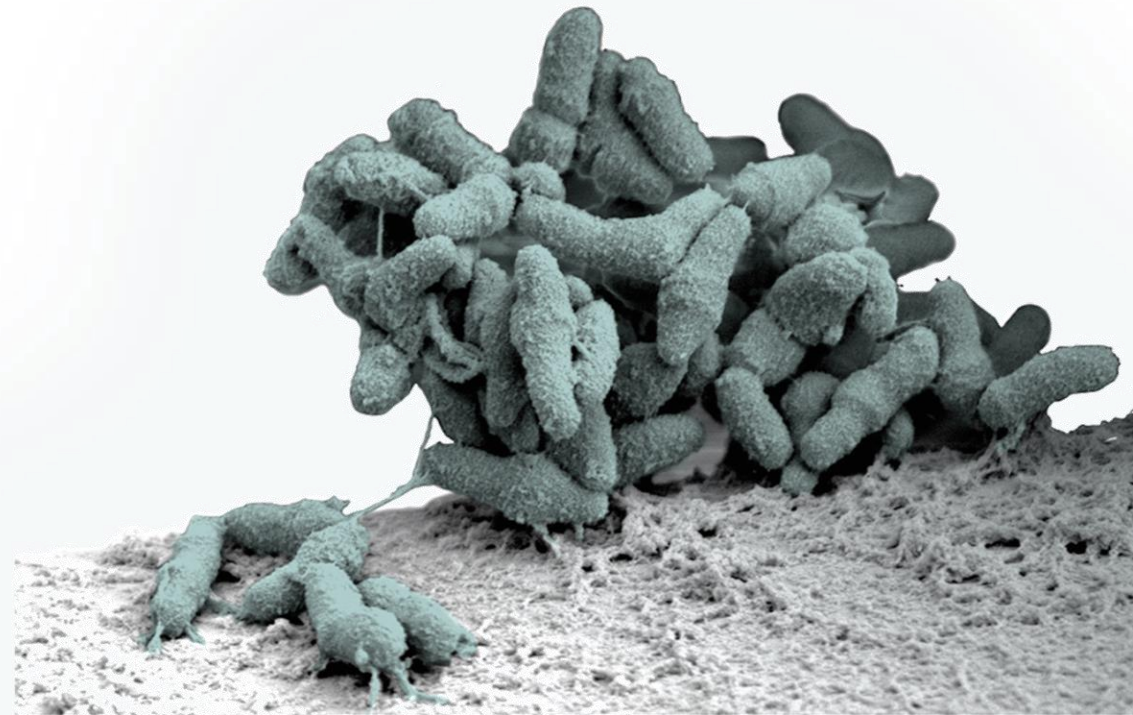


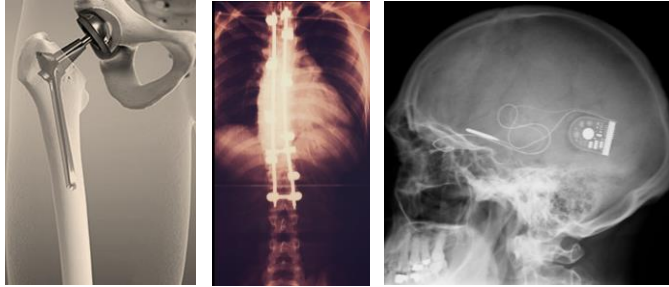
Joint nanostrategies toward the eradication of bacterial biofilms

