



Universiteit
Leiden
The Netherlands

Intradermal delivery of nanoparticulate vaccines using coated and hollow microneedles

Du, G.

Citation

Du, G. (2018, October 30). *Intradermal delivery of nanoparticulate vaccines using coated and hollow microneedles*. Retrieved from <https://hdl.handle.net/1887/66514>

Version: Not Applicable (or Unknown)

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/66514>

Note: To cite this publication please use the final published version (if applicable).

Cover Page



Universiteit Leiden



The handle <http://hdl.handle.net/1887/66514> holds various files of this Leiden University dissertation.

Author: Du, G.

Title: Intradermal delivery of nanoparticulate vaccines using coated and hollow microneedles

Issue Date: 2018-10-30

Intradermal delivery of nanoparticulate vaccines using coated and hollow microneedles

Guangsheng Du
杜广盛

Intradermal delivery of nanoparticulate vaccines using coated and hollow microneedles

PhD thesis with summary in Dutch

©2018 Guangsheng Du. All rights reserved. No part of this thesis may be reproduced or transmitted in any form or by any means without written permission of the author.

Cover: Schematic diagram of the microneedle-mediated delivery of nanoparticulate vaccines and the subsequent uptake of the vaccines by antigen-presenting cells

Cover design: Guangsheng Du

Printing: Ridderprint BV, Ridderkerk, The Netherlands

ISBN: 978-94-6375-099-8

Intradermal delivery of nanoparticulate vaccines using coated and hollow microneedles

PROEFSCHRIFT

ter verkrijging van
de graad van Doctor aan de Universiteit Leiden,
op gezag van de Rector Magnificus prof.mr. C.J.J.M. Stolker,
volgens besluit van het College voor Promoties
te verdedigen op dinsdag 30 Oktober 2018
klokke 15.00 uur

door

Guangsheng Du

Geboren te Linyi, China

in 1988

Promotoren:

Prof. Dr. J.A. Bouwstra

Prof. Dr. W. Jiskoot

Promotiecommissie:

Prof. Dr. H. Irth, LACDR, Chair

Prof. Dr. A.P. Ijzerman, LACDR, Secretary

Prof. Dr. J. Kuiper, LACDR

Prof. Dr. H.W. Frijlink, Universiteit Groningen

Prof. Dr. V. Pr at, Universite catholique de Louvain

Dr. E. Mastrobattista, Universiteit Utrecht

The studies presented in this thesis were performed at the Division of BioTherapeutics, Leiden Academic Centre for Drug Research (LACDR), Leiden University, Leiden, The Netherlands. The studies were partially financed by the Chinese Scholarship Council (CSC). The publication of this thesis was financially supported by the Leiden University.

Table of Contents

Chapter 1	General introduction, aim and outline of this thesis	1
Chapter 2	Mesoporous silica nanoparticle-coated microneedle arrays for intradermal antigen delivery	13
Chapter 3	Hollow microneedle-mediated intradermal delivery of model vaccine antigen-loaded PLGA nanoparticles elicits protective T cell-mediated immunity to an intracellular bacterium.....	37
Chapter 4	Intradermal vaccination with hollow microneedles: a comparative study of various protein antigen and adjuvant encapsulated nanoparticles	59
Chapter 5	Immunogenicity of diphtheria toxoid and poly(I:C) loaded cationic liposomes after hollow microneedle-mediated intradermal injection in mice	81
Chapter 6	Coated and hollow microneedle-mediated intradermal immunization in mice with diphtheria toxoid loaded mesoporous silica nanoparticles.....	97
Chapter 7	Summarizing discussion and prospects	117
Appendices		
	Nederlandse samenvatting.....	127
	Curriculum Vitae.....	133
	List of publications.....	135

