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Self-assembling peptide-mimetic hydrogels as long-acting delivery platforms for HIV prevention

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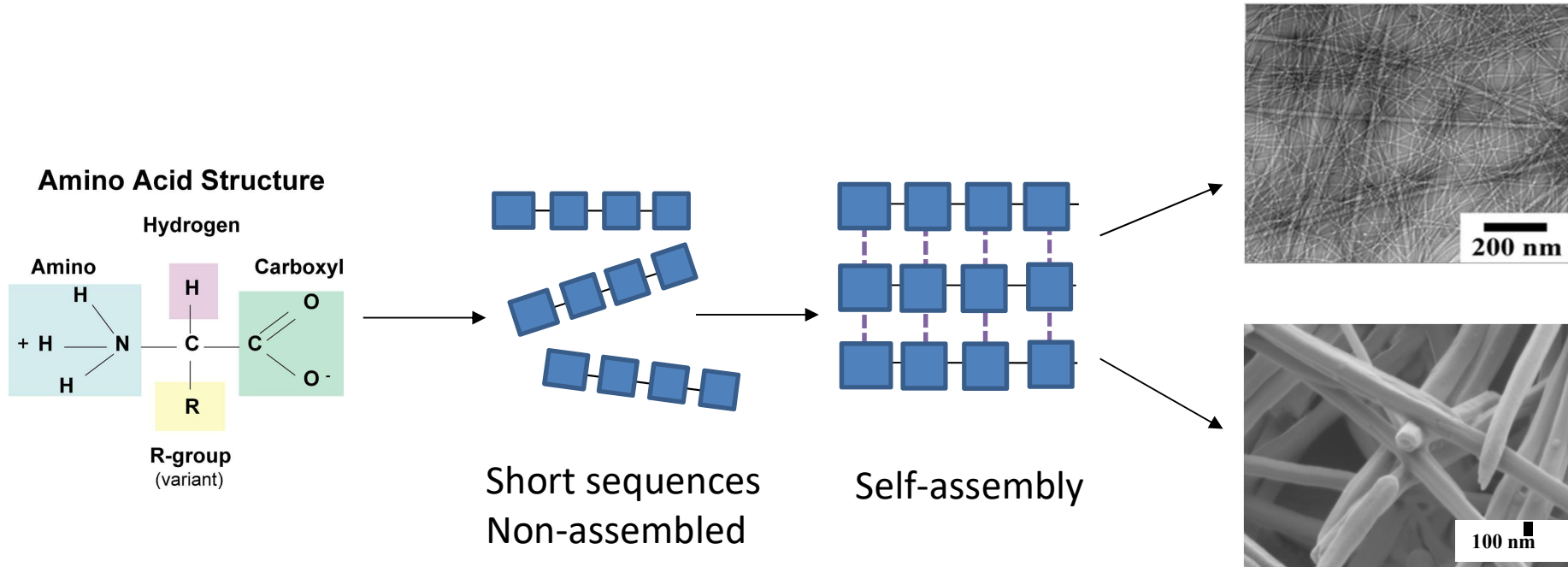
Self-assembling peptide-mimetic hydrogels as long-acting delivery platforms for HIV prevention.

Sophie Coulter
School of Pharmacy, QUB

SfAM ECS Research Symposium 2019



Our core technology

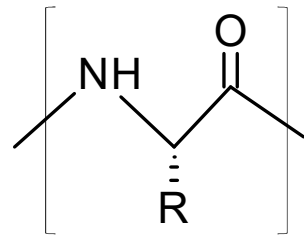


Why peptides/peptide-mimetics?

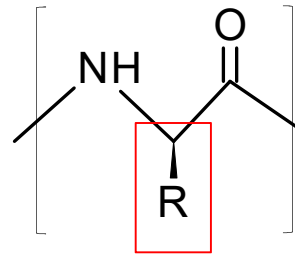
- Biocompatible
- Biodegradable
- Antimicrobial action
- Versatility
- Reduced synthesis times



