



Universiteit
Leiden
The Netherlands

Exploration of the endocannabinoid system using metabolomics

Di, X.

Citation

Di, X. (2023, February 7). *Exploration of the endocannabinoid system using metabolomics*. Retrieved from <https://hdl.handle.net/1887/3515754>

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/1887/3515754>

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

**Exploration of the
endocannabinoid system using
metabolomics**

Xinyu Di 狄新宇

The publication of the thesis was financially supported by:

Leiden University Libraries

Sciex

Cover design: Xinyu Di

Thesis lay-out: Xinyu Di

Printing: PrintSupport4U

© Copyright, Xinyu Di, 2023

ISBN: 978-94-93289-21-5

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

Exploration of the endocannabinoid system using metabolomics

Proefschrift

ter verkrijging van
de graad van doctor aan de Universiteit Leiden,
op gezag van rector magnificus prof.dr.ir. H. Bijl,
volgens besluit van het college voor promoties
te verdedigen op dinsdag 7 februari 2023
klokke 15:00 uur

door

Xinyu Di 狄新宇

Geboren te Rugao, China in 1992

Promotor

Prof. dr. T. Hankemeier

Co-promotores

Dr. I. Kohler

Vrije Universiteit Amsterdam, the Netherlands

Dr. E.H.J. Krekels

Promotiecommissie

Prof. dr. H. Irth

Prof. dr. J.A. Bouwstra

Prof. dr. R.F. Kaddurah-Daouk

Duke university school of medicine, United States

Prof. dr. J.M.F.G. Aerts

Prof. dr. L.H. Heitman

Dr. S. Moco

Vrije Universiteit Amsterdam, the Netherlands

The research described in this thesis was performed at Metabolomics and Analytics Center (MAC) of the Leiden Academic Centre for Drug Research (LACDR), Leiden University (Leiden, The Netherlands). The research was financially supported as indicated in each chapter.

Contents

Chapter 1	General introduction and scope	1
Development of metabolomics-based approaches		
Chapter 2	A platform for the analysis of metabolites in endocannabinoids - related pathways <i>Manuscript in preparation</i>	21
Chapter 3	Quantification of endocannabinoids in human cerebrospinal fluid using a novel micro-flow liquid chromatography-mass spectrometry method. <i>Analytica Chimica Acta (2022)</i>	41
Application to clinical studies on cardiometabolic health		
Chapter 4	Plasma levels of endocannabinoids and their analogues as potential biomarkers of cardiometabolic risk in young sedentary adults <i>Manuscript submitted</i>	63
Chapter 5	Omega-6 and omega-3 oxylipins as potential markers of cardiometabolic risk in young adults <i>Obesity (2022)</i>	89
Chapter 6	Acute and long-term exercise differently modulate plasma levels of oxylipins, endocannabinoids, and their analogues in young sedentary adults: a randomized controlled-trial <i>EBioMedicine (2022)</i>	127
Chapter 7	Conclusions and perspectives	165
Appendix	Nederlands samenvatting	176
	Curriculum vitae	180
	List of publications	181
	Acknowledgements	183