Cláudia Nunes



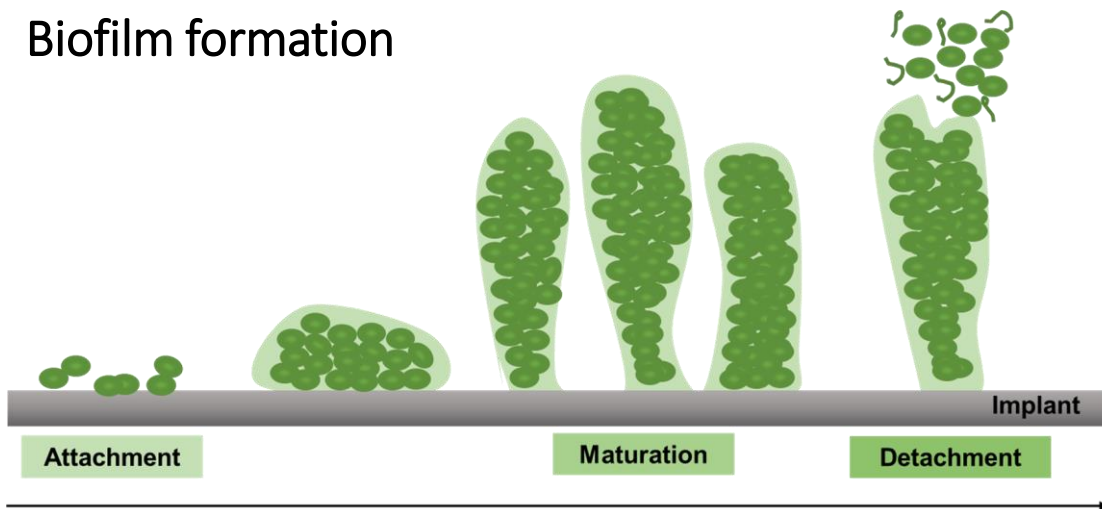
Lipid-based nanocarriers as tools to efficiently and synergistically eradicate bacterial biofilms

Implantable medical devices

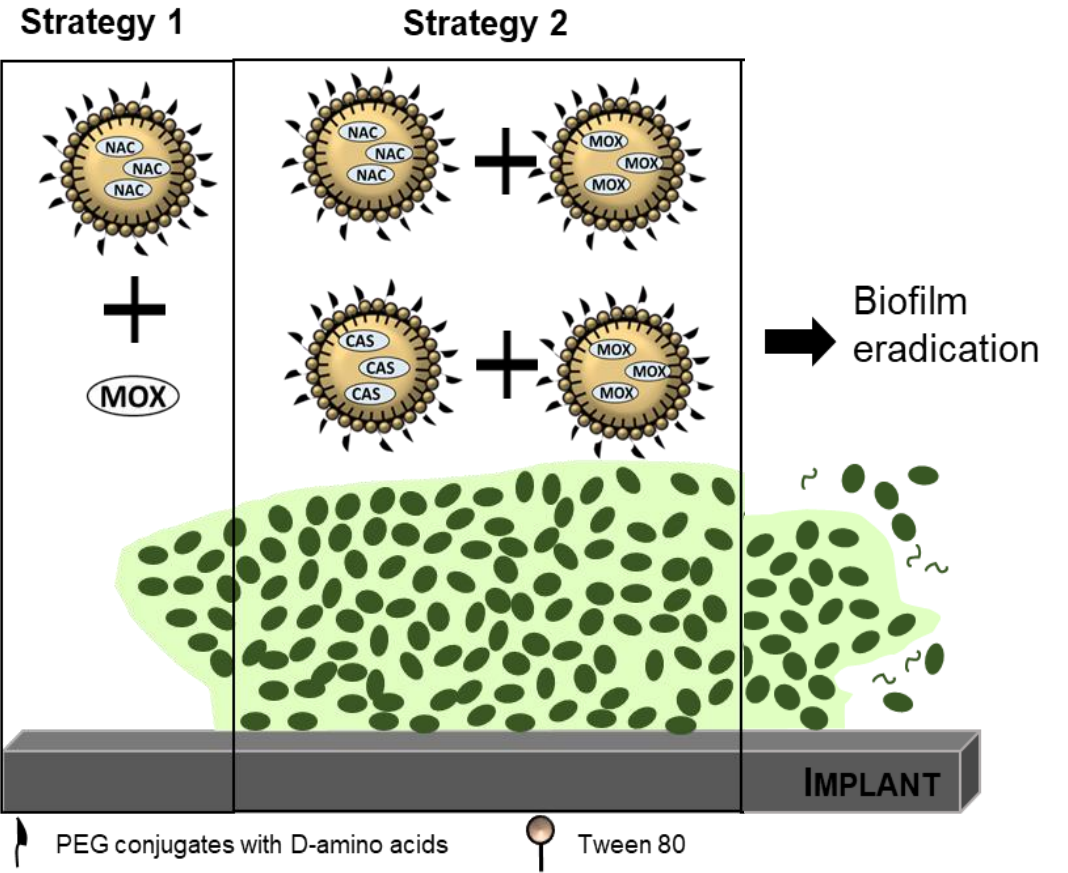


Problem?

