



Universiteit
Leiden
The Netherlands

Migraine biochemistry and visual snow

Dongen, R.M. van

Citation

Dongen, R. M. van. (2022, March 31). *Migraine biochemistry and visual snow*. Retrieved from <https://hdl.handle.net/1887/3281284>

Version: Publisher's Version

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/3281284>

Note: To cite this publication please use the final published version (if applicable).

Migraine biochemistry and visual snow

Robin van Dongen

Robin van Dongen
Migraine biochemistry and visual snow
PhD thesis, Leiden University, Leiden, The Netherlands, 2022

© Robin van Dongen, 2022

Cover design: Ilse Modder (www.ilsemodder.nl)
Layout: Ilse Modder (www.ilsemodder.nl)
Printed by: Gildeprint (www.gildeprint.nl)



Copyright of published material in chapters 2,3,5,6 and 7 lies with the publisher of the journal listed at the beginning of each paper. No part of this thesis may be reproduced in any form, by print, photocopy, digital file, internet, or any other means without written permission of the copyright holder.

The research presented in this thesis was performed at the Department of Neurology, Leiden University Medical Center, Leiden, The Netherlands.

This work is funded by grants of the Leiden University Medical Center (MD-PhD grant, R.M. van Dongen) and Netherlands Organization for Scientific Research (VICI grant no. 918.56.601 and Spinoza 2009 to M.D. Ferrari), the Netherlands Organization for Health Research and Development (Clinical Fellowship grant no. 90700217 and VIDI grant no. 917-11-31 to G.M. Terwindt), and European Community (EC) funded FP7-EUROHEADPAIN (grant no. 602633 to M.D. Ferrari and A.M.J.M. van den Maagdenberg).

Funding for publication of this thesis has been provided by the Dutch Headache Society and was gracefully accepted.

Migraine biochemistry and visual snow

Proefschrift

ter verkrijging van
de graad van doctor aan de Universiteit Leiden
op gezag van rector magnificus prof. dr. i.r. H. Bijl
volgens besluit van het college voor promoties
te verdedigen op 31 maart 2022
klokke 10.00 uur

door

Robin Marc van Dongen

Geboren te Voorburg in 1992

Promotores

Prof. dr. M.D. Ferrari

Prof. dr. A.M.J.M. van den Maagdenberg

Prof. dr. G.M. Terwindt

Leden promotiecommissie

Prof. dr. N.J.A. van der Wee

Prof. dr. T. Hankemeier (faculteit Medical Delta, Erasmus MC)

Dr. A. Maassen van den Brink (faculteit Interne Geneeskunde, Erasmus MC)

Prod. dr. J.E.A. Portielje

Contents

Chapter 1	General introduction	9
Part I: Migraine		25
Chapter 2	Migraine biomarkers in cerebrospinal fluid: A systematic review and meta-analysis	27
Chapter 3	The effect of needle size on cerebrospinal fluid collection time and post-dural puncture headache: A retrospective cohort study	51
Chapter 4	Cerebrospinal fluid and plasma amine profiles in migraine	63
Part II: Migraine and visual snow		81
Chapter 5	Symptoms related to the visual system in migraine	83
Chapter 6	Treatment effects and comorbid diseases in 58 patients with visual snow	99
Chapter 7	Migraine prevalence in visual snow with prior illicit drug use (Hallucinogen Persisting Perception Disorder) versus without	111
Chapter 8	General discussion	127
Addendum		
	Summary	152
	Nederlandse samenvatting	155
	List of publications	158
	Curriculum Vitae	159
	Dankwoord	160