A colistin coating to prevent biomaterial-associated infections

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Introduction

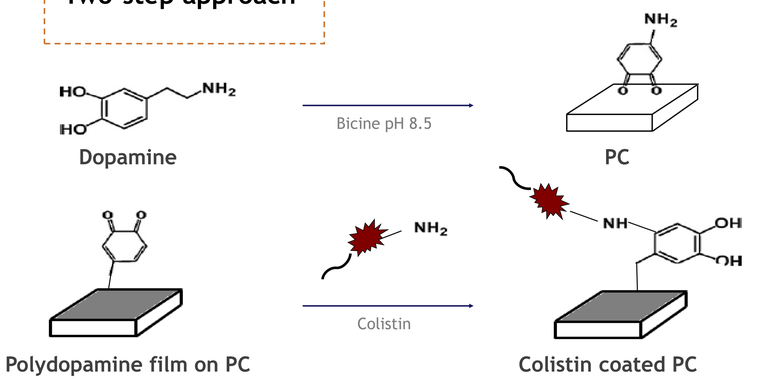
Bacterial colonisation of indwelling devices followed by biofilm formation remains a serious concern in modern health care. Device-associated infections are difficult to treat because cells within a biofilm are less susceptible to antimicrobial treatment and to host immune system. The emergence of multidrug resistant bacteria and the lack of alternative therapeutic options have led to the revival of colistin. Although effective, some concerns have been raised about its toxicity and the development of bacterial resistance. Colistin covalent immobilization onto a biomaterial surface may overcome these drawbacks as it avoids patient exposure to sub-inhibitory concentrations.

AIM

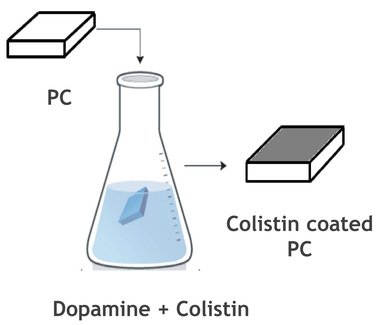
to apply and optimize a polydopamine (pDA) dip-coating strategy for covalent immobilization of colistin on polycarbonate (PC) surfaces

Methods

Two-step approach



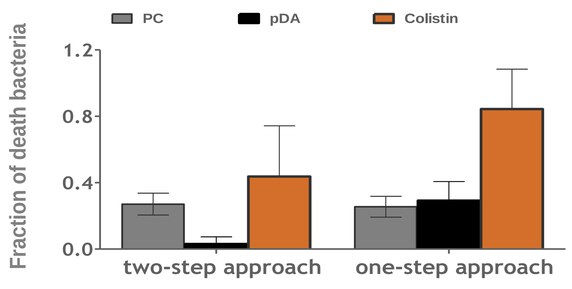
One-step approach



Results

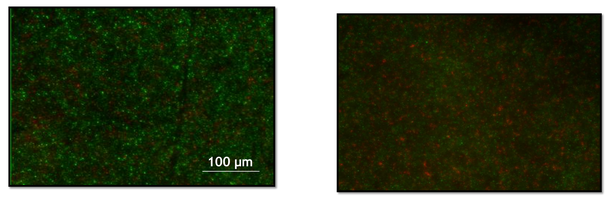
SURFACE CHARACTERIZATION

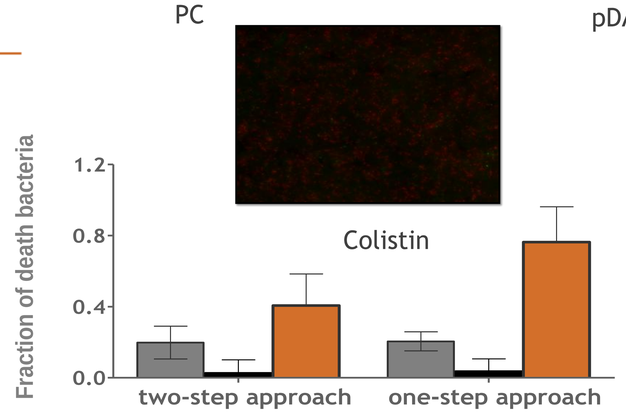
Substrate	Contact angle	Chemical composition		
		C (%)	O (%)	N (%)
PC	82	85.3	14.7	0.0
+ pDA	46	70.13	21.18	8.69
+ Colistin	49	69.75	19.39	10.85



P. aeruginosa ATCC 27853

ANTIMICROBIAL PERFORMANCE





P. aeruginosa ATCC 39324

Conclusions

- **Polydopamine** was successfully exploited to functionalize biomaterial surfaces with colistin to impart them with **antimicrobial properties**.
- **Colistin**-coated surfaces were effective at **killing bacteria** on contact.

COLISTIN is a promising candidate for the development of an ANTIMICROBIAL COATING for clinical applications.

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