Biofilm formation



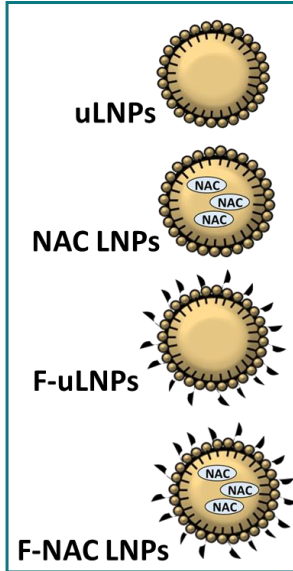
Our treatment approach



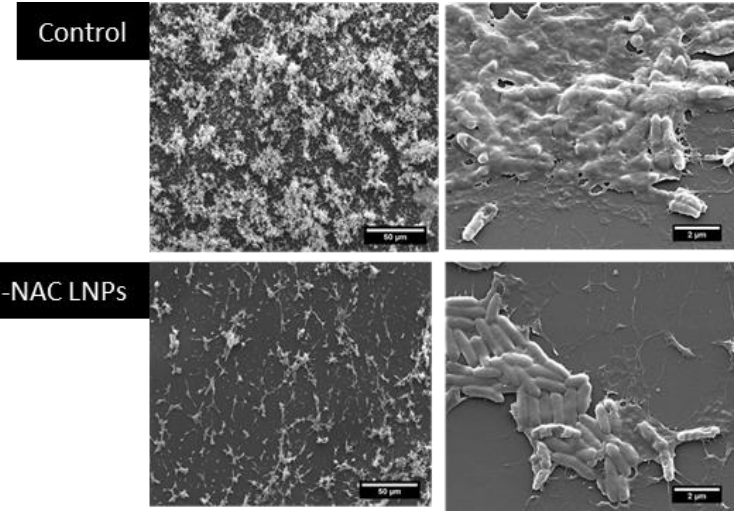
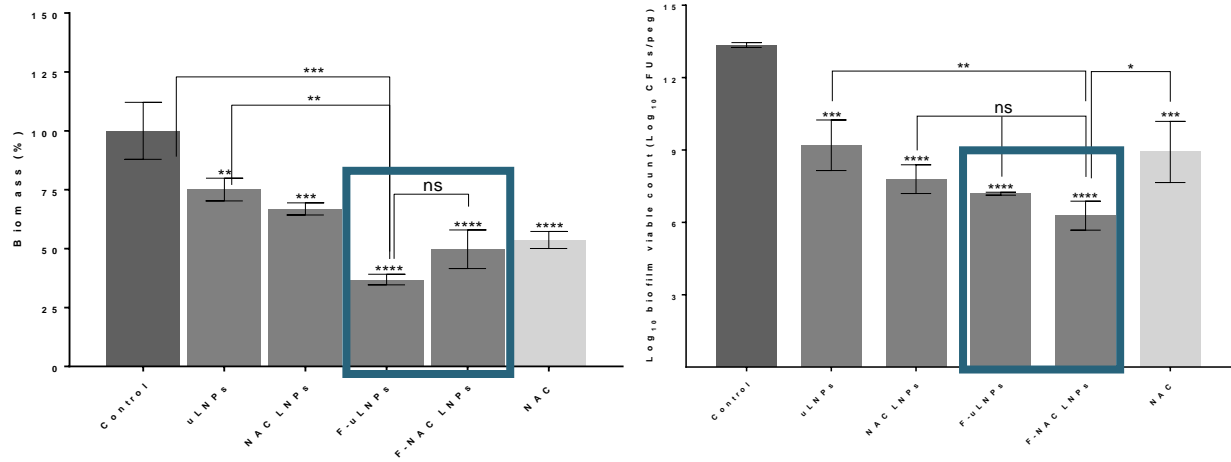
Insufficient drug penetration
 Surgery
 Bacterial resistance

R.M. Pinto, *et al.* FEMS Microbiol Rev 2019, 43 (6), 622-641.
 R.M. Pinto, *et al.* Front Microbiol 2020, 11, 952.

