



Universiteit
Leiden
The Netherlands

Systematic investigations into the role of ceramide subclass composition on lipid organization and skin barrier

Nadaban, A.

Citation

Nadaban, A. (2024, May 16). *Systematic investigations into the role of ceramide subclass composition on lipid organization and skin barrier*.

Retrieved from <https://hdl.handle.net/1887/3754008>

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/1887/3754008>

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

**Systematic investigations into the role of ceramide
subclass composition on lipid organization
and skin barrier**

Andreea Nădăban

Systematic investigations into the role of ceramide subclass composition on lipid organization and skin barrier

PhD thesis with summary in Dutch

The research described in this thesis was performed at the division of BioTherapeutics of the Leiden Academic Centre for Drug Research (LACDR), Leiden University (Leiden, The Netherlands). The research was financially supported by the National Institutes of Health (National Institute of Arthritis and Musculoskeletal and Skin Diseases, U.S.A.), grant number R01AR072679.

Cover image: A schematic representation of the epidermis, the upper layer of the skin. Stratum corneum (SC) is the top layer of the epidermis and it consists of corneocytes embedded in a lipid matrix. The zoomed in section shows an illustration of the SC lipids, which represent the main focus of this thesis. Some elements of the cover image were obtained from iStock photo.

Cover design: Andreea Nădăban

Layout: Andreea Nădăban

Printed by: Ipskamp Printing

ISBN: 978-94-6473-439-3

© Copyright, Andreea Nădăban, 2024. All rights reserved. No part of this thesis may be reproduced or transmitted in any form or by any means without the permission of the author.

**Systematic investigations into the role of ceramide subclass
composition on lipid organization and skin barrier**

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 donderdag 16 mei 2024
klokke 15.00 uur

door

Andreea Nădăban
geboren te Arad, Roemenië
in 1993

Promotores:

Prof. dr. J.A. Bouwstra

Prof. dr. R. Rissmann

Promotiecommissie:

Prof. dr. H. Irth

Prof. dr. E.C.M. de Lange

Prof. dr. D.J. Moore (University of Edinburgh)

Prof. dr. E. Sparr (Lund University)

Prof. dr. A. Kros

Dr. J. van Smeden

To my parents

TABLE OF CONTENTS

Chapter 1	Introduction, aim and outline of the thesis	9
Chapter 2	Lesional skin of Seborrheic Dermatitis patients is characterized by skin barrier dysfunction and correlating alterations in the stratum corneum ceramide composition	29
Chapter 3	Phytosphingosine ceramide mainly localizes in the central layer of the unique lamellar phase of skin lipid model systems	63
Chapter 4	Effect of sphingosine and phytosphingosine ceramide ratio on lipid arrangement and barrier function in skin lipid models	93
Chapter 5	Influence of the sphingosine and phytosphingosine ceramide ratio on the lipid organization in the short periodicity phase	125
Chapter 6	The molecular arrangement of ceramides in the unit cell of the long periodicity phase of stratum corneum models shows a high adaptability to different ceramide head group structures	151
Chapter 7	Summary and perspectives	183
Appendices	Nederlandse samenvatting, Curriculum Vitae, List of publications	195