Exploring Polydopamine-based Coating Strategies to boost Chlorohexidine immobilization for the Development of an Antimicrobial Surface

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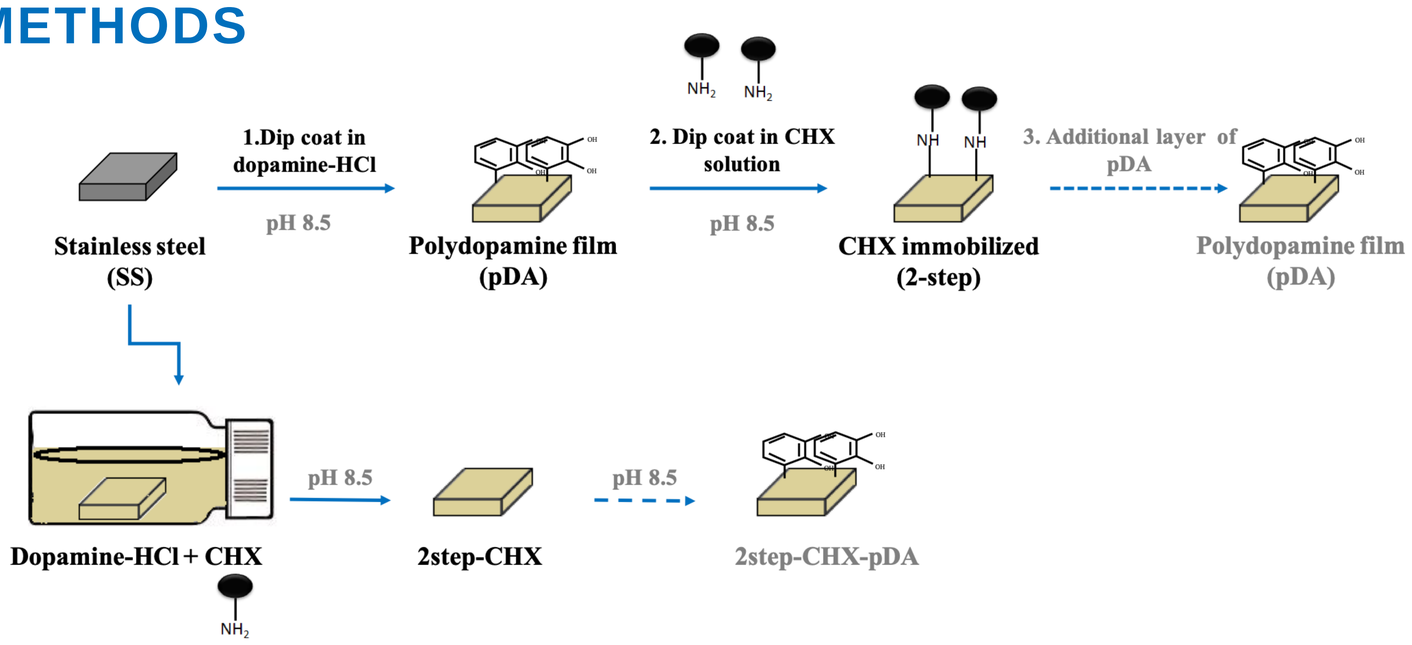
INTRODUCTION

Orthopedic implants have been widely used to restore the function of load-bearing joints, reducing pain and improving the life quality of millions of people every year. These devices are, however, prone to microbial infection, which remains a major cause of morbidity and mortality in modern Healthcare. The development of novel approaches to confer the surfaces of orthopedic implants with anti-infective properties is, therefore, in great demand.

METHODS



MAIN GOAL

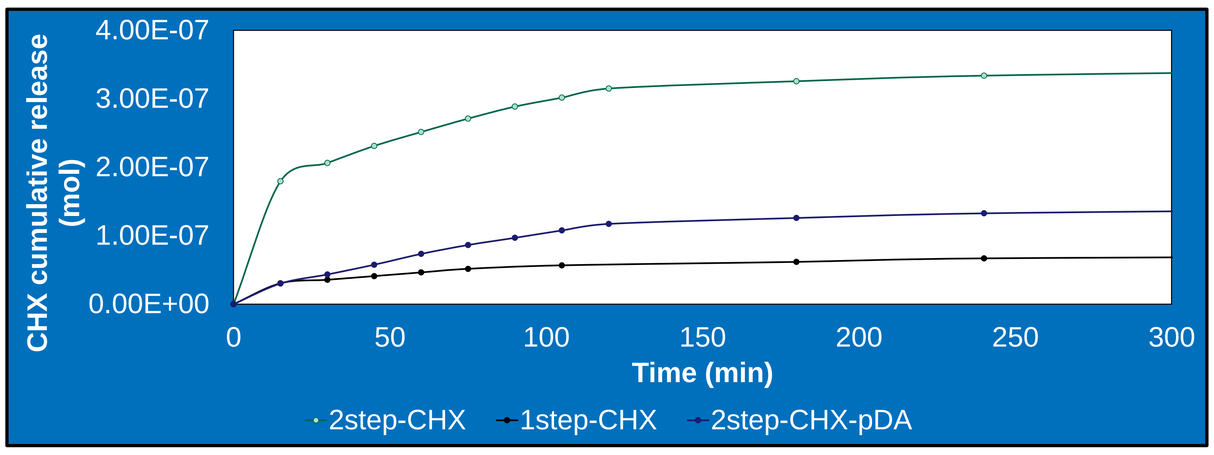
To explore a mussel-inspired coating strategy to modulate the immobilization of chlorohexidine (CHX) onto stainless steel surfaces and impart them with antimicrobial features.

