

MICROFLUIDIC PRODUCTION OF PLGA@LIPID HYBRID NANOPARTICLES FOR CO-DELIVERY OF TWO ANTICANCER AGENTS



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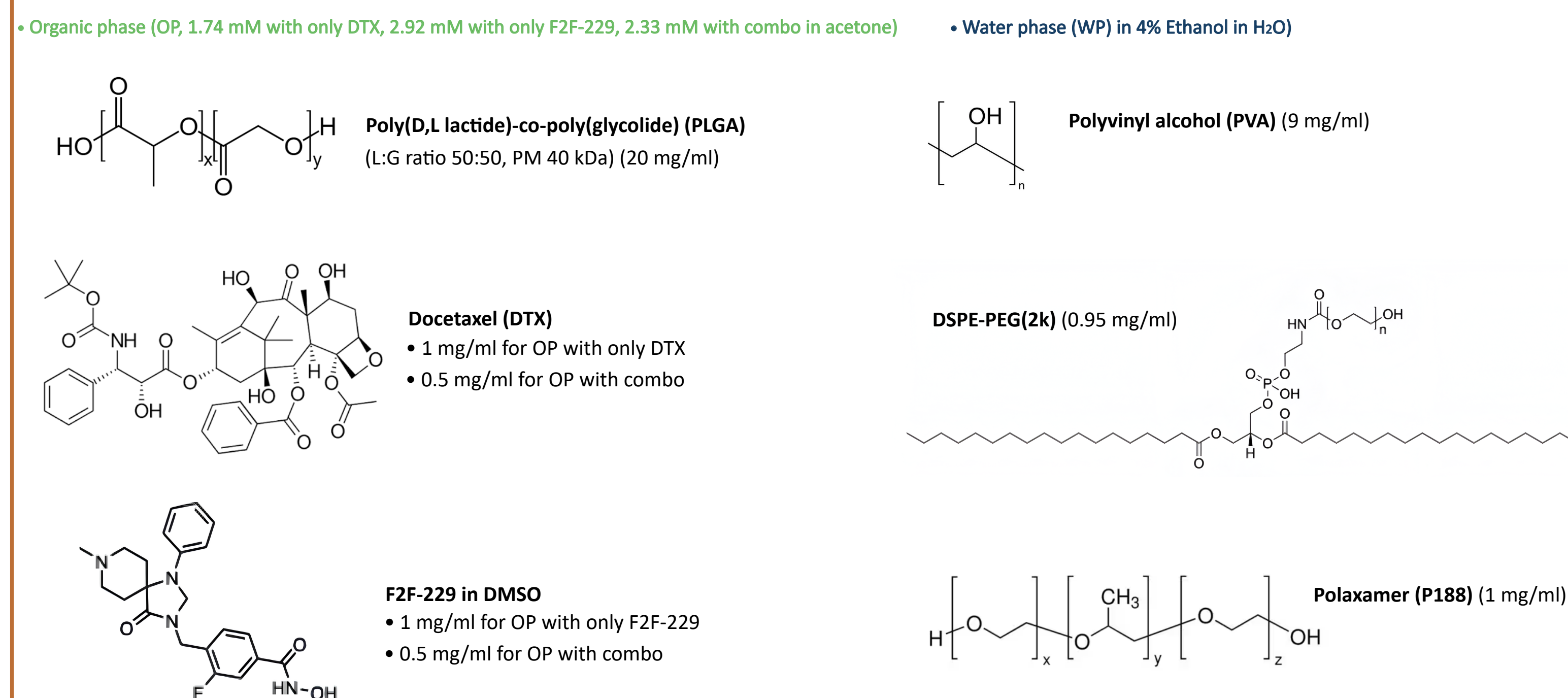


