Structure-Activity Relationship of Synthetic Antimicrobial Peptide Mimics (SAMPs) obtained by RAFT

WARWICK
INTEGRATE ANTIMICROBIAL RESISTANCE

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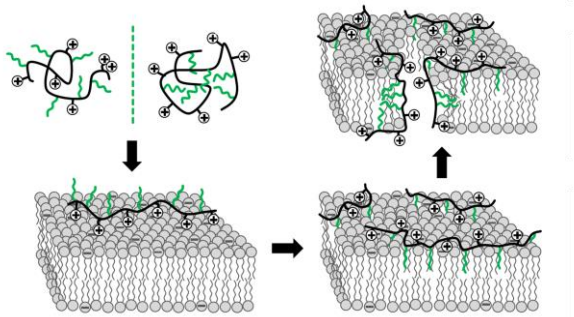
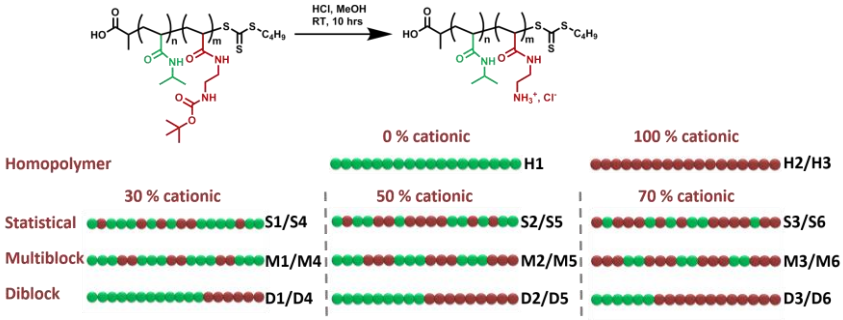
INTRODUCTION

Recent work focuses on the role of antimicrobial peptides[1] (AMPs) as a solution to the development of resistance against antibiotics, as AMPs target bacterial membrane, thus resistance against these systems cannot be easily developed. Polymeric materials have predominantly appeared as the ideal candidates because their properties can be tuned easily and can be much cheaper to produce on industrial scale than peptides[2,3]. The present works focuses on the effect of the segmentation of the sequence of well-defined SAMPs synthesized with RAFT polymerization[4] on their antimicrobial activity and the hemocompatibility.

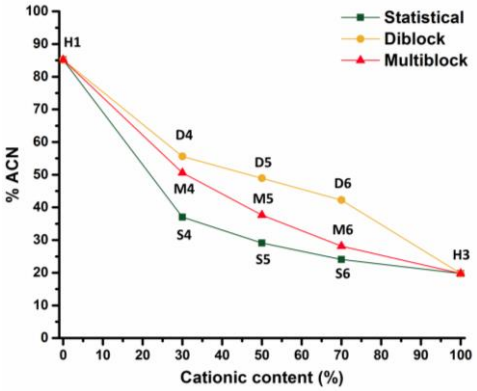
RATIONAL DESIGN OF SAMPs OF VARIOUS SEGMENTATION



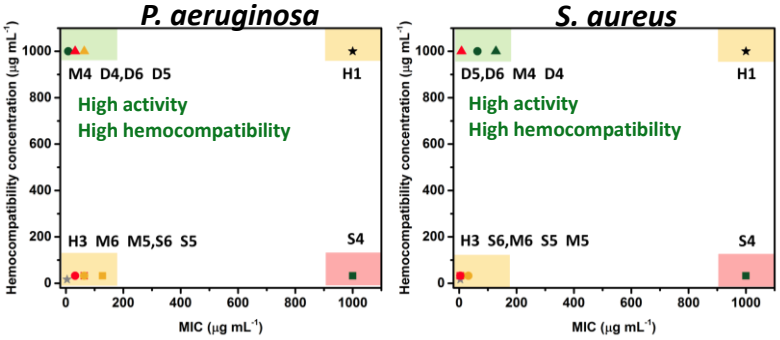


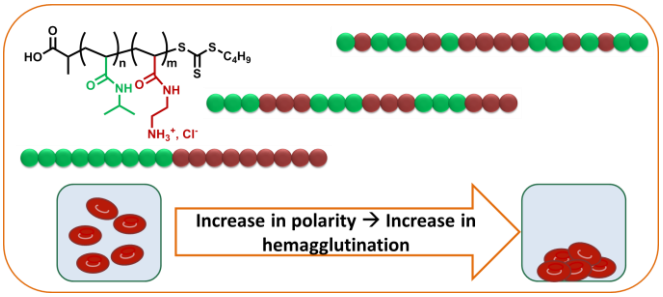
EFFECT OF SEGMENTATION ON THE POLARITY AND THE BIOLOGICAL PROPERTIES OF THE SAMPs

Sample name	HC_{10}[a] (µg/mL)	c_H[b] (µg/mL)	MIC[c] (µg/mL) E. Coli	MIC[c] P. Aeruginosa	MIC[c] S. Aureus	MIC[c] S. Epidermidis	Selectivity[d] E. Coli	Selectivity[d] P. Aeruginosa	Selectivity[d] S. Aureus	Selectivity[d] S. Epidermidis
H1	>1000	>1000	>1000	>1000	>1000	>1000	>1	>1	>1	>1
H3	512	16	4	4	4	32	4.00	4	4	0.5
S4	>1000	32	>1000	>1000	>1000	32	0.03	0.03	0.03	8
S5	>1000	32	64	128	8	2	0.5	0.3	4	16
S6	>1000	32	64	64	4	2	0.5	0.5	8	16
D4	>1000	>1000	512	32	128	32	>2	>30	>8	>30
D5	>1000	>1000	64	64	8	4	>16	>15	>125	>250
D6	>1000	>1000	32	32	8	4	>29	>30	>125	>250
M4	>1000	>1000	128	8	64	4	>8	>125	>15	>250
M5	>1000	32	1000	64	32	8	0.03	0.5	1	4
M6	>1000	32	128	32	4	4	0.3	1	8	8



[a] HC_{10} is the minimum concentration at which at least 10 % of the maximum lysis was observed ; [b] c_H is the highest concentration at which the polymers do not induce any aggregation of RBCs ; [c] MIC is the minimum inhibition concentration at which bacteria growth is inhibited by at least 95 % ;[d] Selectivity: lowest value between HC10 and c_H (hemocompatibility concentration) divided by the MIC of the bacteria species concerned.





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