RESULTS

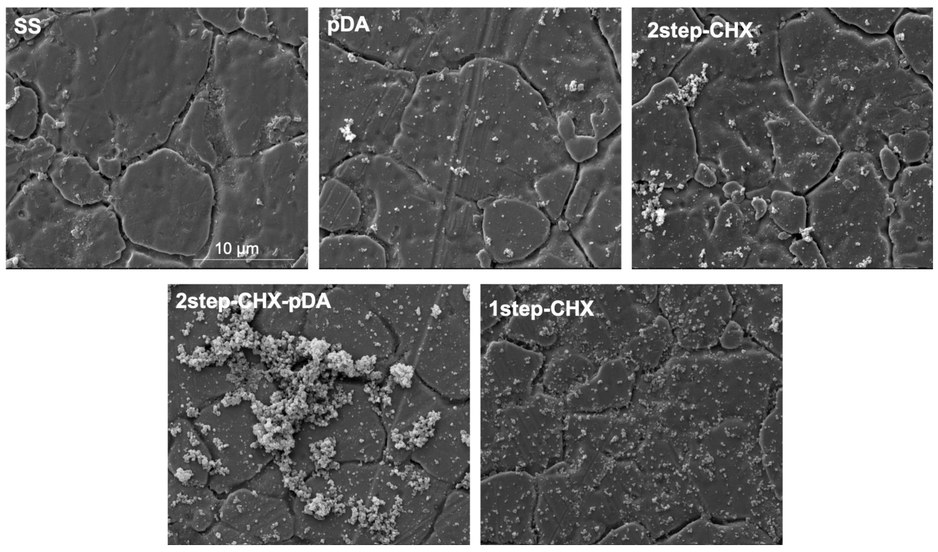
CONTACT-KLLING AND LEACHING ACTIVITY

Bacterial/ Strategy	*S. aureus*		*S. epidermidis*	
	Contact-killing	Leaching	Contact-killing	Leaching
2step-CHX	Yes	Yes	Yes	Yes
2step-CHC-pDA	Yes	Yes	Yes	Yes
1step-CHX	Yes	Yes	Yes	Yes
1step-CHX-pDA	No	No	No	No

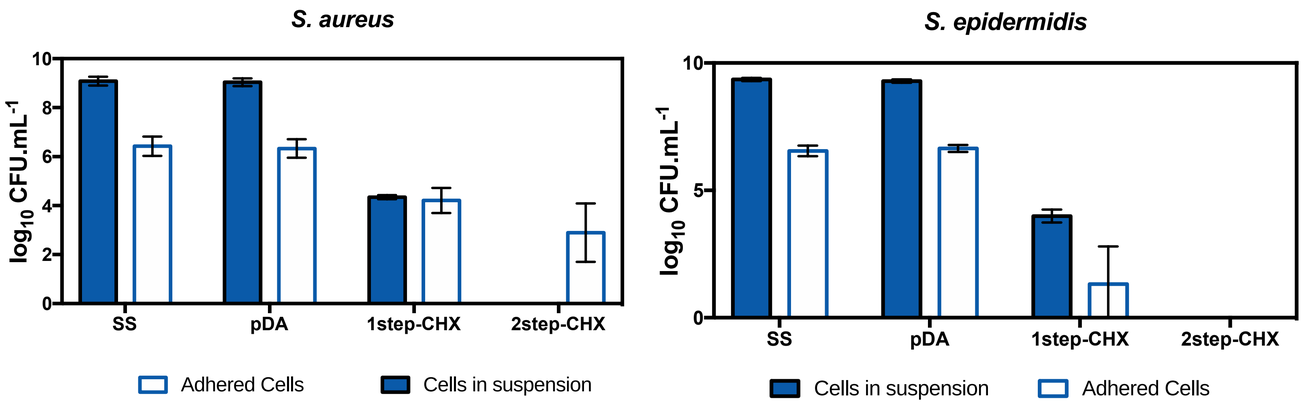
CHX RELEASE PROFILE



SURFACE CHARACTERIZATION



ANTIMICROBIAL FEATURES



CONCLUSION

CHX immobilization using a **2step approach** impaired stainless steel with better antimicrobial features against two important Gram-positive bacteria, holding, therefore, **great potential to prevent orthopaedic infections**.

ONGOING RESEARCH

Coating strategies → CHX immobilization → CHX release ?

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