

University of Groningen

Towards a neurobiological view of depression

van Buel, Erin

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):

van Buel, E. (2017). *Towards a neurobiological view of depression: Search for diagnostic biomarkers and alterations by electroconvulsive therapy*. [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.

Towards a neurobiological view of depression

search for diagnostic biomarkers and alterations
by electroconvulsive therapy

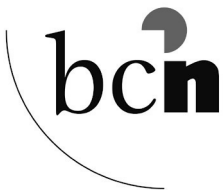
Erin Marijn van Buel

The studies described in this thesis were carried out at the Groningen Institute for Evolutionary Life Sciences (GELIFES), University of Groningen, Groningen, the Preclinical Laboratory for Translational Research into Affective Disorders (PLaTRAD), University Hospital of Psychiatry, Zürich (Switzerland) and Brainlabs B.V., Deventer. This research has been supported by a grant from the Dutch Ministry of Economic Affairs (registered under grant number PID_09_02/120329), ZonMW (registered under grant number 114024029) and a Boehringer Ingelheim Fonds travel grant.

The printing of this thesis was financially supported by the Groningen Graduate School of Science and Engineering and the University of Groningen



**rijksuniversiteit
 groningen**



Layout	Bianca Pijl, www.pijlldesign.nl , Groningen, The Netherlands
Cover design	Iris de Groot
Printed by	Ipskamp Printing Enschede, The Netherlands
ISBN	978-90-367-9861-7 (print) 978-90-367-9862-4 (digital)

© Copyright 2017 E.M. van Buel, Groningen, The Netherlands
All rights reserved. No part of this thesis may be reproduced stored in a retrieval system, or transmitted in any form or by any means, without prior permission of the author.



rijksuniversiteit
 groningen

Towards a neurobiological view of depression

Search for diagnostic biomarkers and alterations by
 electroconvulsive therapy

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

vrijdag 30 juni 2017 om 14.30 uur

door

Erin Marijn van Buel

geboren op 31 januari 1985
 te Amsterdam

Promotores

Prof. dr. U.L.M. Eisel

Prof. dr. R.A. Schoevers

Copromotores

Dr. H.C. Klein

Dr. F.J. Bosker

Beoordelingscommissie

Prof. dr. M.J.H. Kas

Prof. dr. E.A. van der Zee

Prof. dr. S. Bahn

Table of contents

Chapter 1	General introduction	7
Chapter 2	Biomarker approaches in major depressive disorder evaluated in the context of current hypotheses.	19
Chapter 3	Major Depressive Disorder is associated with changes in a cluster of serum and urine biomarkers; implications for the development of a biomarker-based diagnostic test.	53
Chapter 4	Immune and neurotrophin stimulation by electroconvulsive therapy: is some inflammation needed after all?	77
Chapter 5	Absence of therapeutic effects of repeated electroconvulsive seizures (ECS) and induction of impaired learning-memory associated with hippocampal inflammation and reduced cholinergic activity in a mouse chronic psychosocial stress model	97
Chapter 6	Electroconvulsive seizures (ECS) do not prevent LPS-induced behavioral alterations and microglial activation.	117
Chapter 7	Electroconvulsive seizures do not modify entry of chimeric immune cells into the brain in a mouse model of severe inflammatory depression.	133
Chapter 8	General discussion	153
	Nederlandse samenvatting	165
	Word of thanks	169
	Curriculum vitae	171
	List of publications	173

