

GRADUATE AND POSTDOCTORAL STUDIES

MCGILL UNIVERSITY



FINAL ORAL EXAMINATION
FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

OF

SAMANEH FARSIJANI
SCHOOL OF DIETETICS AND HUMAN NUTRITION

**PRESERVING MUSCLE MASS, STRENGTH AND PERFORMANCE IN
FREE-LIVING OLDER ADULTS: A**

April 5, 2017
1:00 PM

RAYMOND BUILDING, R3-045
McGill University, MacDonald Campus

COMMITTEE:

Dr. Don Smith, Pro-Dean, Department of Plant Science

Dr. Tim Johns, Departmental Chair, School of Dietetics and Human Nutrition

Dr.

ABSTRACT

Older people form the fastest growing proportion of the world's population. Loss of muscle mass and strength, known as sarcopenia, and impaired physical function are well-recognized aspects of aging.

Sarcopenia is considered an important predictor of frailty, disability, institutionalization and mortality, imposing a heavy burden on the healthcare system. Among many possible etiologic factors, an unbalanced diet and specifically inadequate protein intake, is thought to contribute to sarcopenia in senior adults. It remains to be determined whether mealtime distribution of protein intake, independent of protein quantity, affects muscle mass and physical performance in older adults in the long-term. Despite the potential contribution of dietary factors to healthy aging, the role of dairy products on body composition and physical performance in free-living older adults has been scarcely studied in longitudinal studies.

The global objectives of this thesis are: (1) to examine the extent to which total protein intake and mealtime protein distribution are associated with lean mass (LM) and appendicular LM (aLM) and their 2-y changes; (2) to examine the cross-sectional and longitudinal relationship between mealtime distribution of protein intake and physical performance; and (3) to investigate the association between total dairy intake and changes in body composition and physical performance over 3 years, using the NuAge database (Quebec Longitudinal Study on Nutrition as a Determinant of Successful Aging) in community-dwelling men and women (aged 67-84 y). In this thesis, dietary data were extracted from 2 sets of three nonconsecutive 24-h food recalls collected at baseline (T0) and after 2 years (T2). Participants' protein intake

of LM loss in either sex. In Study 2, a more even distribution of protein intake was associated with higher muscle strength, but not mobility function, in both sexes throughout the entire follow-up (3 years), independently of the total protein intake. Despite a steady deterioration of physical performance over 3 years, it was not affected by protein intake distribution in either sex. Study 3 showed independent associations between higher dairy consumption and higher LM and a better mobility score throughout follow-up in both sexes. Higher dairy intake was inversely associated with body fat in women, while the association was positive in men. Additionally, the risk of pre-frailty/frailty was lower among high dairy consumers in men. However, time-dependent changes in body composition, muscle strength or physical performance were not related to dairy intake in either sex.

Our studies strongly support that specific nutritional approaches, e.g., higher and a more evenly distributed protein intake as well as higher dairy intake, are independently associated with higher muscle mass and better physical function, but not with their changes over our short (2-3 years) follow up in the elderly. However, having a higher baseline lean mass and strength may indicate a delay in reaching the sarcopenic threshold even at the same rate of decline. Nevertheless, longer-

CURRICULUM VITAE

- 2016/09 Best poster award. 13th edition of the Network Research Days and Académie Nationale de Médecine de France. Quebec Network for Research on Aging (RQRV).
- 2015/5 Abstract Award for outstanding research related to the CNS thematic conference. Canadian Nutrition Society (CNS)
- 2015/5 CNS Trainee Award/ Poster Competition: One of the 8 finalists in the poster competition.
- 2014/6 Best Poster Presentation award. Health Outcomes Axis & McGill Geriatric Division Research Day.
- 2014 – 2016 Research Grant: Quebec Network for Research on Aging (RQRV): “Role of Dairy Product Consumption in Elderly People on The Expression of Genes Involved in Inflammation: A Nutrigenomics Study (\$15,000).
- 2014/4 Graduate Excellence Award (90020), McGill University.
- 2012/9–2013/8 Graduate Excellence Award (00071), McGill University.
- 2011/9–2012/8 Graduate Excellence Fellowship (90071AG), McGill University.
- 2003–2007 Dean of Nutrition and Dietetics Award for Excellence in Academic Records, Shahid Beheshti University of Medical Sciences & Health Services, Tehran, Iran.

PUBLICATIONS

Published:

Farsijani S, Morais JA, Payette H, Gaudreau P, Shatenstein B, Gray-Donald K, Chevalier S (2016). *Relation between mealtime distribution of protein intake and lean mass loss in free-living older adults of the NuAge study*. Am J Clin Nutr 2016; 104(3):694-703.

Chevalier S and **Farsijani S** (2014). *Cancer cachexia and diabetes: similarities in metabolic alterations and possible treatment*. Appl Physiol Nutr Metab. 39(6): 643-53.

Under peer-review: revisions required

Farsijani S, Payette H, Morais JA, Shatenstein B, Gaudreau P, Chevalier S (2016). *Even Mealtime Distribution of Protein Intake Is Associated with Greater Muscle Strength, But Not with 3-Year Decline, in Free-Living Older Adults: The NuAge Study*. Submitted to Am J Clin Nutr in October 2016 (*Revised version submitted March 6 2017; Under Review*).

Labonte C*, **Farsijani S***, Marliss EB, Gougeon R, Morais JA, Pereira S, Bassil M, Winter A, Murphy J, Combs TP, Chevalier S (2016). *Plasma amino acids*

Ready to submit:

Farsijani S, Payette H, Morais JA, Shatenstein, Gaudreau P, Chevalier S (2016). *Dairy Consumption is Associated with Body Composition, Physical Function and Frailty in Community-Dwelling Older Adults: The Quebec NuAge Longitudinal Study*. Ready to be submitted to the J Nutr.

PRESENTATIONS

Oral Presentations

Farsijani S, Payette H, Morais JA, Shatenstein B, Gaudreau P, Chevalier S. Even Mealtime Distribution of Protein Intake Is Associated with Greater Muscle Strength, But Not with 3-Year Decline, in Free-Living Older Adults: The Nuage Study. Experimental Biology, Chicago, Illinois, USA. April, 2017.

Farsijani S, Payette H, Morais JA, Shatenstein B, Gaudreau P, Chevalier S. Dairy Consumption is Associated with Body Composition, Physical Function and Frailty in Community-Dwelling Older Adults: The Quebec NuAge Longitudinal Study. Experimental Biology, Chicago, Illinois, USA. April, 2017.

Farsijani S, Morais JA, Payette H, Gaudreau P, Shatenstein B, Gray-Donald K, Chevalier S. The relationship between dietary protein intake distribution and lean mass loss in free-living older adults: effect of sex and total protein intake. Experimental Biology

Farsijani S, Morais JA, Payette H, Gaudreau P, Shatenstein B, Gray-Donald K,

weight and composition, physical and cognitive functions, metabolic profile and inflammation. Health Outcomes Axis & McGill Geriatric Division Research Day, Montreal, Quebec, Canada, June 12, 2014. (**Winner of poster competition**).