

University of Groningen

Intestinal function in cholestasis and essential fatty acid deficiency

Los, E.L.

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:

2007

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Los, E. L. (2007). *Intestinal function in cholestasis and essential fatty acid deficiency*. s.n.

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.

Intestinal Function in Cholestasis and Essential Fatty Acid Deficiency

Copyright © 2007 E.L. Los

All rights reserved. No part of this book may be reproduced or transmitted in any form or by any means without written permission of the author and the publisher holding the copyright of the published articles.

Cover and page design: Leonie Los

Printed by Ponsen & Looijen B.V., Wageningen, The Netherlands

RIJKSUNIVERSITEIT GRONINGEN

Intestinal Function in Cholestasis and Essential Fatty Acid Deficiency

Proefschrift

ter verkrijging van het doctoraat in de
Medische Wetenschappen
aan de Rijksuniversiteit Groningen
op gezag van de
Rector Magnificus, dr. F. Zwarts,
in het openbaar te verdedigen op
woensdag 14 november 2007
om 13.15 uur

door

Esther Leonie Los

geboren op 26 februari 1980
te Zwolle

Promotores:

Prof. dr. H.J. Verkade

Prof. dr. F. Kuipers

Copromotor:

Dr. E.H.H.M. Rings

Beoordelingscommissie:

Prof. dr. A.J. Moshage

Prof. dr. R.J. Porte

Prof. dr. P.J.J. Sauer

ISBN paper version: 978-90-367-3214-7

ISBN electronic version: 978-90-367-3213-0

SPONSORING

Printing of this thesis was financially supported by:



rijksuniversiteit
groningen

Rijksuniversiteit Groningen
Faculteit der Medische Wetenschappen



Graduate School for
Drug Exploration

Groningen University Institute for Drug
Exploration (GUIDE)



ACE Pharmaceuticals B.V.



Numico Research B.V.



Nutricia Nederland B.V.



Mead Johnson Nutritional



AstraZeneca B.V.



Harlan Nederland B.V.



Zambon Nederland B.V.



MPI Pharma B.V.

Their contribution is gratefully acknowledged!

Paranimfen

Titia Woudenberg-Vrenken
Jelske van der Veen

Research

The studies described in this thesis were conducted within the Groningen University Institute for Drug Exploration (GUIDE), Center for Liver, Digestive, and Metabolic Diseases, Department of Pediatrics, University Medical Center Groningen, University of Groningen, Groningen, The Netherlands

Funding

The studies in these thesis were supported by the Dutch Digestive Foundation (MLDS). E.H.H.M. Rings and H.J. Verkade are supported by a fellowship of the Royal Netherlands Academy of Arts and Sciences (KNAW). A. Baghdasaryan is supported by the Nutricia Research Foundation.

TABLE OF CONTENTS

Chapter 1	General introduction	9
Chapter 2	Nutrition for children with cholestatic liver disease	37
Chapter 3	Intestinal capacity to digest and absorb carbohydrates is maintained in a rat model of cholestasis	47
Chapter 4	Cholestatic conditions and intestinal cell proliferation and differentiation	59
Chapter 5	Essential fatty acid deficiency in mice impairs lactose digestion	71
Chapter 6	Essential fatty acid deficiency in mice lacking Fxr: milder fat malabsorption and a more hydrophobic bile salt composition	85
Chapter 7	General discussion	95
	Summary	
	Nederlandse samenvatting	
	Dankwoord	
	Curriculum vitae	
	List of publications	

