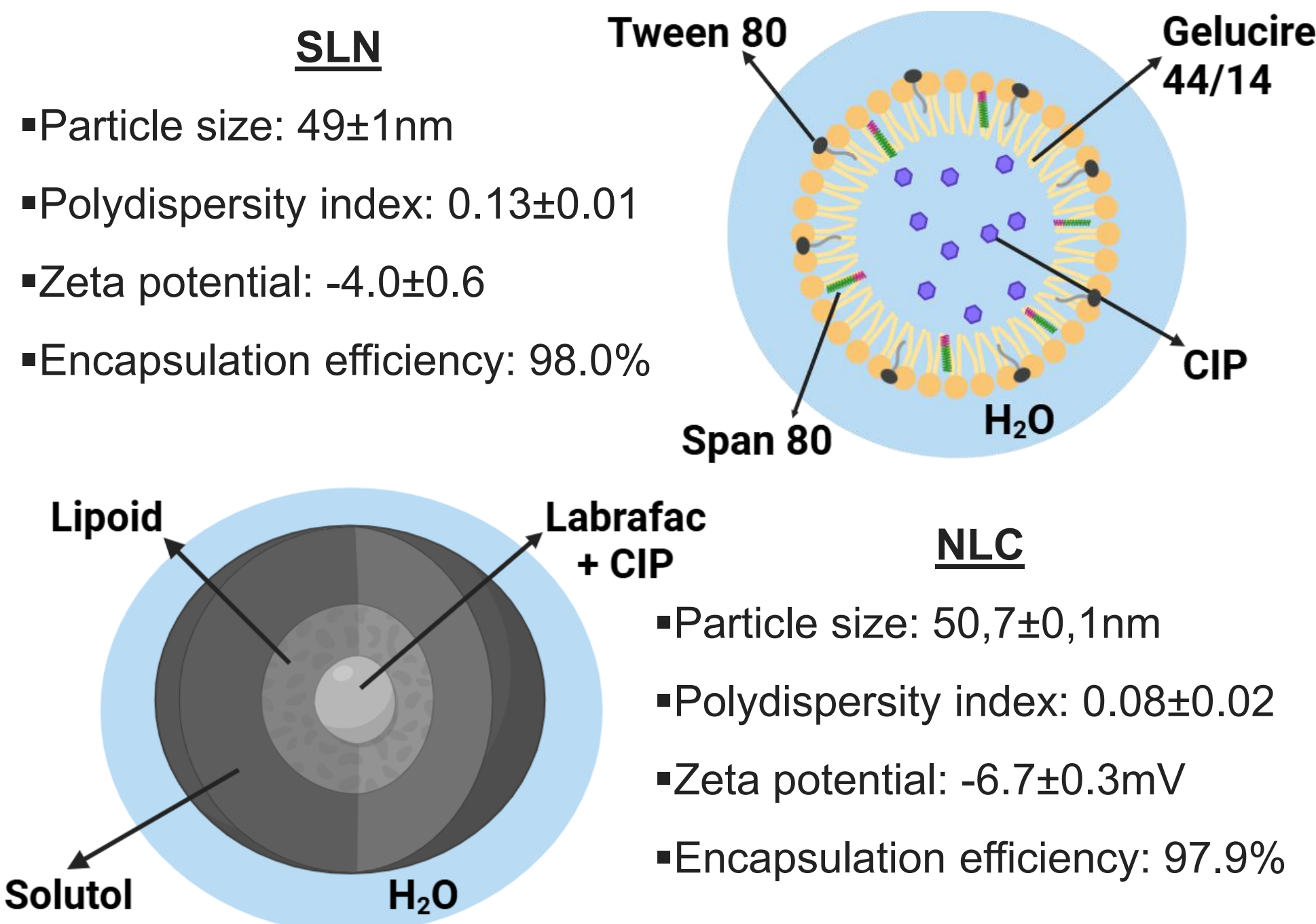
Release test

0.1 N HCl
6h at 37 °C
50 rpm

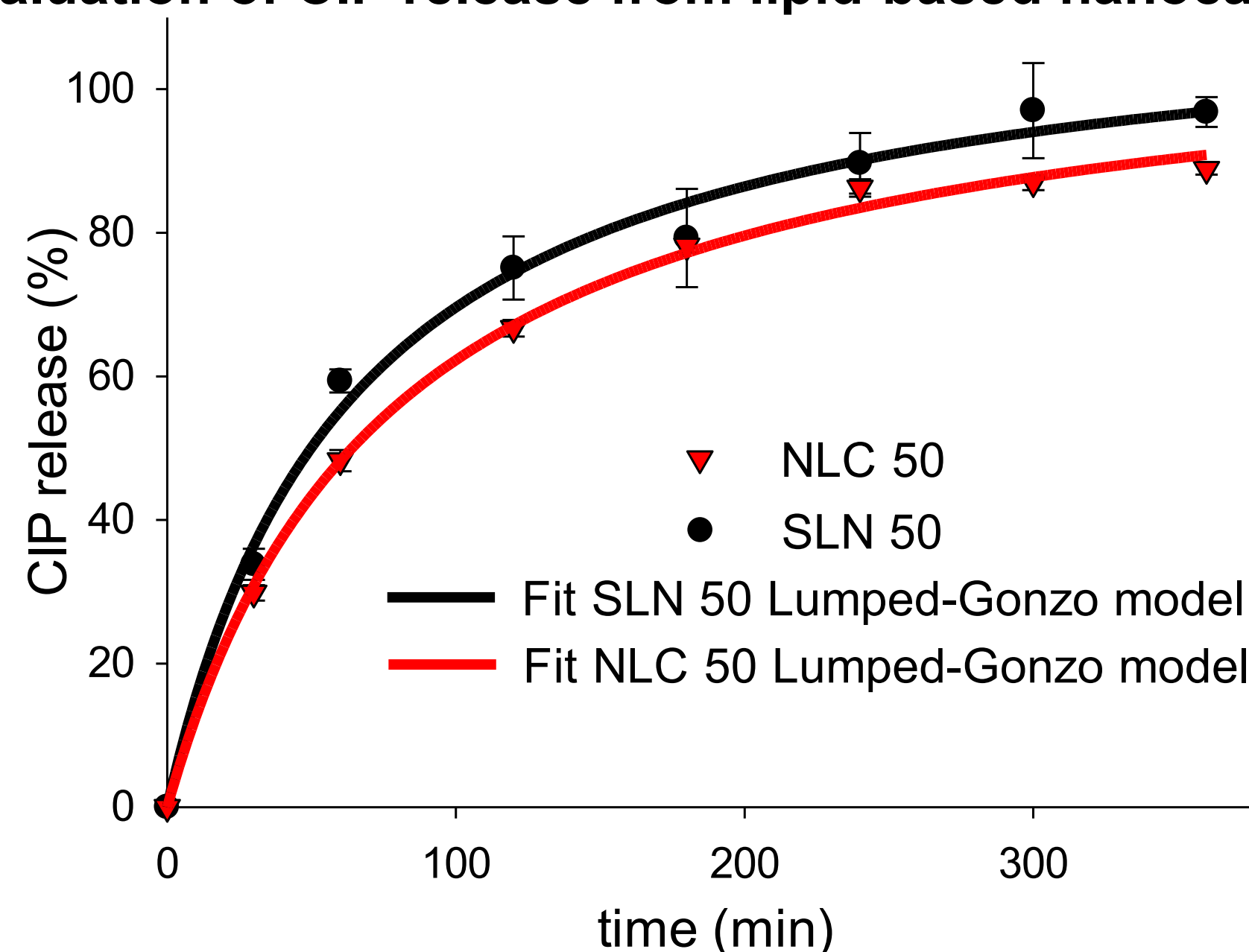


RESULTS & DISCUSSION

Representative structure and characteristics of lipid-based nanocarriers



Evaluation of CIP release from lipid-based nanocarriers



Pharmaceutical parameters for CIP release obtained from Lumped-Gonzo model^{1,2}

Nanocarrier	t _{15%} (min)	MDT _{15%} (min)	CIP _{30min} (%)	DE _{360min} (%)
SLN	9.0	4.3	37.9	75.2
NLC	11.9	5.7	31.5	70.8

MDT: and mean dissolution time, and DE: dissolution efficiency.

CONCLUSION

These results demonstrate that predictive kinetic modeling is a valuable strategy for guiding the rational design of stable and effective lipid-based nanocarriers to improve ciprofloxacin oral bioavailability.

REFERENCES

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- Romero AI, Villegas M, Cid AG, Parentis ML, Gonzo EE, Bermúdez JM. Validation of kinetic modeling of progesterone release from polymeric membranes. *Asian J Pharm Sci*. 2018;13: 54–62. doi:10.1016/j.ajps.2017.08.007