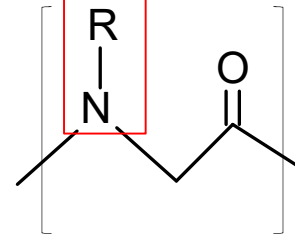
Peptide-mimetic hydrogels



L form peptide

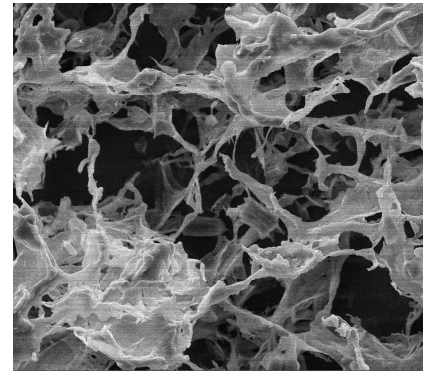
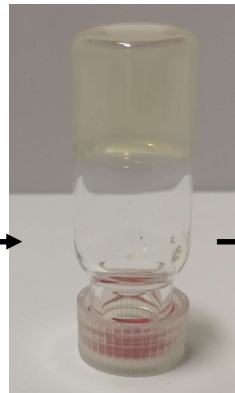


D form peptide

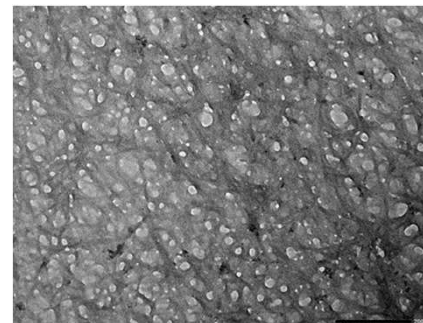


Peptoid

Synthesised sequence → conjugate drug → hydrogel formation → sustained release



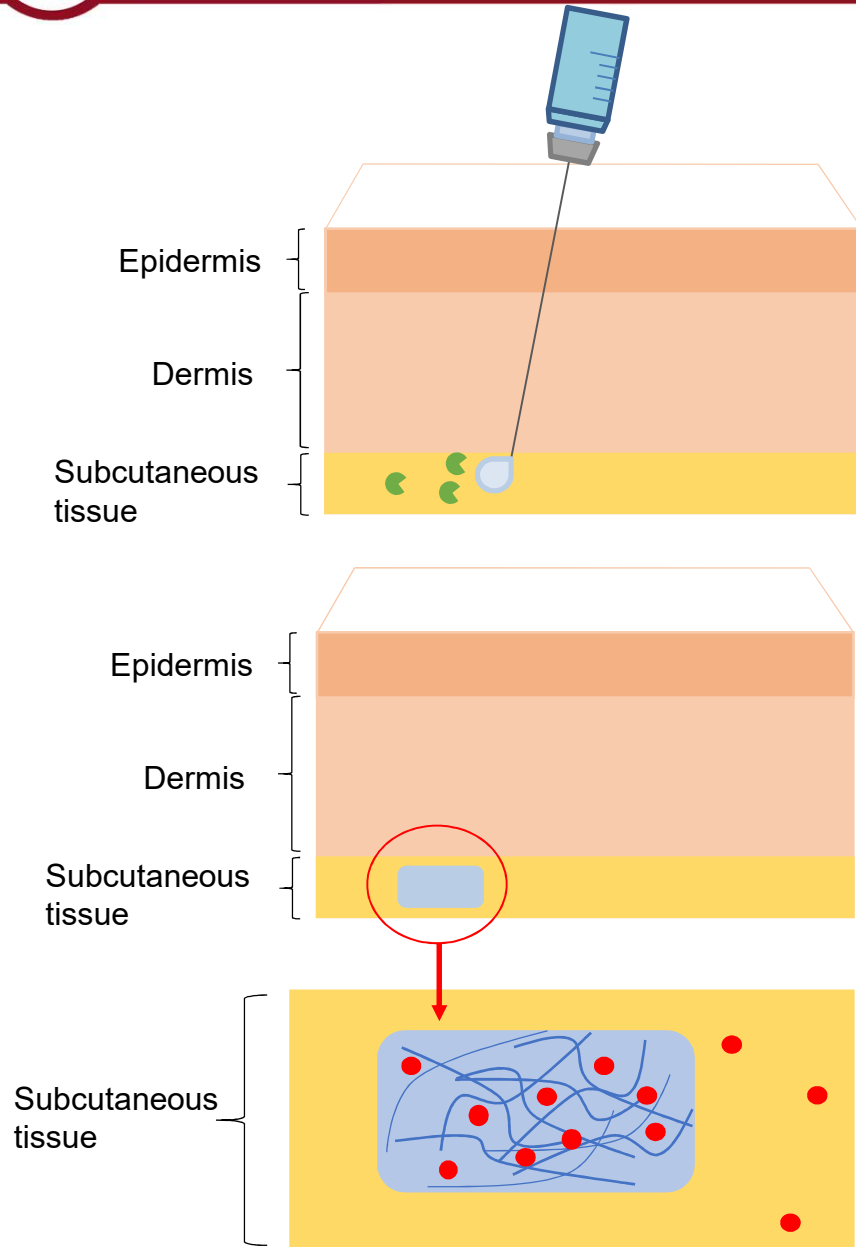
SEM
5000x



TEM
5000x



Therapeutic application



Soluble peptide-mimetic-antiretroviral conjugate administered subcutaneously each month.



