**OP-10**

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## Hydrophobic ion pairing as a strategy for improved encapsulation efficiency and prolong release of highly hydrophilic antibiotics through PLGA nanoparticles

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Poly(lactic-co-glycolic acid) (PLGA) nanoparticles (NPs) show promise for treating bone infections. Hydrophilic antibiotics used to treat these infections locally have weak interactions with PLGA, leading to low encapsulation efficiency (EE), drug loading (DL), and high initial burst release. Hydrophobic ion pairing (HIP) has been used to overcome these challenges and enable sustained antibiotic release over several weeks [1,2].
This study aimed to optimize the HIP method by exploring different anionic surfactants as HIP agents and the molar ratio of drug to counterion. The Zetasizer Nano ZS was utilized to determine the size, polydispersity index, and zeta potential of the prepared PLGA NPs. Additionally, HPLC and UV-vis spectroscopy were employed to measure EE and DL of antibiotics along with their HIP complexes in PLGA NPs. Furthermore, Particle Charge detector was used to establish the charge of these complexes. The results demonstrated a significant increase in both EE and DL for highly hydrophilic antibiotics within PLGA NP when using the HIP method.

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