

University of Groningen

## Microvascular endothelial responses in critical illness

Jongman, Rianne Mariëlle

**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:*

2017

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

*Citation for published version (APA):*

Jongman, R. M. (2017). *Microvascular endothelial responses in critical illness: Focus on the Ang/Tie2 system*. [Thesis fully internal (DIV), University of Groningen]. Rijksuniversiteit Groningen.

### 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.

# **MICROVASCULAR ENDOTHELIAL RESPONSES IN CRITICAL ILLNESS**

**Focus on the  
Ang/Tie2 system**

© Rianne Jongman, 2017

All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means without permission of the author.

Cover design & illustration: isontwerp.nl - Eindhoven

Lay-out: Rianne Jongman

Printed by: Ipskamp Printing - Enschede

ISBN (printed): 978-94-034-0104-1

ISBN (digital): 978-94-034-0103-4

The research described in of this thesis is financially supported by: University of Groningen (RUG), University Medical Center Groningen (UMCG), department of Critical Care, and department of Anesthesiology, Dutch Kidney Foundation, Dutch Society of Anesthesiology (NVA).

Financial support by the University of Groningen (RUG) and the Dutch Kidney Foundation for the publication of this thesis is gratefully acknowledged.



rijksuniversiteit  
 groningen

# Microvascular endothelial responses in critical illness

Focus on the Ang/Tie2 system

## 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 1 november 2017 om 14.30 uur

door

**Rianne Mariëlle Jongman**

geboren op 6 oktober 1977  
 te Sneek

**Promotores**

Prof. dr. G. Molema

Prof. dr. J.G. Zijlstra

Prof. dr. M.M.R.F. Struys

**Copromotor**

Dr. M. van Meurs

**Beoordelingscommissie**

Prof. dr. C. Boer

Prof. dr. L.P.H.J. Aarts

Prof. dr. R.H. Henning

## **Paranimfen**

Ing. P.J. Zwiers

Ing. T. Kuiper



# Inhoudsopgave

<b>CHAPTER 1</b>	Introduction and aim of the thesis	8
<b>CHAPTER 2</b>	The renal angiotensin/Tie2 system in lethal human sepsis ( <i>Crit Care. 2014</i> )	28
<b>CHAPTER 3</b>	The flow dependency of Tie2 expression in endotoxemia ( <i>Intensive Care Med. 2013</i> )	34
<b>CHAPTER 4</b>	Angiotensin/Tie2 dysbalance is associated with acute kidney injury after cardiac surgery assisted by cardiopulmonary bypass ( <i>PLoS One. 2015</i> )	64
<b>CHAPTER 5</b>	Off-pump CABG surgery reduces systemic inflammation compared with on-pump surgery but does not change systemic endothelial responses: a prospective randomized study ( <i>Shock. 2014</i> )	82
<b>CHAPTER 6</b>	Partial deletion of Tie2 affects microvascular endothelial responses to critical illness in a vascular bed and organ-specific way	106
<b>CHAPTER 7</b>	Summary, conclusions, and future perspectives	140
<b>APPENDICES</b>	Nederlandse samenvatting	166
	About the author	168
	List of publications	170
	Dankwoord	174