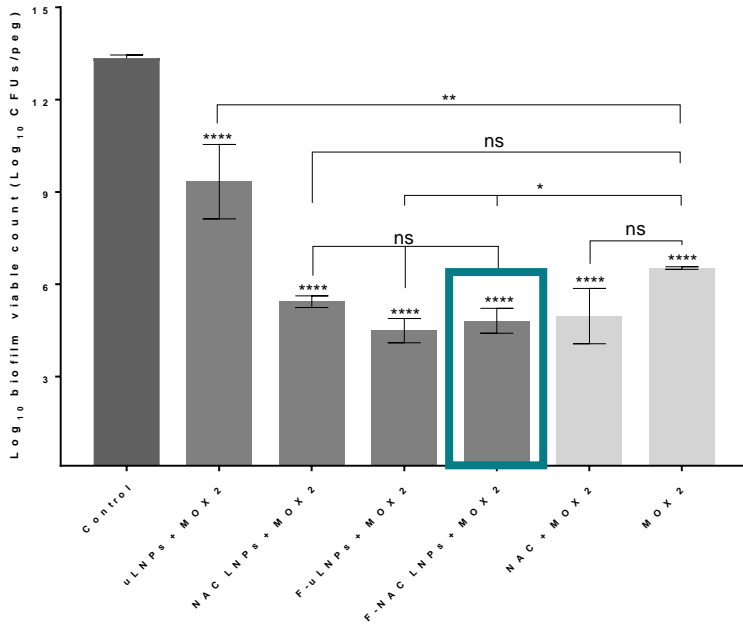
Strategy 1: Main results



In vitro antibiofilm efficacy: *P. aeruginosa*



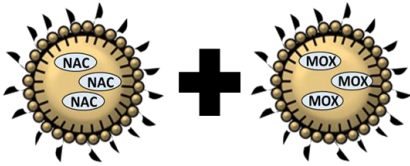
Functionalized NPs have highest biofilm biomass and viability reduction. NAC encapsulation does not improve the effect of F-uLNPs.



At a MOX concentration of 2 μg ml⁻¹, functionalized LNPs showed a significant reduction in viable count when compared to treatment with MOX alone.

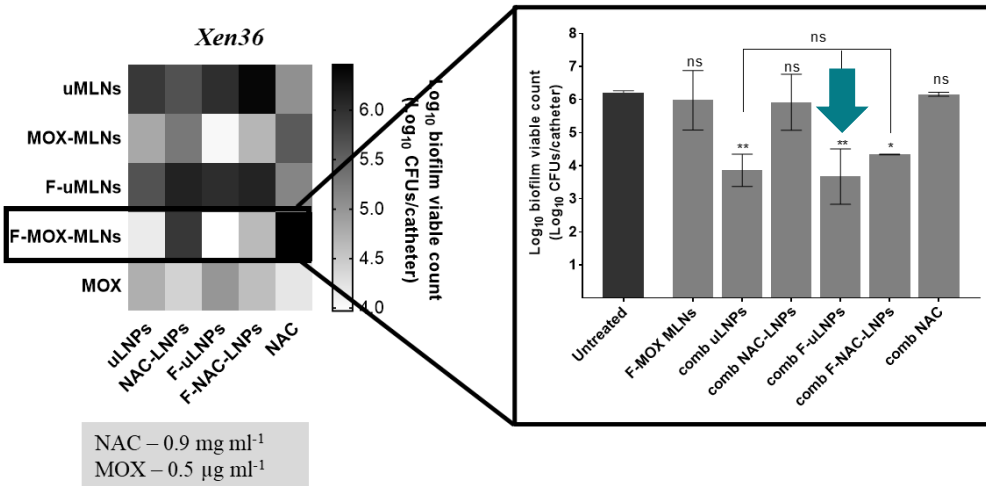
F-NAC LNPs in combination with MOX has the potential to be a safe strategy to eradicate bacterial biofilms.

