



University of Groningen

Nanoscopic vibrations by	bacteria adher	ring to surfaces
Song, Lei		

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version Publisher's PDF, also known as Version of record

Publication date: 2015

Link to publication in University of Groningen/UMCG research database

Citation for published version (APA):

Song, L. (2015). Nanoscopic vibrations by bacteria adhering to surfaces. University of Groningen.

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: https://www.rug.nl/library/open-access/self-archiving-pure/taverneamendment.

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): http://www.rug.nl/research/portal. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

Download date: 25-08-2022

Nanoscopic vibrations by bacteria adhering to surfaces

Lei Song

Nanoscopic vibrations by bacteria adhering to surfaces

By Lei Song



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

Copyright © 2015 by Lei Song

Printed by Ipskamp Drukkers

ISBN (printed version): 978-90-367-8409-2

ISBN (electronic version): 978-90-367-8408-5



Nanoscopic vibrations by bacteria adhering to surfaces

Proefschrift

ter verkrijging van de graad van doctor aan de Rijksuniversiteit Groningen

op gezag van de

rector magnificus, prof. dr. E. Sterken, en volgens besluit van het College voor Promoties.

De openbare verdediging zal plaatsvinden op woensdag 16 december 2015 om 12.45 uur

door

Lei Song

geboren op 17 september 1984 te Hubei, China Promotores: Prof. dr. Ir. H.J. Busscher

Prof. dr. H.C. van der Mei

Copromotores: Dr. ir. J. Sjollema

Beoordelingscommissie : Prof. dr. M.A. Cohen Stuart

Prof. dr. J. M. van Dijl

Prof. dr. H. Chen

Paranimfen: Jiapeng Hou

Qihui Zhou

To my family!

Contents

Chapter 1	Introduction and general aim of this thesis	1
Chapter 2	Nanoscopic vibrations of bacteria with different cell-wall properties adhering to surfaces under flow and static conditions	9
	(ACS Nano, 2014; 8: 8457-8467. Impact factor 12.881)	
Chapter 3	Contribution of adsorbed protein films to the nanoscopic vibrations exhibited by bacteria adhering through ligand-receptor bonds	33
	(Langmuir, 2015; 31(38): 10443-10450. Impact factor 4.457)	
Chapter 4	Mouthrinses influence bond stiffness and detachment of oral bacteria	55
	(Submitted to the Journal of Dental Research. Impact factor 4.139)	
Chapter 5	Brownian motion position map patterns of adhering bacteria under flow and static conditions for different bacterial strains	71
Chapter 6	General discussion	83
	Summary	95
	Summary	
	Samenvatting	99
	摘要	105
	Acknowledgements	109