University of Groningen

The effects of preeclampsia on the maternal cardiovascular system

Lip, Simone V.

DOI:
[10.33612/diss.130539197](https://doi.org/10.33612/diss.130539197)

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):

Lip, S. V. (2020). *The effects of preeclampsia on the maternal cardiovascular system: Gene expression and its (epigenetic) regulation in experimental preeclamptic cardiovascular tissues and cells*. [Thesis fully internal (DIV), University of Groningen]. University of Groningen. <https://doi.org/10.33612/diss.130539197>

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.

The effects of preeclampsia on the maternal cardiovascular system

Copyright © 2020 – Simone Lip

All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means without written permission of the author and the publisher holding respective copyrights of the published articles, if applicable.

ISBN 9789464024517

Cover design and layout by Marleen Daamen
Printed by Gildeprint

Printing of this thesis was financially supported by the University of Groningen, University Medical Center Groningen, Graduate School of Medical Sciences, Research Institute SHARE.

rijksuniversiteit
 groningen

The effects of preeclampsia on the maternal cardiovascular system

Gene expression and its (epigenetic) regulation in
experimental preeclamptic cardiovascular tissues and cells

Proefschrift

ter verkrijging van de graad van doctor aan de
Rijksuniversiteit Groningen
op gezag van de
rector magnificus prof. dr. C. Wijmenga
en volgens besluit van het College voor Promoties.

De openbare verdediging zal plaatsvinden op
woensdag 26 augustus 2020 om 11.00 uur

door

Simone Vivande Lip
geboren op 23 november 1989
te Groningen

Promotores

Prof. dr. T. Plösch

Dr. M.M. Faas

Prof. dr. S.A. Scherjon

Beoordelingscommissie

Prof. dr. M.G. Rots

Prof. dr. R.A. de Boer

Prof. dr. M. Spaanderman

Financial support by the Dutch Heart Foundation for the publication of this thesis is gratefully acknowledged

The research described in this thesis was supported by a grant of the Dutch Heart Foundation (DHF 2013T084)

Paranimf

Leny Sprik

Table of contents

CHAPTER 1	9
General introduction and outline of this thesis	
CHAPTER 2	37
Experimental preeclampsia in rats affects vascular gene expression patterns	
<i>Published 01 November 2017: Scientific Reports 7, Article number: 14807 (2017)</i>	
CHAPTER 3	63
Gene expression in the heart postpartum experimental preeclampsia	
CHAPTER 4	85
Plasma from preeclamptic patients affects gene expression in human endothelial and vascular smooth muscle cells	
CHAPTER 5	111
Early-onset preeclampsia, plasma microRNAs and endothelial cell function	
<i>Published May 2020: American Journal of Obstetrics and Gynecology, Volume 222, Issue 5</i>	
CHAPTER 6	137
Sex-specific differences in gene expression and DNA methylation of naive endothelial cells	
CHAPTER 7	157
General discussion and future perspectives	
CHAPTER 8	175
Summary	177
Nederlandse samenvatting	183
Dankwoord	189