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Optimizing Amino Acids and Protein for Musculoskeletal Health during Periods of Rest or Disuse

Speaker biography

Prof. Stuart Phillips is a distinguished academic and researcher at McMaster University in Hamilton, Ontario, Canada. He has an impressive educational background, having earned a Bachelor of Science (BSc) degree and a Master of Science (MSc) degree from McMaster University. He further pursued his academic journey and obtained a Ph.D. from the University of Waterloo.

Currently, Prof. Phillips holds the esteemed position of Distinguished University Professor in the Department of Kinesiology at McMaster University. He also serves as the Tier 1 Canada Research Chair in Skeletal Muscle Health. In addition to these roles, he is the Director of the McMaster Centre for Nutrition, Exercise, and Health Research, located within the Faculty of Science. Prof. Phillips also serves as the Director of McMaster Physical Activity Centre of Excellence (PACE), which is also housed within the Faculty of Science.

Prof. Phillips is an esteemed member of the McMaster Institute for Research on Aging (MIRA) and the Centre for Metabolism, Obesity, and Diabetes Research (MODR) within the Faculty of Health Sciences. His extensive contributions to research are reflected in his impressive career citations, which exceed 31,000. He has authored over 400 original scientific research and review papers, further establishing his expertise and impact in his field.

The focus of Prof. Phillips' work revolves around the interaction of nutrition and exercise on human skeletal muscle protein turnover, as well as its impact on exercise, aging, and body composition. His research has significantly contributed to our understanding of skeletal muscle health and its implications for overall well-being. Prof. Phillips is recognized as a

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fellow of the American College of Sports Medicine (ACSM) and the Canadian Academy of Health Sciences (CAHS). Furthermore, his consistent presence in the top 1% of highly-cited scholars globally in the fields of nutrition and physiology for six consecutive years (2018-2023) attests to the impact and relevance of his research.

Prof. Stuart Phillips' significant contributions to the understanding of skeletal muscle health, exercise, aging, and nutrition have made him a respected authority in his field. His research has played a crucial role in advancing knowledge and improving human health and well-being.

Abstract

Skeletal muscle disuse occurs in various scenarios, including bed rest for illness or limb immobilization[1]. Even a relative 'disuse' modelled experimentally using reduced daily steps results in similar adaptations, albeit on a slower scale[2]. Disuse is most problematic in older persons, especially those with chronic disease, overt malnutrition or undernutrition[3]. Disuse induces a marked perturbation to the processes that govern muscle protein turnover – muscle protein synthesis (MPS) and muscle protein breakdown (MPB). The disuse-induced removal of contractile stimulation of muscle results in a loss of amino acid sensitivity and a reduced stimulaiton of MPS, similar to the anabolic resistance of feeding[4]. The result is rapid deconditioning and loss of strength, muscle mass, and general worsening of metabolic regulation[3]. Combating these adverse disuse effects has been attempted with nutritional support with some success[5, 6]. The strategic mitigation of disuse atrophy requires a formulation with a balance of high-quality protein and energy to support an anabolic (anti-catabolic) state. An optimal approach to mitigating disuse-induced decline will require specific protein and amino acid formulations in combination with other nutritional supports, including adequate energy. The primary ingredients in any such formulation would include proteins with a high leucine content since leucine is the primary amino acid responsible for the stimulation of MPS[7]. There must also be, of course, all other essential amino acids (EAA) in abundance to support ongoing MPS. These sentiments are particularly true in persons with sarcopenia, for whom high-quality protein is of primary importance[8, 9]. There also needs to be a focus on the provision of sufficient energy so as to rive anabolism and support recory.

The main reason why we should attempt to aggressively support an older malnourished patient during a disuse event is because the loss of muscle is profound in these patients. Older persons may also be sarcopenic, which would exacerbate the loss of muscle[10]. We know that older people struggle to return to normal function after disuse, and often, muscle loss during these times represents a permanent loss, and the older patient is at risk of a downward spiral of events that is hard to mitigate. The illustration below shows the vicious cycle of how prolonged immobility and reduced muscle mass and function can become incapacitating.

