



UvA-DARE (Digital Academic Repository)

The epileptogenic trinity

Oxidative stress, brain inflammation and iron in epilepsy

Zimmer, T.S.

Publication date

2021

[Link to publication](#)

Citation for published version (APA):

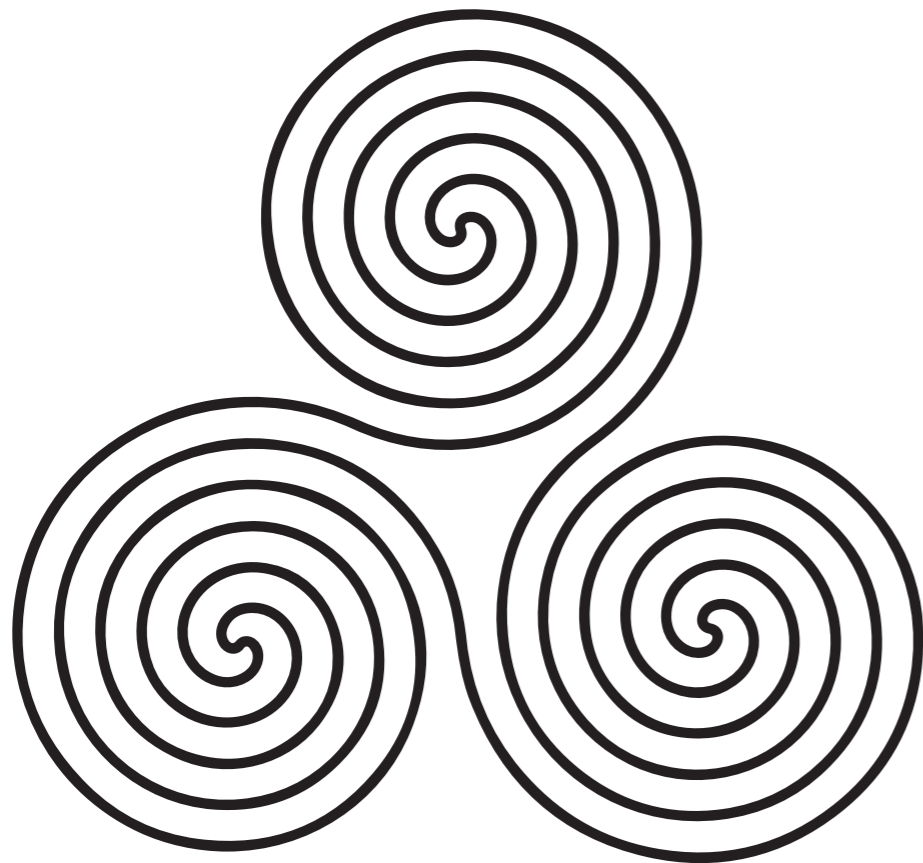
Zimmer, T. S. (2021). *The epileptogenic trinity: Oxidative stress, brain inflammation and iron in epilepsy*. [Thesis, fully internal, Universiteit van Amsterdam].

General rights

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), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

Disclaimer/Complaints regulations

If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: <https://uba.uva.nl/en/contact>, or a letter to: Library of the University of Amsterdam, Secretariat, P.O. Box 19185, 1000 GD Amsterdam, The Netherlands. You will be contacted as soon as possible.



The epileptogenic trinity

Till Zimmer

The epileptogenic trinity:

Oxidative stress, brain inflammation and
iron in epilepsy



Till Zimmer

The epileptogenic trinity:

Oxidative stress, brain inflammation and iron in epilepsy

Till Stephan Zimmer

The research described in this thesis was performed at the department of (Neuro) pathology at the Amsterdam UMC, University of Amsterdam, the Netherlands. The research was funded by the European Union's Horizon 2020 Research and Innovation Programme under the Marie Skłodowska-Curie grant agreement no. 722053 (EU-GliaPhD).

The printing of this thesis was financially supported by the Graduate School and the department of (Neuro)pathology at the Amsterdam UMC, University of Amsterdam.

ISBN: 9789082787184

Cover design & lay-out by Till S. Zimmer
Printed by Ipskamp Printing

In memoriam

Dr. med. Yusupha Charles Jow

a friend of the sciences

**The epileptogenic trinity:
Oxidative stress, brain inflammation and iron in epilepsy**

ACADEMISCH PROEFSCHRIFT

ter verkrijging van de graad van doctor
aan de Universiteit van Amsterdam
op gezag van de Rector Magnificus
prof. dr. ir. K.I.J. Maex
ten overstaan van een door het College voor Promoties ingestelde
commissie,
in het openbaar te verdedigen in de Agnietenkapel
op dinsdag 4 mei 2021, te 12.00 uur

door

Till Stephan Zimmer
geboren te Bonn

Promotiecommissie

Promotor:	prof. dr. E.M.A. Aronica	AMC-UvA
Copromotor:	dr. ing. E.A. van Vliet dr. J.D. Mills	AMC-UvA AMC-UvA
Overige leden:	prof. dr. I. Huitinga dr. M.M. De Curtis prof. dr. S. Florquin prof. dr. H.W.H.G. Kessels prof. dr. Y.B.W.E.M. Roos prof. dr. P.J. Lucassen prof. dr. J.W. Sander	Universiteit van Amsterdam Fondazione IRCCS Istituto Neurologico Carlo Besta AMC-UvA Universiteit van Amsterdam AMC-UvA Universiteit van Amsterdam University College London

Faculteit der Geneeskunde

Table of contents

Chapter 1	General introduction	p. 11
Chapter 2	Oxidative stress and inflammation in a spectrum of epileptogenic cortical malformations: molecular insights into their interdependence	p. 56
Chapter 3	Balloon cells promote immune system activation in focal cortical dysplasia 2b	p. 84
Chapter 4	Upregulation of the pathogenic transcription factor SPI1/PU.1 in tuberous sclerosis complex and focal cortical dysplasia by oxidative stress	p. 122
Chapter 5	Chronic activation of anti-oxidant pathways and iron accumulation in epileptogenic malformations	p. 158
Chapter 6	Iron accumulation and dysregulated iron metabolism after status epilepticus and temporal lobe epilepsy	p. 198
Chapter 7	General discussion	p. 251
Chapter 8	English summary	p. 276
Chapter 9	Nederlandse samenvatting	p. 282
Appendix	List of publications	p. 288
	Portfolio	p. 290
	Curriculum Vitae	p. 293
	Acknowledgements	p. 294