↓
NEXT STEP? Strategy 2



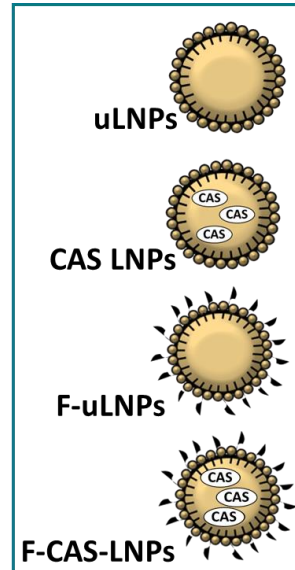
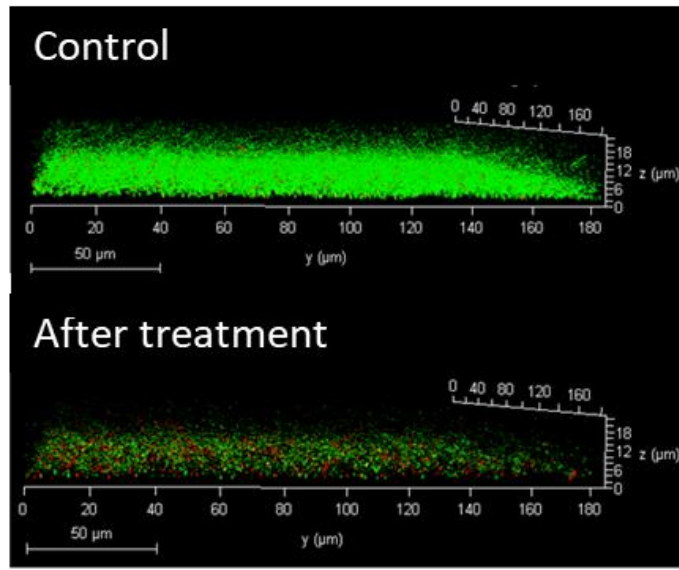
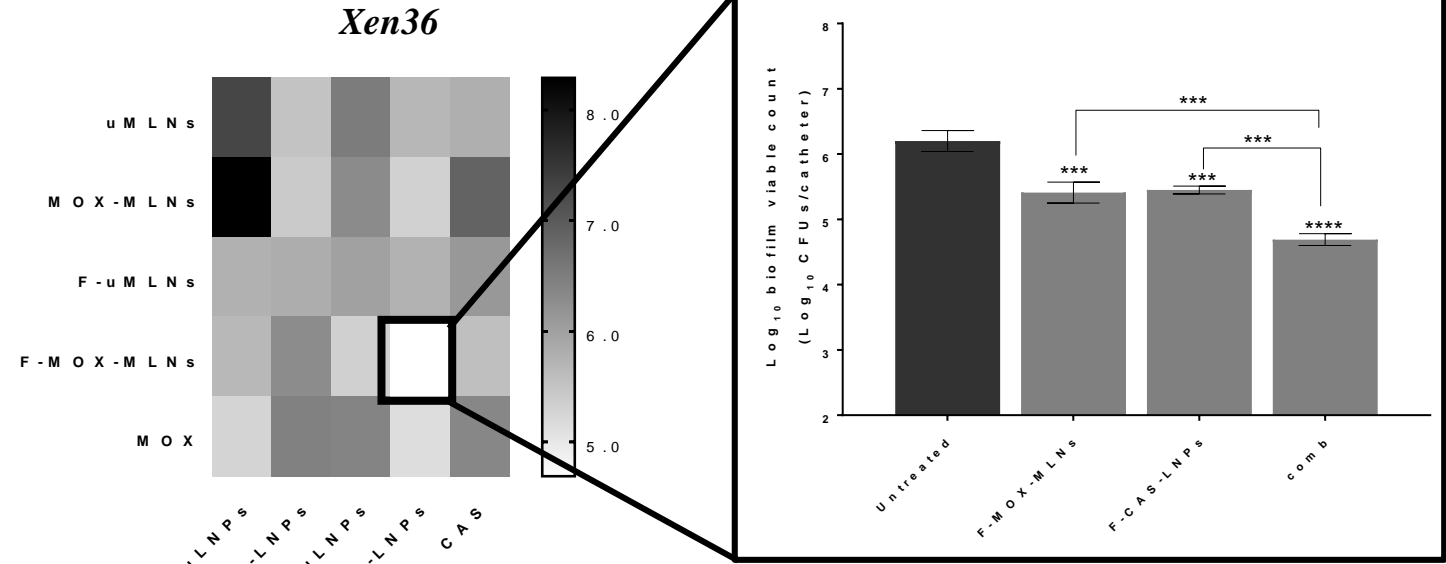
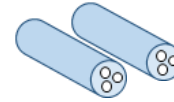
Strategy 2: Main results