Introduction

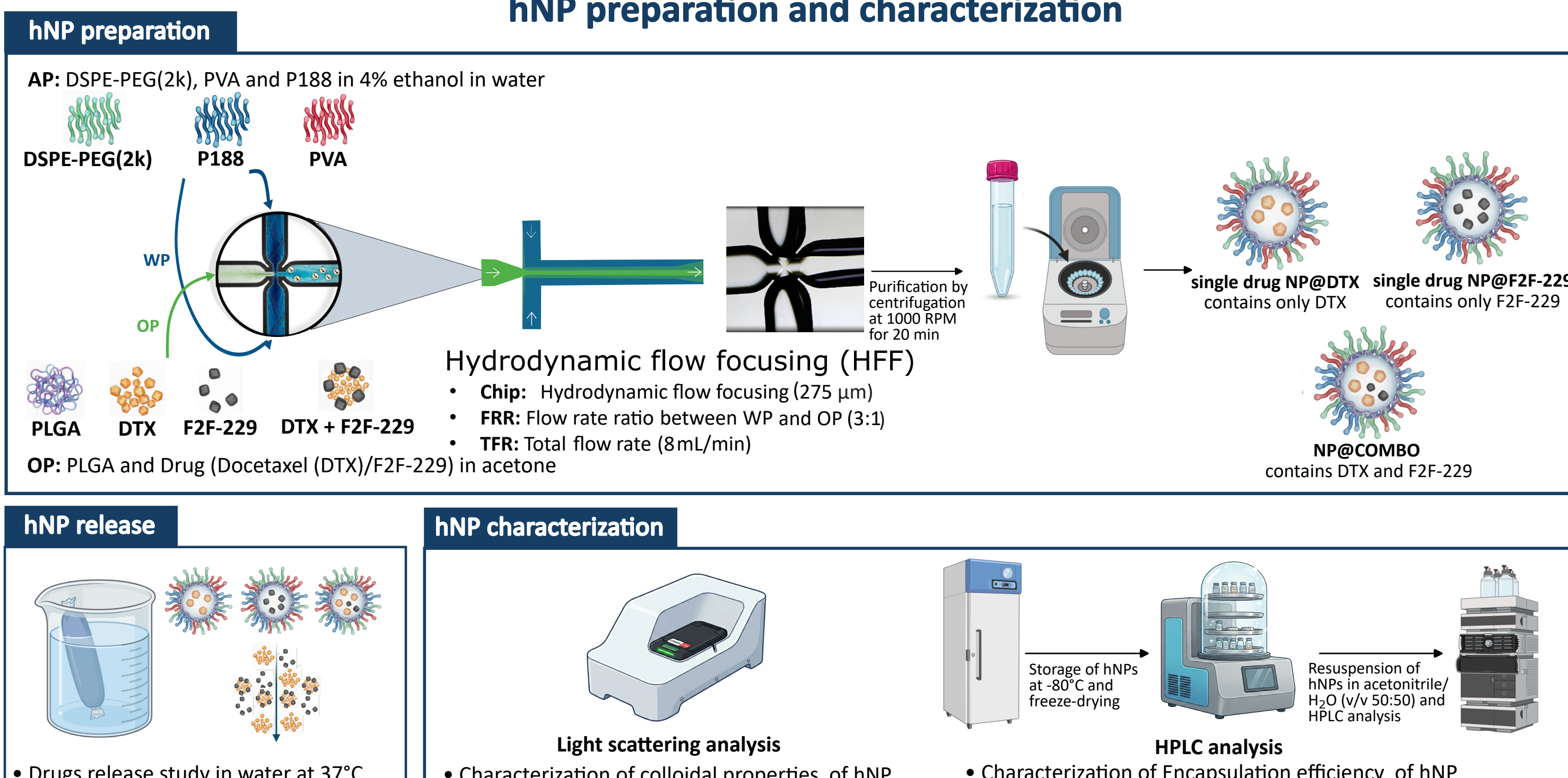
Hybrid nanoparticles (hNP) are widely investigated in nanomedicine for controlled drug release, modulating pharmacokinetics and increasing maximum tolerated dose. There are no FDA-approved hNP available in the clinic,¹ and delivering drug combinations with a simple hNP platform. In order to explore whether delivering small molecules in combination can improve the therapeutic utility of hNP, we developed hNP loaded with docetaxel (DTX) and a novel epigenetic modulator F2F-229²⁻⁵ against MDA-MB-231 triple-negative breast cancer cells, acting as potent and selective histone deacetylase 6 (HDAC6) inhibitor. Alone, F2F-229 is too hydrophobic to administer conventionally, thus necessitating the encapsulation into a nanoparticle formulation.

