

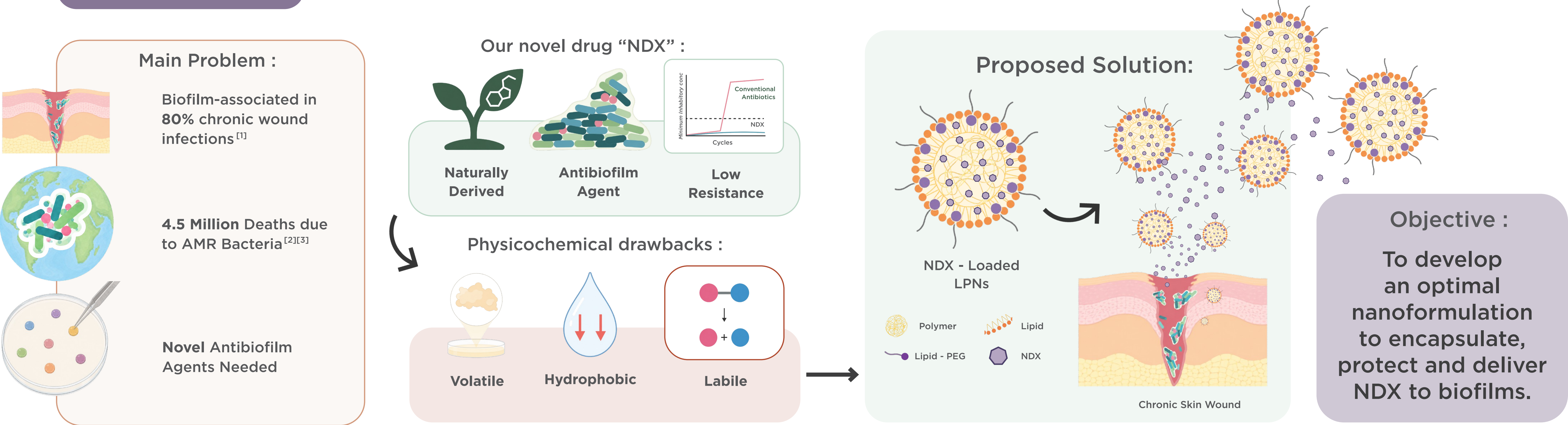
Lipid-polymer Hybrid Nanoparticle System Loaded with Novel Bioactive Anti-biofilm Compound for the Treatment of Infectious Diseases

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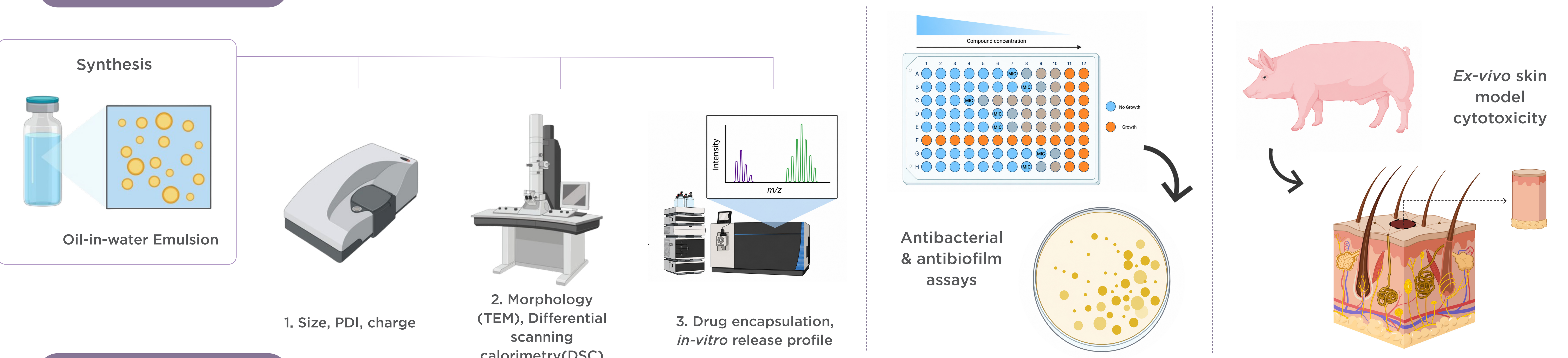
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Background