S. aureus biofilm viability: NAC + MOX nanosystems



S. aureus biofilm viability: CAS + MOX nanosystems

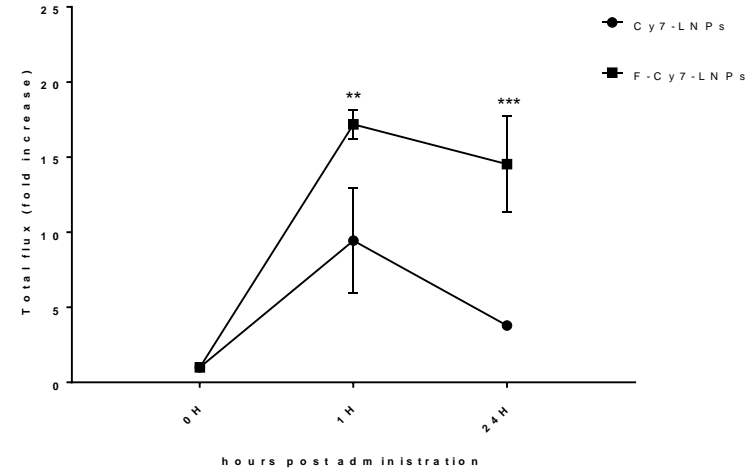
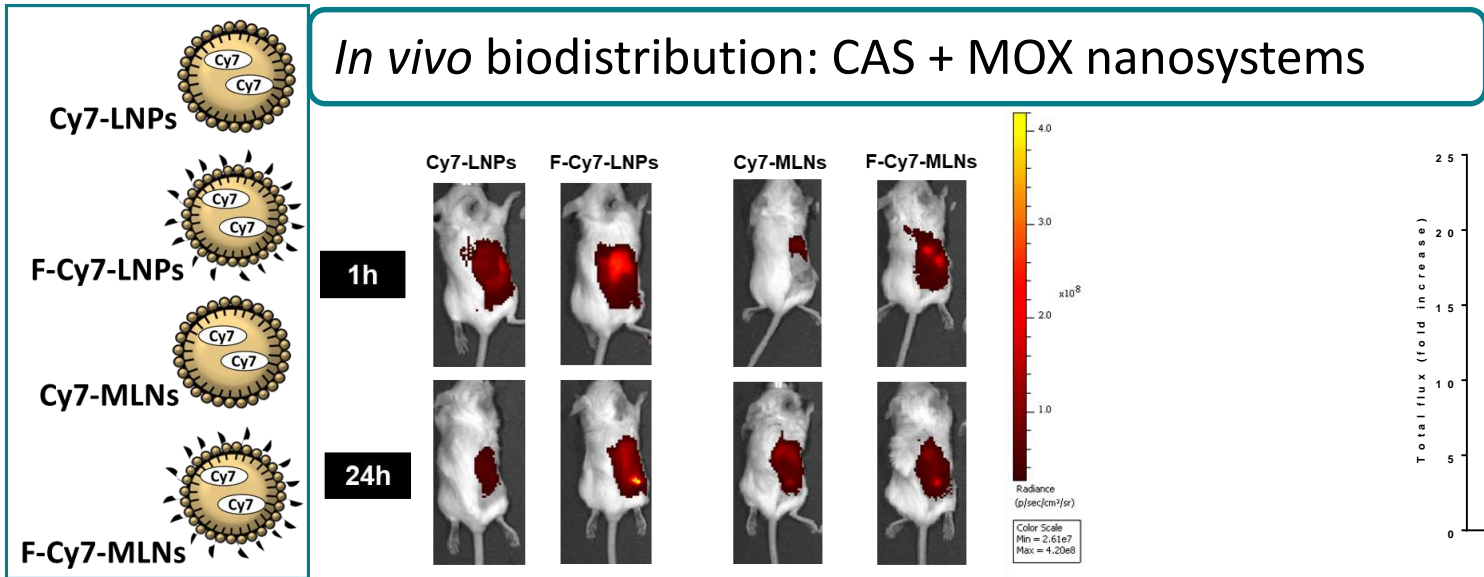
Catheter biofilm model