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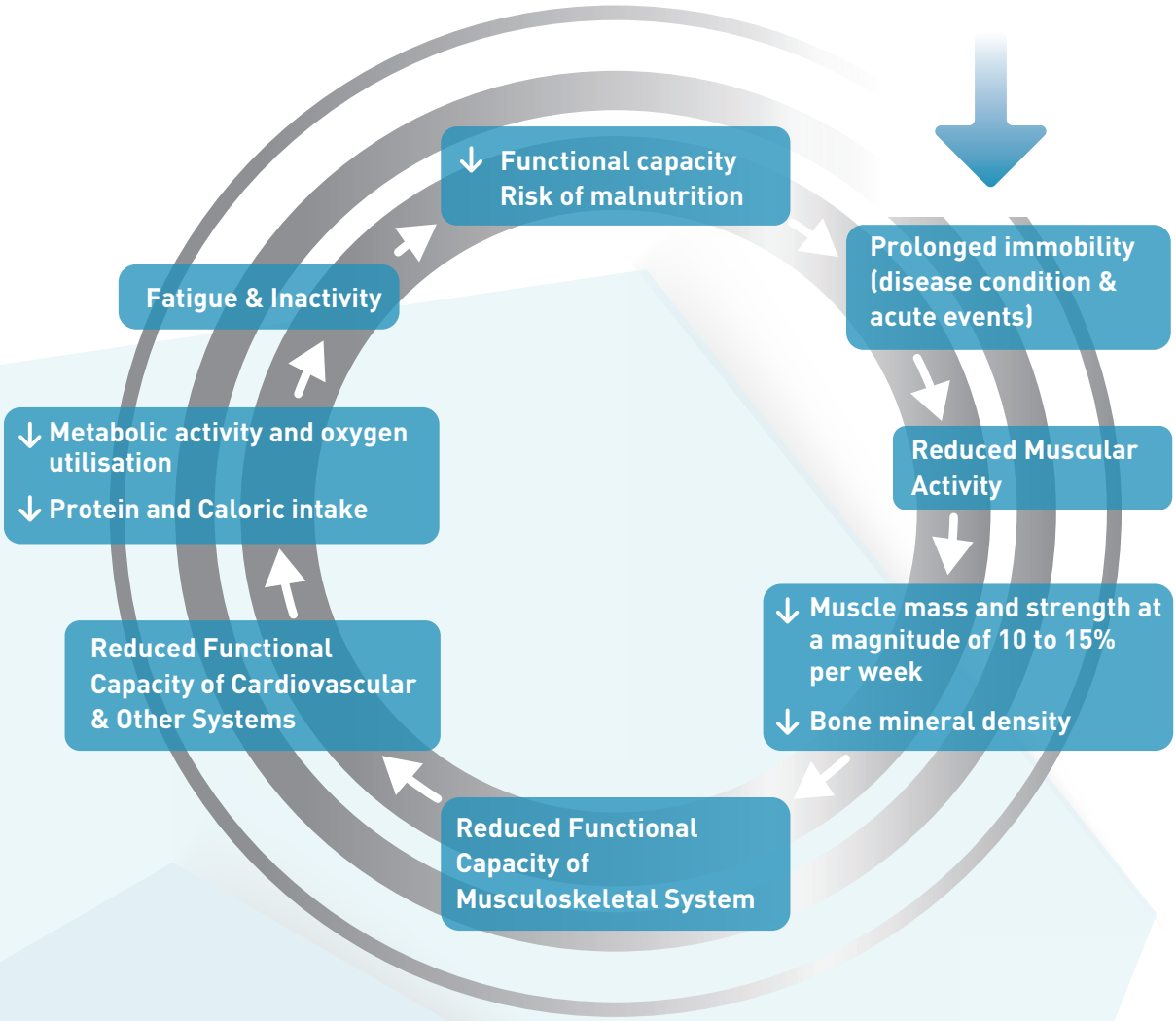
MULTISYSTEMIC CONSEQUENCES OF PHYSICAL INACTIVITY ASSOCIATED WITH BED REST



The aim of my presentation is to present a review of the protein- and amino-acid-related supports that are core to the mitigation of disuse or even reduced activity-induced atrophy with an emphasis on older persons who may be at risk for malnutrition. Ideally, protein nutrition would induce a more rapid return to normal function and break the cycle of undernutrition/malnutrition and disuse-induced muscle loss and the downward spiral associated with such conditions.

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Watch the 22:48 minute conference talk with Professor Stuart Phillips and hear about OPTIMIZING AMINO ACIDS AND PROTEIN FOR MUSCULOSKELETAL HEALTH DURING PERIODS OF REST OR DISUSE

https://youtu.be/B9eAgNjBDVQ

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