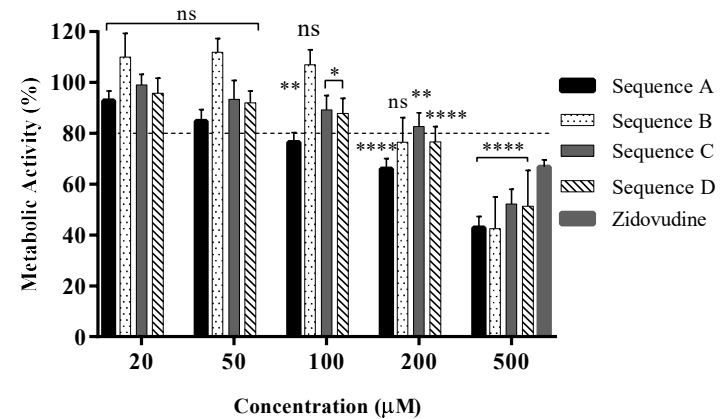
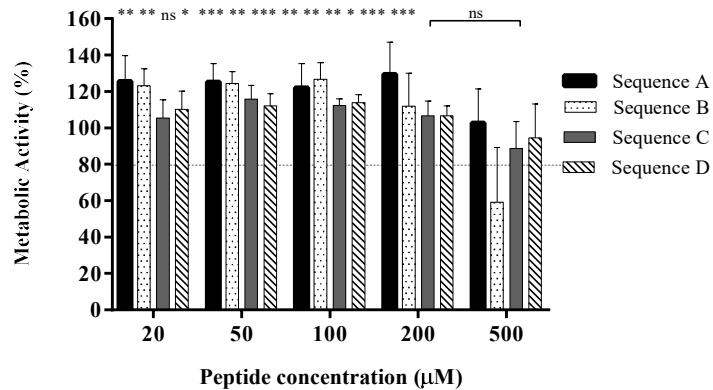
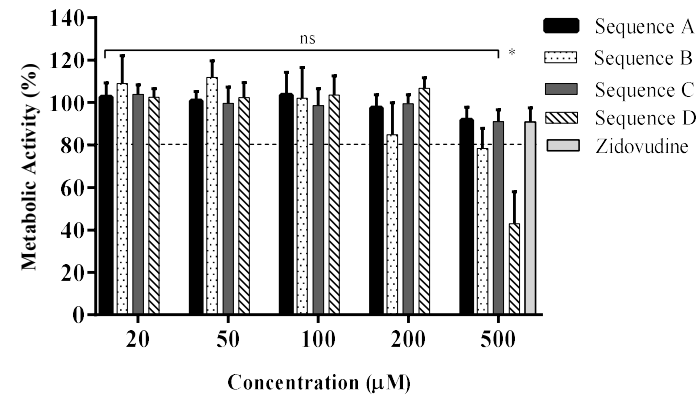
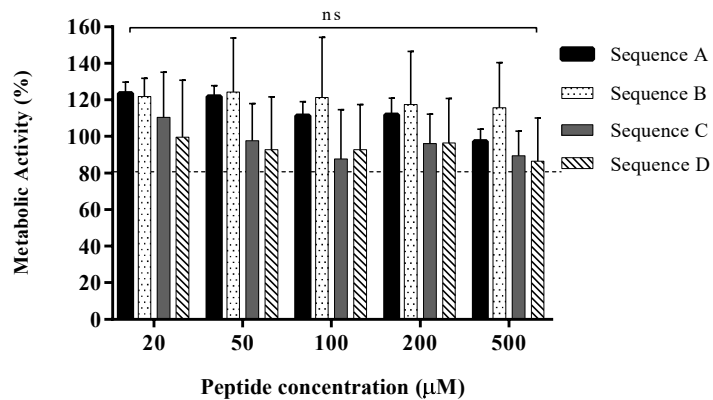
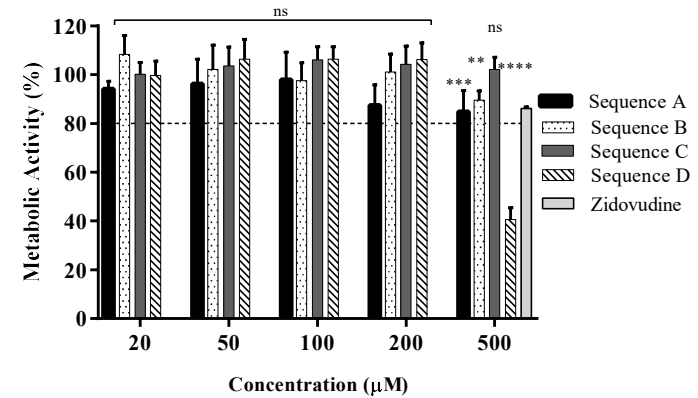
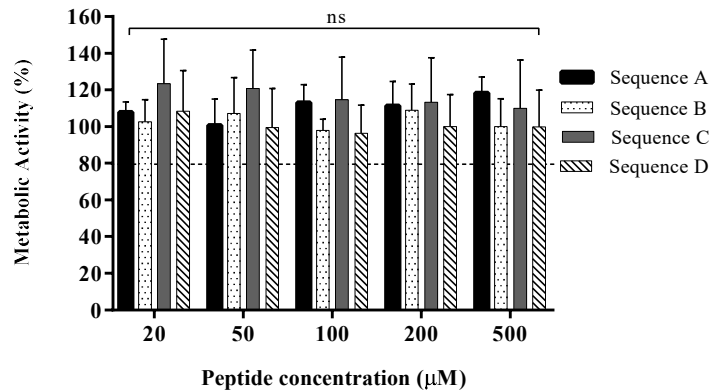
Phosphatase enzymes within the tissue cleave the phosphate group from the sequence backbone to afford a protease resistant hydrogel.



