



University of Groningen

Exploring	combined	influences of	of material	topography,	stiffness	and chemisti	y on	cell
	at biointerf						•	

Zhou, Qihui

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: 2018

Link to publication in University of Groningen/UMCG research database

Citation for published version (APA):

Zhou, Q. (2018). Exploring combinéd influences of material topography, stiffness and chemistry on cell behavior at biointerfaces [Groningen]: Rijksuniversiteit 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).

Take-down policy
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: 15-07-2018

Exploring Combined Influences of Material Topography, Stiffness and Chemistry on Cell Behavior at Biointerfaces

Qihui Zhou

Exploring Combined Influences of Material Topography, Stiffness and Chemistry on Cell Behavior at Biointerfaces
By Qihui Zhou



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

Copyright © 2018 by Qihui Zhou
Cover designed by Qihui Zhou
Printed by Offpage, Amsterdam, The Netherlands
ISBN (printed version): 978-94-034-0780-7
ISBN (electronic version): 978-94-034-0779-1



Exploring Combined Influences of Material Topography, Stiffness and Chemistry on Cell Behavior at Biointerfaces

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 11 juli 2018 om 12.45 uur

door

Qihui Zhou

geboren op 01 februari 1988 te Shandong, China

Promotor

Prof. dr. ir. H.J. Busscher

Copromoter

Dr. P. van Rijn

Beoordelingscommissie

Prof. dr. P.Y.W. Dankers

Prof. dr. R.A. Bank

Prof. dr. ir. E. van der Giessen



Paranimfen:

Philipp T. Kühn

Gwenda F. Vasse

Table of Contents

Chapter 1	General Introduction Aim of the Thesis	1 9
	Outline of the Thesis	10
Chapter 2	Mechanical Properties of Aligned Nanotopographies for Directing Cellular Behavior	15
Chapter 3	Directing Mesenchymal Stem Cells with Gold Nanowire Arrays	37
Chapter 4	Directional Nanotopographic Gradients: a High-throughput Screening Platform for Cell Contact Guidance	55
Chapter 5	Screening Platform for Cell Contact Guidance Based on Inorganic Biomaterial Micro/nanotopographical Gradients	75
Chapter 6	Orthogonal Double Gradient for Determining Combined Influences of Stiffness and Wettability on Mesenchymal Stem Cell Behavior	103
Chapter 7	General Discussion	119
	Summary	124
	Samenvatting	130
	Acknowledgements	130
	Curriculum Vitae and Publications	140