Biomimetic approaches toward the control of bacterial infections

Li, Yuanfeng

DOI:
10.33612/diss.171588622

Biomimetic Approaches toward the Control of Bacterial Infections

Yuanfeng Li

Biomimetic approaches toward the control of bacterial infections

University Medical Center Groningen, University of Groningen
Groningen, The Netherlands

Cover designed by Yong Liu and Yuanfeng Li
Layout designed by Yong Liu and Yuanfeng Li
Printed by IPSKAMP printing
ISBN (printed version): 978-94-6421-367-6
ISBN (electronic version): 978-94-6421-369-0

university of groningen

Biomimetic Approaches toward the Control of Bacterial Infections

PhD thesis

to obtain the degree of PhD at the
University of Groningen
on the authority of the
Rector Magnificus Prof. C. Wijmenga
and in accordance with
the decision by the College of Deans.

This thesis will be defended in public on

Monday 28 June, 2021 at 11:00 hours

by

Yuanfeng Li

born on 16 October 1992
in Yunnan, China

Supervisors

Prof. H. J. Busscher
Prof. H. C. van der Mei
Prof. Y. Ren
Prof. L. Shi

Assessment Committee

Prof. A. Herrmann
Prof. J.M. van Dijl
Prof. Z. Zhang

Paranimfen:

Yanyan Wu

Huaiying Zhang

Table of Contents

Chapter 1 **1.1** **1.2** **1.3**	**Introduction** Cell membrane-coated nano-antimicrobials as a strategy for combating bacterial infections Applications and perspectives of cascade reactions in bacterial infection control Y. Li, G. Yang, Y. Ren, L. Shi, R. Ma, H. C. van der Mei, H. J. Busscher. (Frontiers in Chemistry. 2020, 7, 861. IF: 3.7) Aim of the thesis	1
Chapter 2	**Coating of a novel antimicrobial nanoparticle with a macrophage membrane for the selective entry into infected macrophages and killing of intracellular staphylococci** Y. Li, Y. Liu, Y. Ren, L. Su, A. Li, Y. An, V. Rotello, Z. Zhang, Y. Wang, Y. Liu, S. Liu, J. Liu, J. D. Laman, L. Shi, H. C. van der Mei, H. J. Busscher. (Advanced Functional Materials. 2020, 30, 2004942. IF: 16.8)	27
Chapter 3	**A G-quadruplex hydrogel via multicomponent self-assembly: Formation and zero-order controlled release** Y. Li, Y. Liu, R, Ma, Y. Xu, Y. Zhang, B. Li, Y. An, L. Shi. (ACS Applied Materials & Interfaces. 2017, 9, 13056-13067. IF: 8.8)	67
Chapter 4	**A hemin-glucose oxidase loaded, supra-molecular hydrogel cascade-reaction container consuming endogenous glucose for bacterial eradication from infected wounds - a study in diabetic mice** Y. Li, L. Su, Y. Liu, F. Huang, Y. Ren, Y. An, L. Shi, H. C. van der Mei, H. J. Busscher. (Submitted to Materials Today)	93
Chapter 5	**General discussion**	127
	Summary	135
	Samenvatting	139

This PhD thesis resulted from a 2 + 2 program, sponsored by
the University Medical Center Groningen, Groningen, The Netherlands and
Nankai University, Tianjin, China.

Supervisor at Nankai University: Prof. Linqi Shi.

To my dearest family!