Experimental design

Components hNP

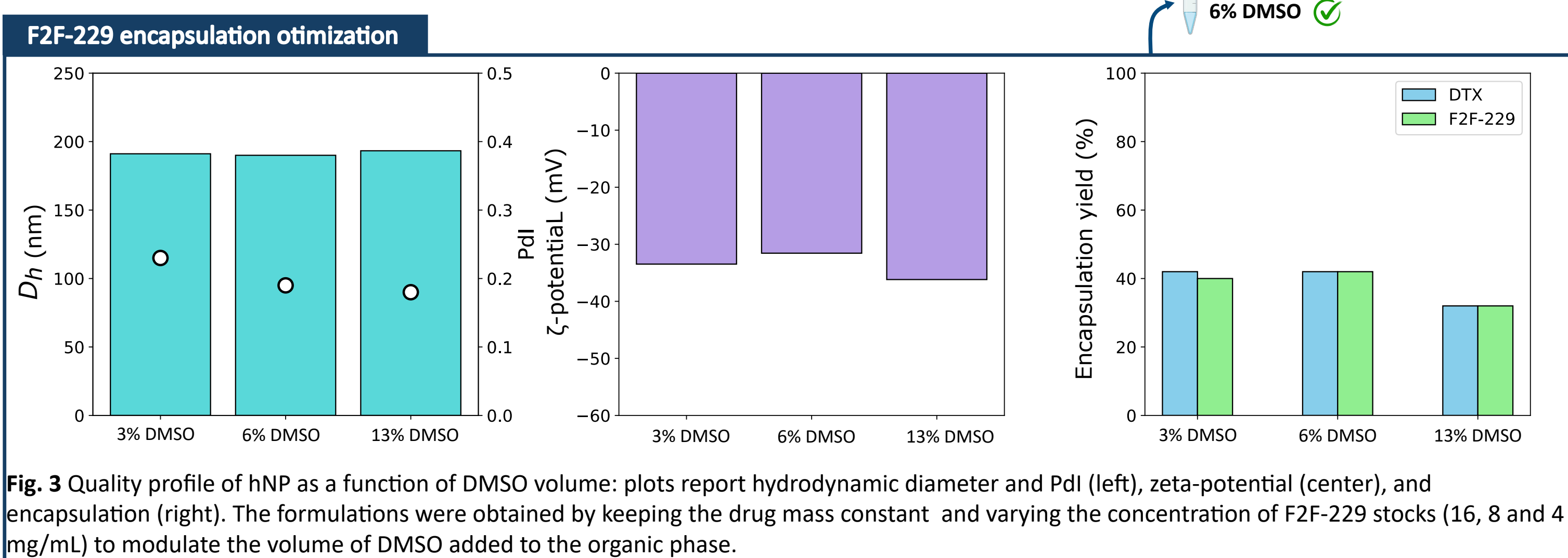