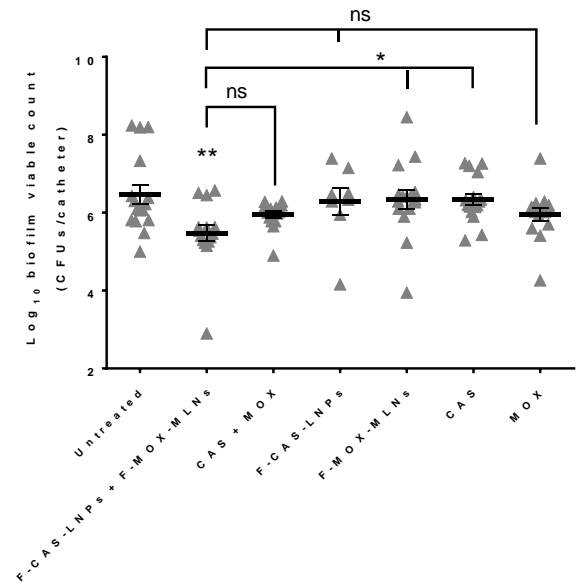
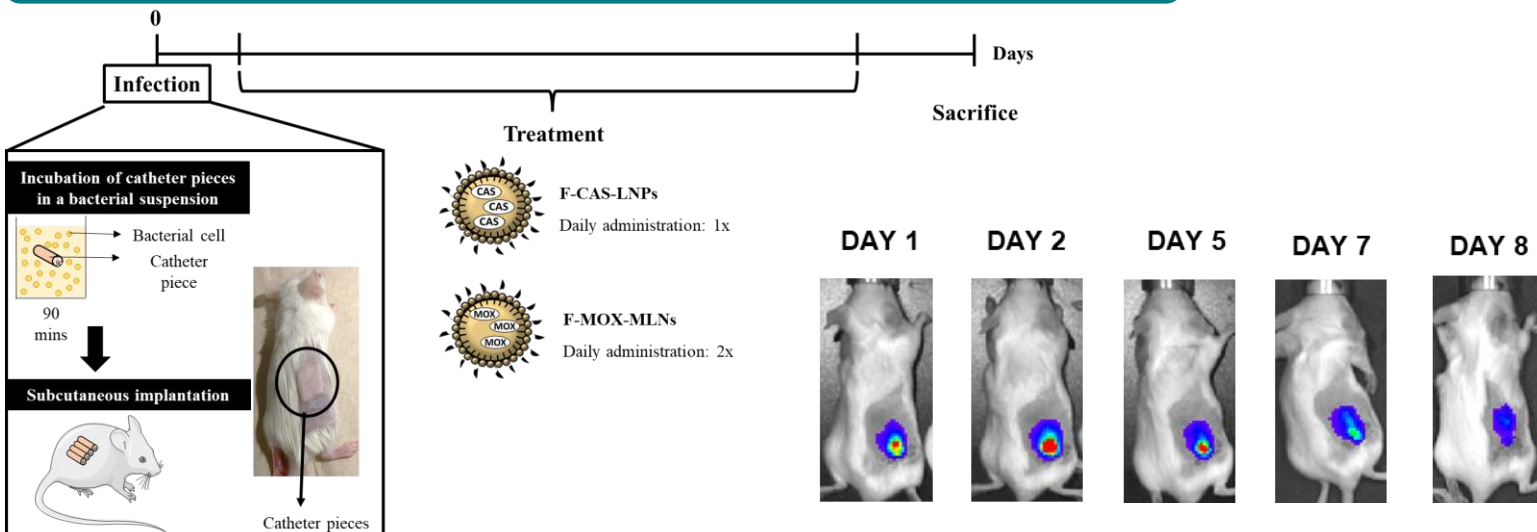
The combination of F-MOX-MLNs with F-CAS-LNPs revealed the highest potential in reducing the biofilm viable count.

Strategy 2: Main results

In vivo biodistribution: CAS + MOX nanosystems



In vivo antibiofilm efficacy: CAS + MOX nanosystems



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FCT PhD PROGRAMMES



Thank you all for your attention

