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Modulating iron metabolism in anemia of inflammation in the critically ill

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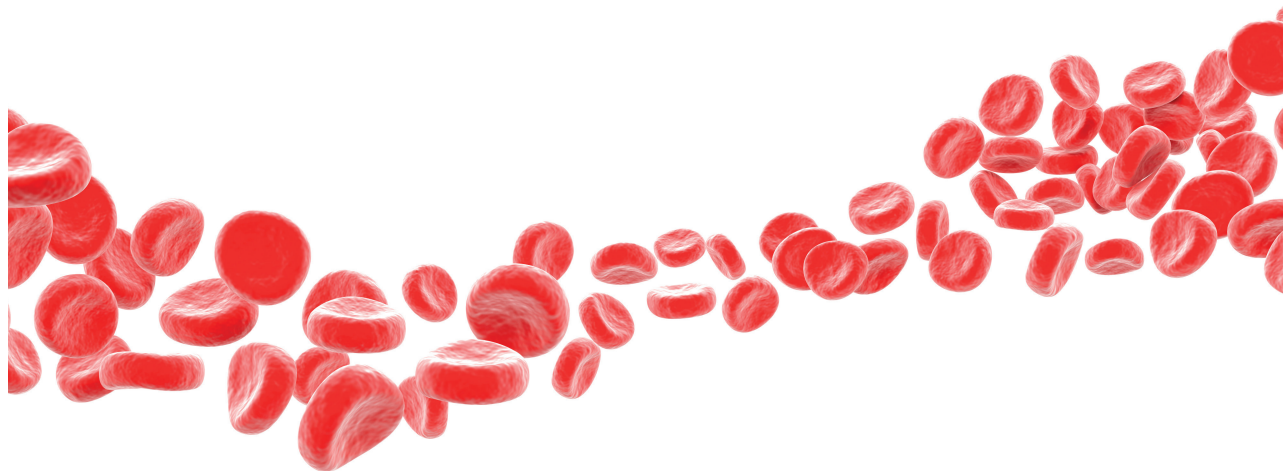
APPENDICES

List of publications

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LIST OF PUBLICATIONS

Boshuizen M, Kim A, Khorramian E, Gabayan V, Slot E, Nolte M, Hoogenboezem M, Nemeth E, Ganz T, Juffermans NP, van Bruggen R. Iron therapy to treat anemia of inflammation is not improved by transferrin supplementation. *To be submitted*

van Hezel ME, van Manen L, **Boshuizen M**, Straat M, de Cuyper I, Beuger B, Kopatz WF, Nieuwland R, Tanck MWT, de Korte D, Meijers J, Zwaginga JJ, van Bruggen R, Juffermans NP. The effect of red blood cell transfusion on platelet function in critically ill patients. *Submitted*

Boshuizen M, Maas MAW, van Manen L, Roelof JTTH, Swinkels DW, Schultz MJ, van Bruggen R, Juffermans NP. The effect of apotransferrin as an adjunct therapy to transfusion on levels of free iron, bacterial outgrowth and organ injury in a rat pneumonia model. *To be submitted*

Van Hezel ME, **Boshuizen M**, Peters AL, Straat M, Vlaar AP, Spoelstra-de Man AME, Tanck MWT, Tool ATJ, Beuger B, Kuijpers T, Juffermans NP, van Bruggen R. Red blood cell transfusion results in adhesion in human endotoxemia and in critically ill patients with sepsis. (2019) *Transfusion*

Boshuizen M, van Bruggen R, Zaat SA, Schultz, MJ, Aguilera A, Motos A, Senussi T, Idone FA, Pelosi P, Torres A, Li Bassi G, Juffermans NP. Development of a model for anemia of inflammation that is relevant for critical care. (2019) *Intensive Care Medicine Experimental*

Boshuizen M, Li Bassi G, Juffermans NP. Transferrin as a possible treatment of anemia of inflammation in the critically ill. (2019) *Annual Update in Intensive Care and Emergency Medicine*

