



Universiteit  
Leiden  
The Netherlands

**Clinical aspects of endogenous hypothyroidism and subclinical hyperthyroidism in patients with differentiated thyroid carcinoma**  
Heemstra, K.A.

**Citation**

Heemstra, K. A. (2009, September 2). *Clinical aspects of endogenous hypothyroidism and subclinical hyperthyroidism in patients with differentiated thyroid carcinoma*. Retrieved from <https://hdl.handle.net/1887/13946>

Version: Corrected 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/1887/13946>

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

Clinical aspects of endogenous  
hypothyroidism and  
subclinical hyperthyroidism  
in patients with differentiated  
thyroid carcinoma

Publication of this thesis was financially supported by Ipsen Farmaceutica BV, Novo Nordisk BV, Bayer Schering Pharma and Novartis Oncology.

Lay out & cover design: Froukje van de Klundert  
Printed by: Gildeprint Drukkerijen  
ISBN/EAN 9789490122461

© 2009 K.A. Heemstra

All rights reserved. No part of this thesis may be reproduced or transmitted in any form, by any means, electronic or mechanical, without the prior written permission of the author, or where appropriate, of the publisher of the articles.

# Clinical aspects of endogenous hypothyroidism and subclinical hyperthyroidism in patients with differentiated thyroid carcinoma

Proefschrift

ter verkrijging van  
de graad van Doctor aan de Universiteit Leiden  
op gezag van Rector Magnificus prof. mr. P.F. van der Heijden,  
volgens besluit van het College voor Promoties  
te verdedigen op woensdag 2 september 2009

klokke 15.00 uur

door

**Karen Anne Heemstra**

geboren te Weert  
in 1982

# Promotiecommissie

Promotores: Prof. Dr. J.W.A. Smit  
Prof. Dr. J.A. Romijn

Copromotor: Dr. E.P.M. van der Kleij-Corssmit

Referent: Prof. P. Lips (VU Medisch Centrum, Amsterdam)

Overige leden: Prof. J.H. Bolk  
Prof. H.A. Delemarre-van der Waal  
Prof. J. Kievit  
Prof. H. Pijl

*Voor mijn ouders*



# Contents

01	General Introduction	9
02	Serum Thyroglobulin Concentrations Predict Disease-free Remission and Death in Differentiated Thyroid Carcinoma	33
03	Type 2 Iodothyronine Deiodinase in Human Skeletal Muscle: Effects of Hypothyroidism and Fasting.	47
04	The Effects of Thyrotropin Suppressive Therapy on Bone Metabolism in Patients with Well-Differentiated Thyroid Carcinoma	61
05	Thyroid Hormone Independent Associations between serum TSH levels and Indicators of Bone Turnover in Cured Patients with Differentiated Thyroid Carcinoma	77
06	Thyroid hormone rather than TSH decreases bone turnover during hypothyroidism in athyroid patients with differentiated thyroid carcinoma	91
07	The Type 2 Deiodinase Thr92Ala Polymorphism is Associated with Decreased Femoral Neck Bone Mineral Density and Increased Bone Turn-over	103
08	Glucose Tolerance and Lipid Profile in Long-term Exogenous Subclinical Hyperthyroidism and the Effects of Restoration of Euthyroidism, a Randomised Controlled Trial	119
09	Autonomic nervous system function in chronic exogenous subclinical thyrotoxicosis and the effect of restoring euthyroidism	135
10	Short-term overt hypothyroidism induces sympathovagal imbalance in thyroidectomized differentiated thyroid carcinoma patients	149
11	Quality of Life in Cured patients with Differentiated Thyroid Carcinoma	161
12	The Thr92Ala polymorphism in the type 2 deiodinase is not associated with thyroxin dose in athyroid patients or patients with Hashimoto thyroiditis	171
13	General discussion and Summary	181
14	Nederlandse samenvatting	197
	List of publications	208
	Curriculum Vitae	211