Methods



Results

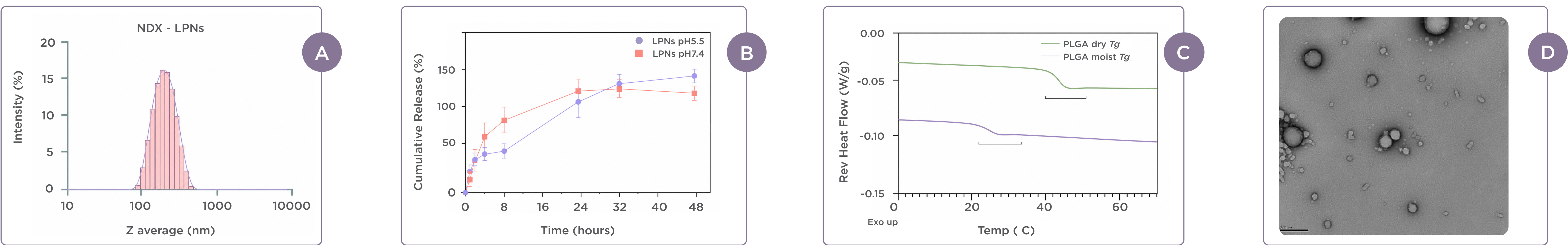


Figure 2 - Characterization of LPNs: **A)** Size distribution of NDX-LPNs **B)** In-vitro release profile of NDX-LPNs at pH 5.5 (blue) and pH7.4 (red) **C)** DSC thermograms of PLGA in dry and moist state **D)** TEM image of NDX-LPNs

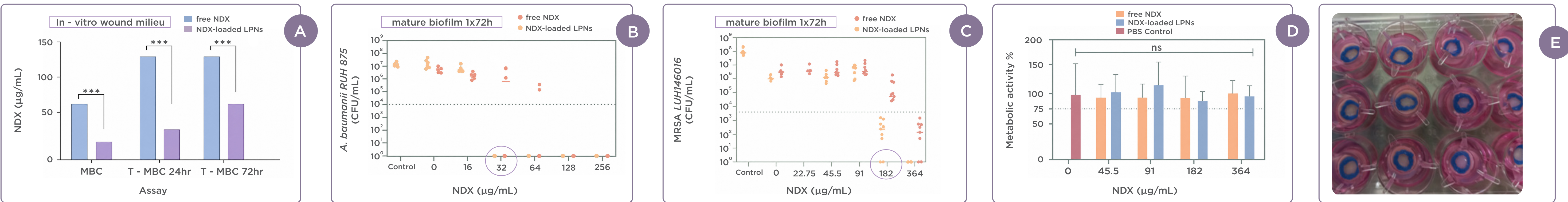


Figure 3 - A) Bactericidal efficacy (MBC) and MBC measured after samples pre-incubated in *in-vitro* wound milieu (T-MBC); Anti-biofilm efficacy of free NDX and NDX-LPNs against mature 7 day biofilms of **B)** *A.baumannii* and **C)** *S.aureus* after a single 72h treatment; **D)** Metabolic activity of NDX-LPNs distribution of NDX-LPNs **E)** In-house *ex-vivo* pigskin model

Conclusion

- Successfully developed LPNs encapsulating NDX with optimal size and encapsulation efficiency.
- LPNs demonstrated a biphasic release pattern with initial burst release followed by sustained release until 24-32hrs.
- LPNs improved chemical stability, antibacterial and antibiofilm properties of NDX.
- LPNs demonstrated excellent biocompatibility in *ex vivo* pigskin model
- This study demonstrates the potential of NDX-LPNs for further development as novel therapeutic agent to combat biofilm-associated infections.

References

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- (2) Hall-Stoodley, L.; Costerton, J. W.; Stoodley, P. Bacterial Biofilms: From the Natural Environment to Infectious Diseases. *Nat. Rev. Microbiol.* 2004, 2 (2), 95–108.
- (3) Lee, H. W.; Kharel, S.; Loo, S. C. J. Lipid-Coated Hybrid Nanoparticles for Enhanced Bacterial Biofilm Penetration and Antibiofilm Efficacy. *ACS Omega* 2022, 7 (40), 35814–35824.