Boshuizen M, Binnekade JM, Nota B, van de Groep K, Cremer OL, Horn J, Schulz MJ, van Bruggen R, Juffermans NP, Molecular Diagnosis and Risk Stratification of Sepsis (MARS) Consortium. Potential of parameters of iron metabolism to diagnose anemia of inflammation in the critically ill. (2019) *Transfusion Medicine and Hemotherapy*

Boshuizen M, van Hezel ME, van Manen L, Straat M, Somsen YBO, Spoelstra – de Man AME, Blumberg N, van Bruggen R, Juffermans NP. The effect of red blood cell transfusion on iron metabolism in critically ill patients. (2018) *Transfusion*

Boshuizen M, Binnekade JM, Nota B, van de Groep K, Cremer OL, Tuinman PR, Horn J, Schulz MJ, van Bruggen R, Juffermans NP, Molecular Diagnosis and Risk Stratification of Sepsis (MARS) Consortium. Iron metabolism in critically ill patients developing anemia of inflammation; a case control study. (2018) *Annals of Intensive Care*

Boshuizen M, van der Ploeg K, von Bonsdorff L, Biemond BJ, Zeerleder SS, van Bruggen R, Juffermans NP. Therapeutic use of transferrin to modulate anemia and conditions of iron toxicity. (2017) *Blood Reviews*

Leopold JH, van Hooijdonk RTM, **Boshuizen M**, Winters T, Bos LD, Abu-Hanna A, Hoek AMT, Fischer JC, van Dongen-Lases EC, Schultz MJ. Point and trend accuracy of a continuous intravenous microdialysis-based glucose-monitoring device in critically ill patients: a prospective study. (2016) *Annals of Intensive Care*

Boshuizen M, Leopold JH, Zakharkina T, Knobel HH, Weda H, Nijsen TM, Vink TJ, Sterk PJ, Schultz MJ, Bos LD, MARS consortium. Levels of cytokines in broncho-alveolar lavage fluid, but not in plasma, are associated with levels of markers of lipid peroxidation in breath of ventilated ICU patients. (2015) *Journal of breath research*

CURRICULUM VITAE

Margit Boshuizen was born on the 29th of April in 1989 in Leusden, the Netherlands. She received her 'Atheneum' diploma in 2007 at the Corderius College in Amersfoort. In the same year she started the study Biomedical Science at the University of Amsterdam. She finished her bachelor Biomedical Science in 2010. This year she was also selected for the master 'Arts-Klinisch Onderzoeker' at Maastricht university, which she finished in 2014. As part of her medical degree she performed her scientific internship at the department of Intensive Care, at the Academic Medical Center in Amsterdam. After obtaining her master degree in 2014, she started as a PhD student at Sanquin Research and Landsteiner Laboratory and the Department of Intensive Care at the Academic Medical Center in Amsterdam, under supervision of Dr. Robin van Bruggen and Prof. Nicole P. Juffermans. The research that she has performed during her PhD project is described in this thesis. During her PhD project, she performed a study under supervision of Dr. Gianluigi Li Bassi at Hospital Clínic, Barcelona in Spain. Besides, she established a research collaboration with Prof. Tomas Ganz at the Center of Iron Disorders at the University of California, Los Angeles in the United States. In 2018 she started to work at the St. Antonius Ziekenhuis in Nieuwegein at the department of Internal Medicine. In 2019 she started her residency Internal Medicine.

PHD PORTFOLIO

PhD student: Margit Boshuizen
 PhD period: August 2014 – August 2018
 Promotors: Prof. dr. N.P. Juffermans; Prof. dr. M.J. Schultz
 Co-promotor: Dr. R. van Bruggen

