

University of Groningen

Topography-mediated Control of Cellular Response: Migration, Intracellular Crowding, and Gene-delivery

Ge, Lu

DOI:
[10.33612/diss.146106454](https://doi.org/10.33612/diss.146106454)

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:
2020

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):
Ge, L. (2020). *Topography-mediated Control of Cellular Response: Migration, Intracellular Crowding, and Gene-delivery*. [Thesis fully internal (DIV), University of Groningen]. University of Groningen. <https://doi.org/10.33612/diss.146106454>

Copyright

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/taverne-amendment>.

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.

Topography-mediated Control of Cellular Response: Migration, Intracellular Crowding, and Gene-delivery

Lu Ge

*Topography-mediated Control of Cellular Response: Migration, Intracellular Crowding,
and Gene-delivery*

By Lu Ge



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

Copyright © 2020 by Lu Ge

Cover designed by Lu Ge

Printed by Ridderprint



university of
 groningen

Topography-mediated Control of Cellular Response: Migration, Intracellular Crowding, and Gene-delivery

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 7 December 2020, at 12.45 hours

by

Lu Ge

born on 06 March 1988
 in Hebei, China

Supervisor

Dr. P. van Rijn

Co-supervisor

Dr. T.G. van Kooten

Assessment Committee

Prof. A. Salvati

Prof. B.N. Melgert

Prof. P.Y.W. Dankers

Paranymphs:

Torben A.B. van der Boon

Valentina Vignali

Contents

Chapter 1	General Introduction and Aim of this Thesis	1
1.1	Cell and material interfaces	2
1.2	Aim of this thesis	8
1.3	Outline of this thesis	8
1.4	References	9
Chapter 2	Gradients Allow for Efficiently Studying Cell Behaviors	17
2.1	Introduction	18
2.2	Physicochemical influences on macroscopic cell behaviors	18
2.3	Cell migration on gradients	24
2.4	References	29
Chapter 3	Topography-mediated Fibroblast Cell Migration is Influenced by Direction, Wavelength, and Amplitude	39
3.1	Introduction	41
3.2	Methods	42
3.3	Results	44
3.4	Discussion	55
3.5	Conclusion	57
3.6	Supporting information	58
3.7	References	59
Chapter 4	Topography Induced Macromolecular Crowding Alteration in Living Cells	63
4.1	Introduction	65
4.2	Methods	66
4.3	Results	68
4.4	Discussion	77
4.5	Conclusion	79
4.6	Supporting information	80
4.7	References	82
Chapter 5	Topography-mediated Enhancement of Non-viral Gene Delivery in Stem Cells	87
5.1	Introduction	89
5.2	Methods	90
5.3	Results	93
5.4	Discussion	102
5.5	Conclusion	103
5.6	References	104
Chapter 6	General Discussion & Future Perspective	109
6.1	Discussion & Future perspective	110
6.2	References	116
Summary		121
Samenvatting		125

