



Universiteit
Leiden
The Netherlands

The role of inflammation in muscle aging

Beenakker, K.G.M.

Citation

Beenakker, K. G. M. (2017, January 31). *The role of inflammation in muscle aging*. Retrieved from <https://hdl.handle.net/1887/45545>

Version: Not Applicable (or Unknown)

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/45545>

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

Cover Page



Universiteit Leiden



The handle <http://hdl.handle.net/1887/45545> holds various files of this Leiden University dissertation.

Author: Beenakker, K.G.M.

Title: The role of inflammation in muscle aging

Issue Date: 2017-01-31

The role of inflammation in muscle aging

PROEFSCHRIFT

TER VERKRIJGING VAN
DE GRAAD VAN DOCTOR AAN DE UNIVERSITEIT LEIDEN,
OP GEZAG VAN RECTOR MAGNIFICUS
PROF.MR. C.J.J.M. STOLKER,
VOLGENS BESLUIT VAN HET COLLEGE VOOR PROMOTIES
TE VERDEDIGEN OP 31 JANUARI 2017
KLOKKE 16.15 UUR

DOOR

Karel Gerard Maria Beenakker

GEBOREN TE EINDHOVEN IN 1986

Promotores:

Prof.dr. R.G.J. Westendorp

Prof.dr. A.B. Maier

(Vrije Universiteit Amsterdam & University of Melbourne)

Promotiecommissie:

Dr. H. Bruunsgaard (University of Copenhagen)

Prof.dr. T.W.J. Huizinga

Prof.dr.ir. S.M. van der Maarel

Prof.dr. C.G.M. Meskers (VU University Medical Center Amsterdam)

Cover: Fluorescent image of muscle cross-section showing a satellite cell at the lower right corner (purple). In Chapter 3 images of this type are used to search for impact of chronic systemic inflammation on muscle aging.

*opgedragen aan mijn oma Elena Manaresi,
door wie mijn affiniteit voor ouderen is ontstaan*

Contents

1	General Introduction	1
2	Patterns of muscle strength loss with age in the general population and patients with a chronic inflammatory state	7
3	Muscle characteristics in patients with an underlying inflammatory state	19
4	Immune responsiveness associates with cardiovascular mortality independent of circulating markers of inflammation	31
5	Men have higher whole blood cytokine production responses than women: a pooled-analysis including 15 study populations	43
6	Pro-inflammatory capacity of classically activated monocytes relates positively to muscle mass and strength	61
7	Variants of the IL-10 gene determine muscle strength in elderly from rural Africa: a candidate gene study	79
8	Discussion	99
	Bibliography	105
	Summary in Dutch — Nederlandse samenvatting	135
	Acknowledgements — Dankwoord	139
	List of Publications	141
	Curriculum Vitæ	143

