

Two-phase endolymphatic hydrops
a *dynamic* model for Menière's disease

E.A. Dunnebier

RIJKSUNIVERSITEIT GRONINGEN



Two-phase endolymphatic hydrops
a dynamic model for Menière's disease

Proefschrift

ter verkrijging van het doctoraat in de
Medische Wetenschappen
aan de Rijksuniversiteit Groningen
op gezag van de
Rector Magnificus, dr. D.F.J. Bosscher,
in het openbaar te verdedigen op
woensdag 9 december 1998
om 14.45 uur

door

Erwin Alexander Dunnebier

geboren op 26 maart 1967
te Lexington (Kentucky, USA)

GRONINGEN
1998

Promotores: Prof. Dr. F.W.J. Albers
Prof. Dr. Ir. H.P. Wit

ISBN 90-9012183-8

Promotiecommissie: Prof.dr. P. van den Broek
Prof.dr.ir. H.J. Busscher
Prof.dr. J.H.A. de Keyser

Paranimfen: M.J. Dunnebier
R. Alefs

Acknowledgement

This study was supported by the Heinsius Houbolt Foundation and is part of the research program of our department: Communication through Hearing and Speech. The program is incorporated in the Sensory Systems Group of the Groningen Graduate School for Behavioural and Cognitive Neurosciences (BCN).

Financial support was provided by:

Schoonenberg Hoortoestellen (Groeneveld Winkelbedrijven B.V.)

Schering-Plough B.V. (producent van Claritine®)

ARTU Biologicals B.V., ASTRA Pharmaceutica B.V., Audicom Hoortoestellen B.V., Audire B.V., Beltone Nederland, Dunnebier Vermogensbeheer, Electro Medical Instruments B.V., Entermed B.V., Glaxo Wellcome B.V., GN Danavox Nederland B.V., Oticon Nederland B.V., Lorex Synthélabo, Medin KNO-instrumenten, Mediprof Holland B.V., Moduvic B.V. Medical Products, Nobel Biocare Benelux B.V., A.C.M. Ooms Allergie B.V., Prof.dr.Eelco Huizinga Stichting, ReSound, Rhône-Poulenc Rorer B.V., Rockmed, SmithKline Beecham Farma B.V., Smith&Nephew Nederland B.V., Stryker, Veenhuis Medical Audio B.V.

Internet

An electronic version of this thesis is available on Internet
<http://www.ub.rug.nl/eldoc/dis/medicine/e.a.dunnebier>

© 1998 E.A. Dunnebier, Groningen

Druk: Van Denderen B.V. Groningen

Acknowledgement

This study was supported by the Heinsius Houbolt Foundation and is part of the research program of our department: Communication through Hearing and Speech. The program is incorporated in the Sensory Systems Group of the Groningen Graduate School for Behavioural and Cognitive Neurosciences (BCN).

Financial support was provided by:

Schoonenberg Hoortoestellen (Groeneveld Winkelbedrijven B.V.)

Schering-Plough B.V. (producent van Claritine[®])

ARTU Biologicals B.V., ASTRA Pharmaceutica B.V., Audicom Hoortoestellen B.V., Audire B.V., Beltone Nederland, Dunnebier Vermogensbeheer, Electro Medical Instruments B.V., Entermed B.V., Glaxo Wellcome B.V., GN Danavox Nederland B.V., Oticon Nederland B.V., Lorex Synthélabo, Medin KNO-instrumenten, Mediprof Holland B.V., Moduvic B.V. Medical Products, Nobel Biocare Benelux B.V., A.C.M. Ooms Allergie B.V., Prof.dr.Eelco Huizinga Stichting, ReSound, Rhône-Poulenc Rorer B.V., Rockmed, SmithKline Beecham Farma B.V., Smith&Nephew Nederland B.V., Stryker, Veenhuis Medical Audio B.V.

Internet

An electronic version of this thesis is available on Internet
<http://www.ub.rug.nl/eldoc/dis/medicine/e.a.dunnebier>

© 1998 E.A. Dunnebier, Groningen

Druk: Van Denderen B.V. Groningen

aan mijn ouders en grootouders

Contents

		page
Chapter 1	Introduction	1
Chapter 2	Endolymphatic hydrops after total dissection or cauterization of the distal portion of the endolymphatic sac	7
Chapter 3	Two-phase endolymphatic hydrops; a new <i>dynamic</i> guinea pig model	19
Chapter 4	Low-voltage field-emission scanning electron microscopy of non-coated guinea-pig hair cell stereocilia	35
Chapter 5	New ultrastructural evidence for the existence of glycocalyx on hair cells of the organ of Corti	53
Chapter 6	Sensory cell damage in two-phase endolymphatic hydrops; a morphologic evaluation of a new experimental model by low-voltage scanning techniques	75
Chapter 7	Cochlear ultrastructure in two-phase endolymphatic hydrops in the guinea pig	93
Chapter 8	Ultrastructure of the endolymphatic sac in two-phase endolymphatic hydrops in the guinea pig	111
Chapter 9	Longitudinal recording of the compound action potential in two-phase endolymphatic hydrops	123
Chapter 10	Summary and conclusions	137
	Publications related to the subject	145
	Samenvatting en conclusies	147
	Dankwoord	161
	Curriculum Vitae	163