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PhD in Gerontological Sciences  
2017-2018

INVITATION to the Public defence of

**Pauline ARNOLD**

To obtain the academic degree of '**DOCTOR IN GERONTOLOGICAL SCIENCES**'

**Muscle activation and muscle recruitment in relation to ageing and inflammation**

**Tuesday 13 March 2018**

Auditorium **Piet Brouwer**, 18:00

Faculty of Medicine and Pharmacy, Laarbeeklaan 103, 1090 Brussel

How to reach the campus Jette:

<http://www.vub.ac.be/english/infoabout/campuses>

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## Summary of the dissertation

Ageing is associated with changes in the neuromuscular system, contributing to muscle weakness, i.e. sarcopenia, and slowing of movement. Both conditions increase the risk of falls and physical dependency in elderly. Neuromuscular mechanisms supposed to be involved are 1) a decrease in maximal voluntary muscle activation, 2) an increase of antagonist muscle coactivation and 3) changed muscle activation patterns. Another age-related factor influencing muscle weakness is inflammation, also playing a role in muscle fatigue. Underlying mechanisms are not clear and literature reports conflicting evidence on the effect of strength training on muscle activation. The objectives of this thesis were 1) to provide insight in underlying mechanisms, i.e. age-related changes in muscle activation, hypothesized to contribute to muscle weakness and slowing of movement in elderly persons and 2) to review systematically the literature for studies regarding the influence of strength training on muscle activation in elderly persons. We showed the involvement of age-related changes in voluntary muscle activation, muscle recruitment and chronic inflammation in muscle weakness and slowing of movement in healthy and normal cognitive functioning older people. Additionally, we showed that local peripheral inflammatory processes are involved in decreased muscle activity during a fatiguing muscle contraction in hospitalized elderly with acute infection. We conclude that exercise-induced increase in voluntary activation is related to strength gains in the lower extremities in healthy older persons. These findings will support clinicians and physiotherapists to be aware of the role of inflammation in changed motor strategies and muscle fatigue in elderly. Prescribing exercise interventions to counter muscle weakness and related physical dependency in elderly persons is recommended.

## Curriculum Vitae

Pauline Arnold was born in Hilversum, The Netherlands, on the 3th of January 1958. She finished secondary school (VWO) in 1977 and studied physiotherapy from 1977-1981 in Amsterdam, at Stichting Academie Fysiotherapie Amsterdam (S.A.F.A.). After graduation she started working in a physiotherapy practice in Baarn and started her own practice in 1986 in Blaricum. She worked as a physiotherapist until 2008. From 1993 she studied 'Manual therapy' at SOMT in Amersfoort and graduated in 1997. In 2002 she started her Master of Science Education at Utrecht University, where she graduated in 2006 (cum laude) as Clinical Health Scientist, specialized in Physiotherapy research. She started to work parttime at SOMT, as a teacher in manual therapy, combining this with working in her own practice. Since 2008 she works fulltime at SOMT, at first in the Master Manual Therapy department, combining teaching with coordinating functions. Since April 2013 she is fulltime head of the Master Physiotherapy in geriatrics department at SOMT, with organizing, teaching, developing and supervising (Mastertheses) responsibility. In January 2013 she started as a PhD-student at the FRIA-research group, led by professor dr. Ivan Bautmans. Pauline is married to Roland van Loenen and they have one daughter, Leonie, born in 1989.