	Year	ECTS
General courses		
Sanquin Science Course	2014	0.4
Laboratory Animals (Article 9)	2014	3.9
BROK	2014	0.9
Informed Consent	2014	0.3
Computing in R	2015	0.4
Advanced Immunology (PAOG Amsterdam, Vumc)	2015	2.9
Practical Biostatistics	2016	1.1
Working with Mice in Research (UCLA, Los Angeles)	2017	0.4
Animal Research (UCLA, Los Angeles)	2017	0.4
Advanced Biostatistics	2017	2.1
Presentations		
<i>"Het therapeutisch potentieel van de plasma eiwitten haptoglobine, hemopexine en transferrine"</i>	2015	0.5
Oral presentation at the NVB, Ede - Invited speaker		
<i>"Iron Metabolism in Critically Ill Patients Developing Anemia of Inflammation"</i>	2017	0.5
Oral presentation at the AABB, San Diego, USA		
<i>"The Effect of Red Blood Cell Transfusion on Iron Metabolism in Critically Ill Patients"</i>	2017	0.5
Poster presentation, AABB, San Diego, USA		
<i>"Transferrin and Iron Therapy in a Mouse Model of Anemia of Inflammation"</i>	2018	0.5
Poster presentation at the ISBT, Toronto, Canada		
<i>"Apotransferrine, een panacee voor stoornissen in het ijzermetabolisme"</i>	2018	0.5
Oral presentation at the NVB, Ede - Invited speaker		

	Year	ECTS
Conferences		
Dutch Society for Blood Transfusion (NVB) Ede, the Netherlands	2015-2018	0.75
American Association of Blood Banks (AABB), San Diego, USA	2017	0.75
International Society of Blood Transfusion (ISBT), Toronto, Canada	2017	0.75
Exchange abroad		
Hospital Clínic, Barcelona, Spain	2015-2016	
Center for Iron Disorders, University of California Los Angeles (UCLA), Los Angeles, United States	2017	
Teaching		
Supervision of Bachelor student (medicine)	2016	1.0
Supervision of Master student (medicine)	2017	1.0
Grants and Awards		
Outstanding abstract award, AABB, San Diego, USA	2017	
Top Poster, AABB, San Diego, USA	2017	
AUF/ Spinoza Fonds, AMC	2017	
Travel grant AI&I, AMC	2017	
Other activities		
Intensive Care meeting	2014-2018	12
Intensive Care Journal club	2014-2018	4
Laboratory Experimental Intensive Care and Anaesthesiology research meeting	2014-2018	12
Sanquin research meeting	2014-2018	12
Sanquin Journal club	2014-2018	4
Sanquin Landsteiner lectures	2014-2018	12
Red Cell Meeting	2014-2018	4
Product Proces Ontwikkeling Sanquin (PPO)	2014-2018	4

DANKWOORD

Nooit gedacht dat er zoveel mensen nodig zouden zijn voor dit proefschrift. Al deze mensen wil ik via deze weg kort en krachtig bedanken. In het bijzonder Nicole en Robin.

Nicole, ik bewonder jouw werklust en hoe je je klinische werk combineert met het doen van onderzoek en het begeleiden van zoveel promovendi. Mijn manuscripten waren vrijwel altijd binnen 24 uur nagekeken en je deur stond altijd voor me open. Ontzettend bedankt hiervoor.

Robin, je bent erg slim en je hebt altijd goede ideeën voor nieuwe experimenten. Daarnaast zorgt jouw vrolijkheid voor een goede en ontspannen sfeer op de werkvloer. Ik heb het getroffen met een co-promotor die zo makkelijk benaderbaar is. Heel erg bedankt daarvoor.

Mijn kamergenoten in M0-210 – waaronder mijn paranimfen Maïke, Laween en Jenny – alle collega's van het LEICA, de IC, Sanquin – met name de rode cel groep, maar ook de neutrofiel groep, rode cel diagnostiek en de research faciliteit – maar ook iedereen van het lab van UCLA en de IC van Hospital Clínic in Barcelona. Naast jullie inhoudelijke hulp, heel veel dank voor alle gezelligheid en werkplezier. Zonder jullie allemaal was dit proefschrift nooit tot stand gekomen.

Tot slot mijn lieve familie, vrienden en natuurlijk Mark, bedankt voor het aanhoren van al mijn verhalen, jullie interesse en alle goede adviezen.

Dank jullie wel!