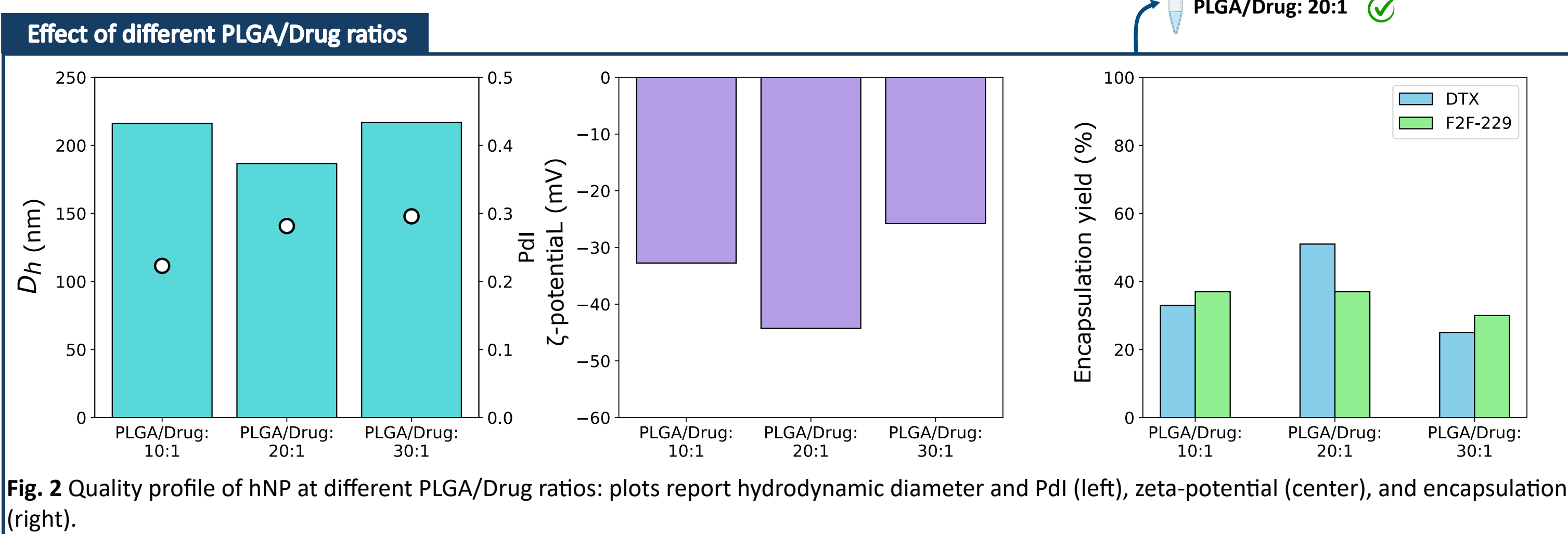
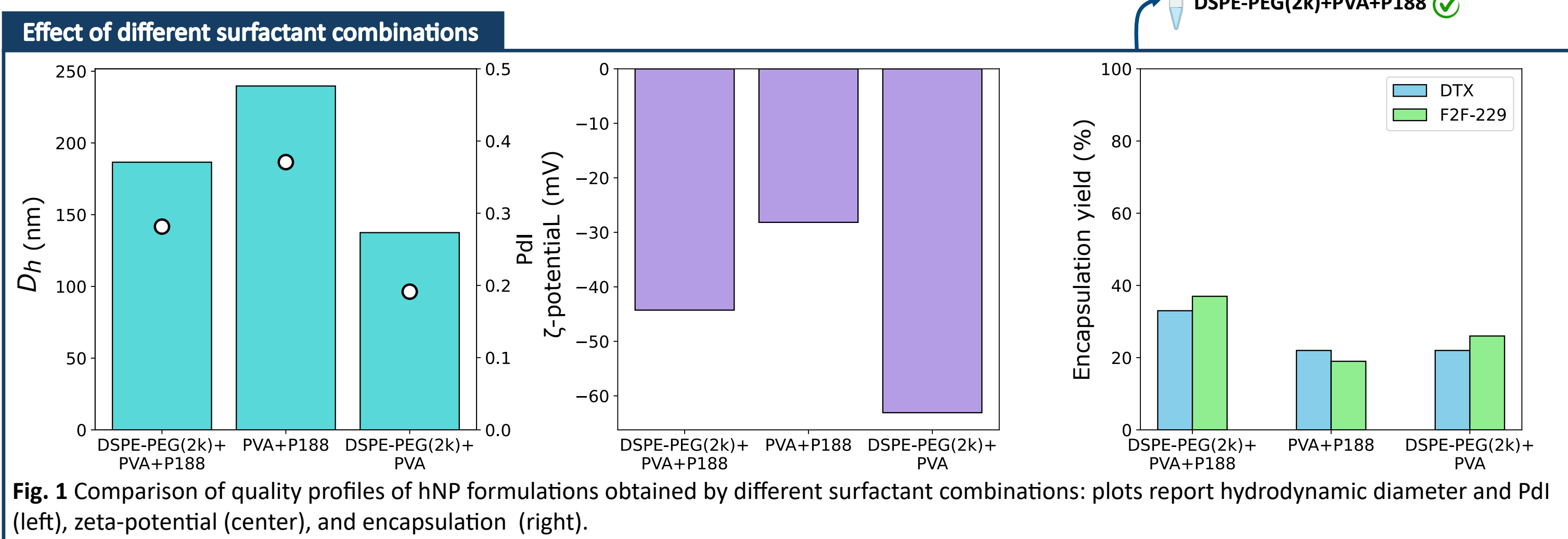