Sustained release of conjugated antiretroviral drug from stable peptide-mimetic hydrogel via hydrolysis of drug-ester linkage.

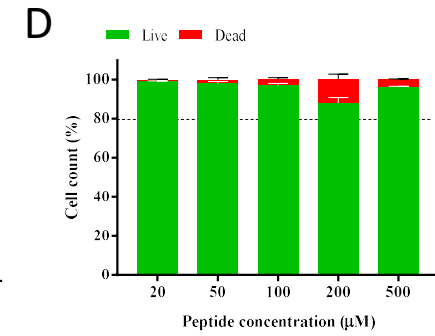
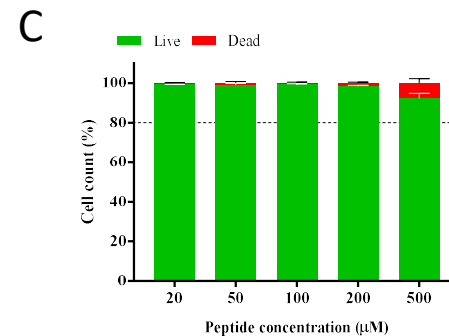
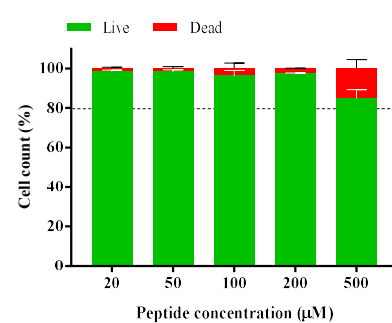
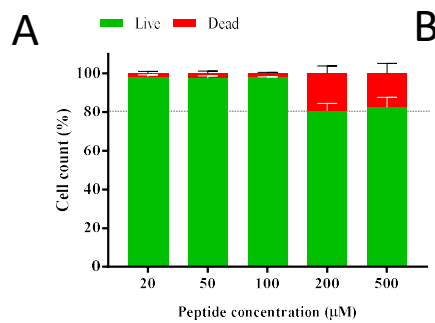
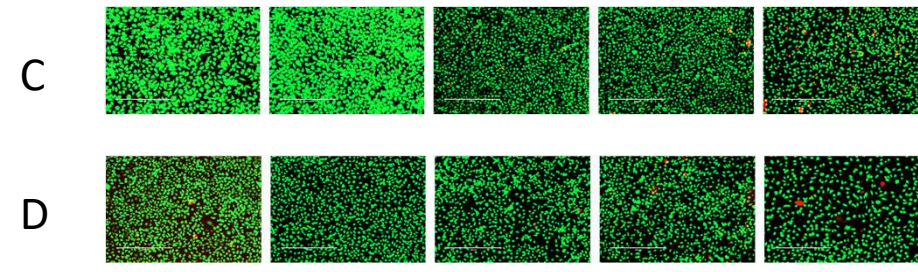
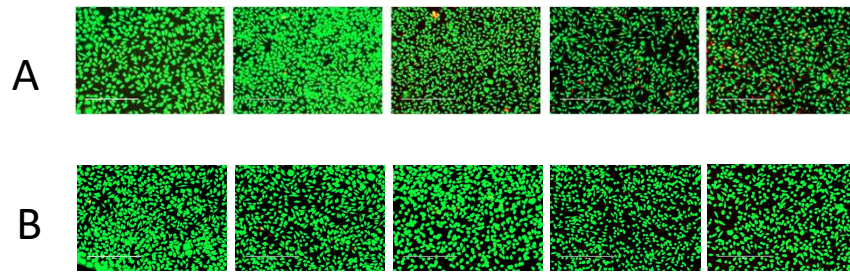
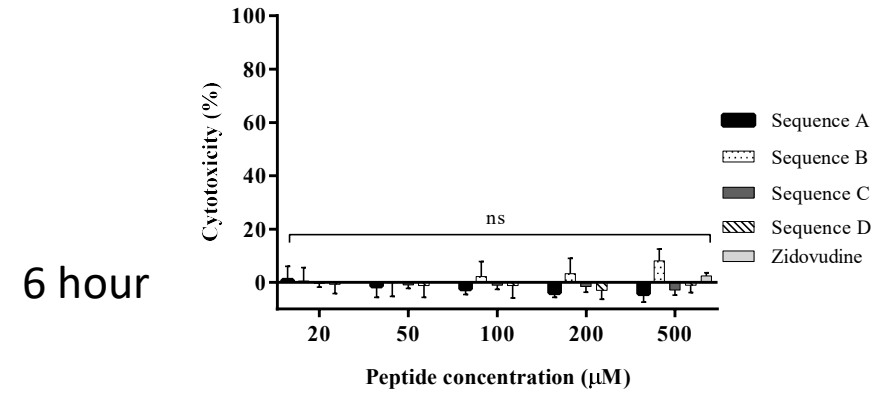
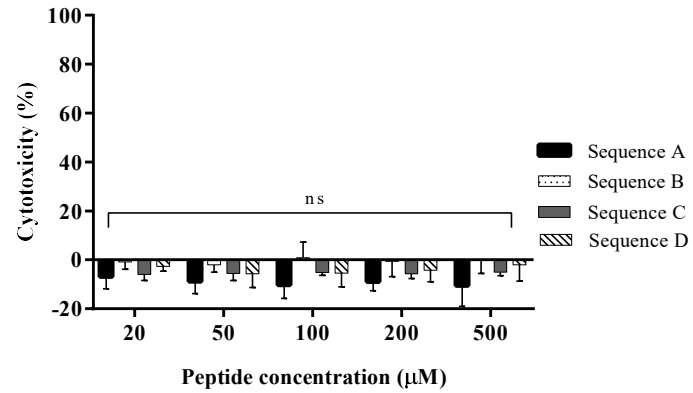