hNP preparation and characterization

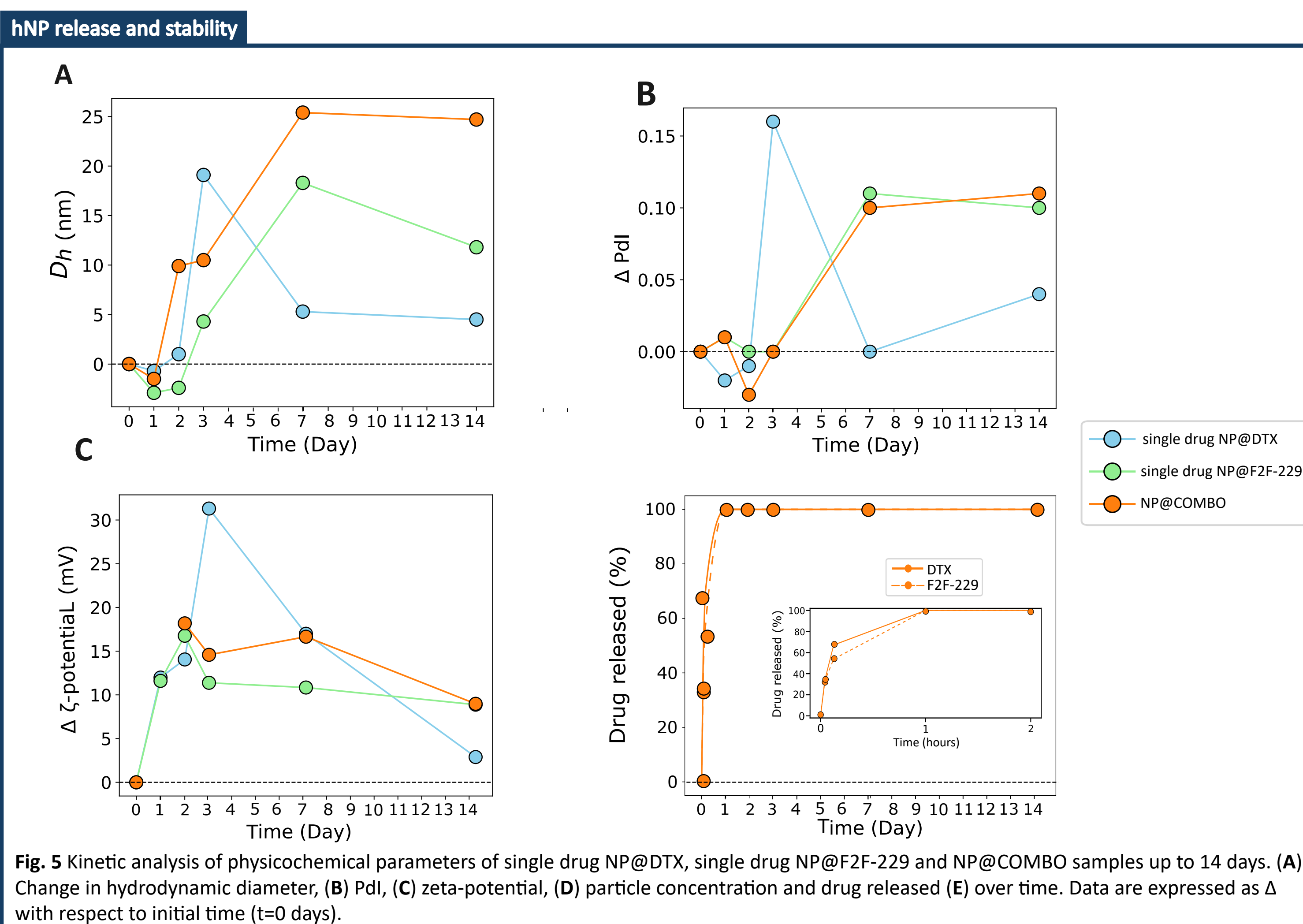
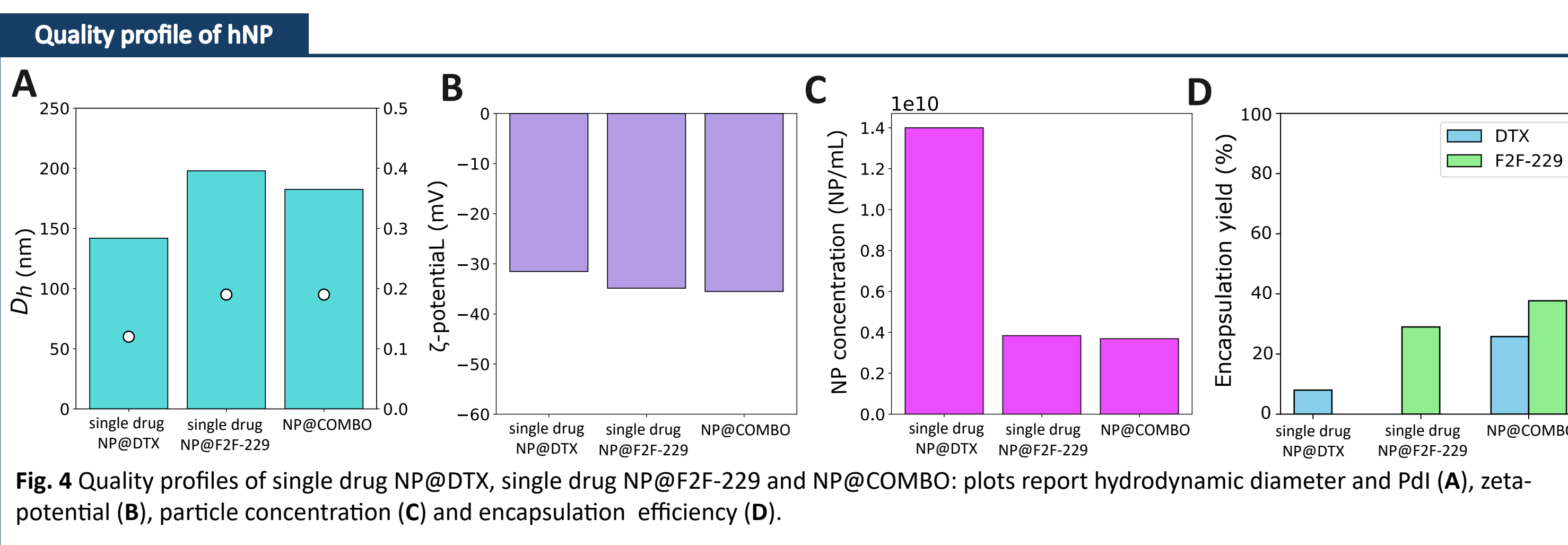


Results and discussion

Optimization of hNP formulation



hNP characterization



Conclusions

In conclusion, the present work establishes a robust method for encapsulating a novel anticancer therapeutic for combination therapy. The resulting formulations demonstrate optimal particle sizes and low PDI, and the simultaneous incorporation of the two drugs within the same formulation leads to a synergistic effect, as evidenced by an increased encapsulation efficiency. Future research efforts will focus on conducting in vitro studies to evaluate the biological efficacy in cellular models, as well as on exploring the potential of encapsulating siRNA to further enhance therapeutic outcomes.

References

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Acknowledgments

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