Biocompatibility



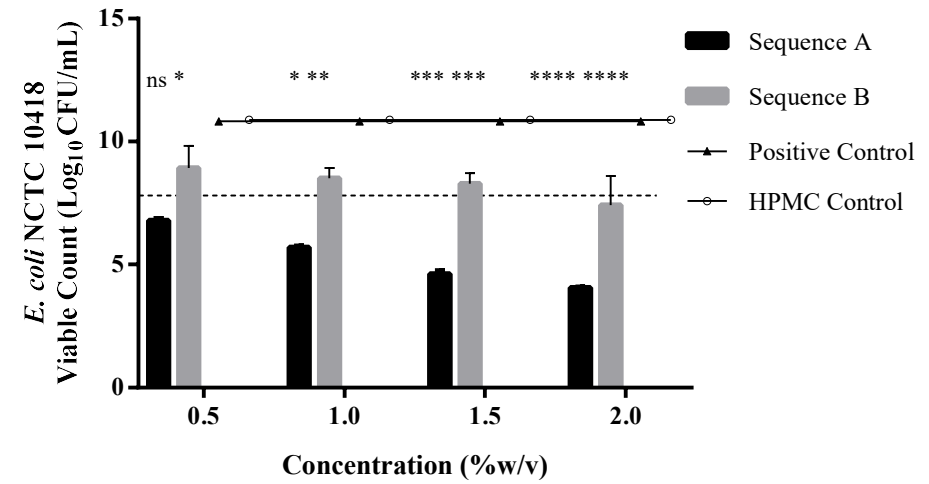
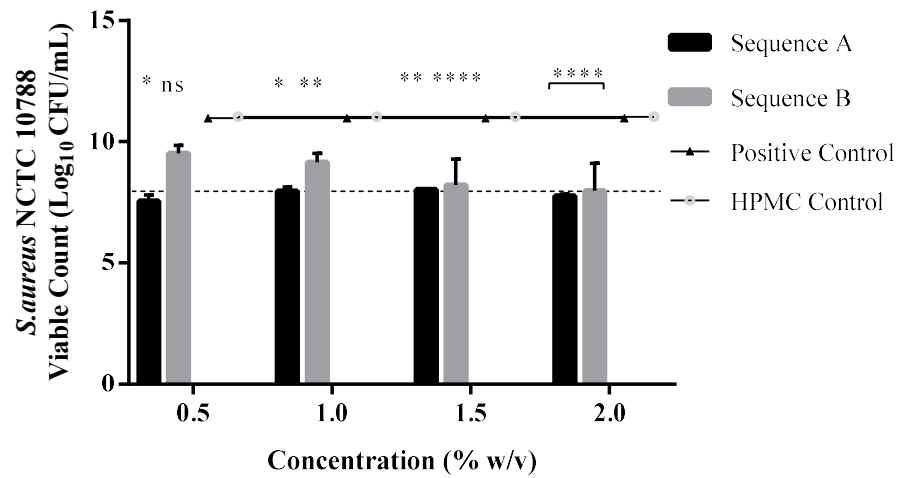


Biocompatibility



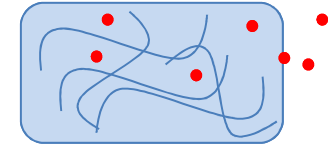
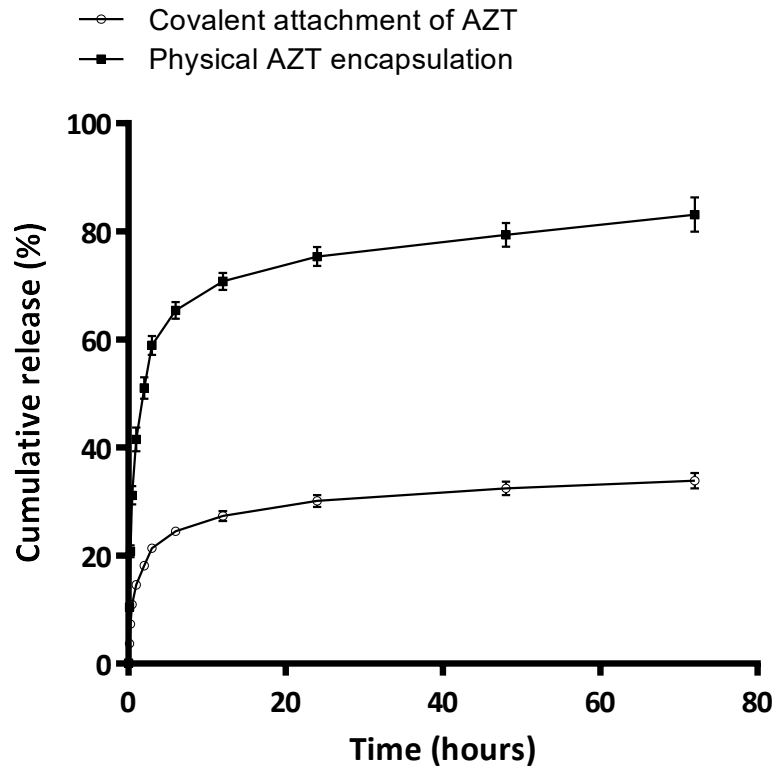


Antimicrobial activity

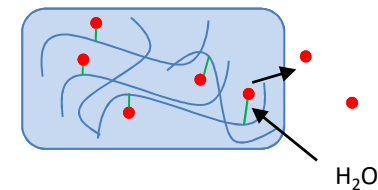




Drug release



Physical encapsulation, drug release via diffusion through hydrogel matrix



Covalent conjugation, drug release via hydrolysis of ester bond followed by diffusion through hydrogel matrix



Acknowledgements

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