

Intermittent Fasting attenuates age-related muscle atrophy: The underlying molecular mechanisms leading to proteins degradation in sarcolemma: Mice model

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Sarcopenia is a gradual loss of muscle mass and strength during aging that increases the risk of morbidity and mortality. Diet regimens that incorporate periods of fasting have gained popularity as a potential therapeutic approach to prolong quality and life expectancy and prevent disease. However, dieting may harm the elderly population and accelerate the breakdown of muscle protein. The sarcopenia is also manifested in a decrease in muscle strength because of damage to the transmission of force to the sides mediated by a complex of glycoproteins and the receptor for the insulin hormone.

The main aim was to measure the metabolic and biochemical changes in skeletal muscles during subsequent aging because of physiological adaptation to two intermittent fasting regimes.

Male mice C57BL/6 of different ages were divided into three groups: One, fasting and eating intermittently for 24 hours (Alternate-Day Fasting - ADF). The second, fasting for 18 hours and eating for 6 hours (Time-Restricted Feeding -TRF), and Third ad libitum, for 12 weeks. Outcome measurement included histological and immunohistochemical analysis, mass spectrometer imaging, morphological properties and clinical techniques.

Intermittent fasting improved body composition by less adipose tissue and more muscle tissue and maintains grip strength. TRF and ADF diets improve glucose uptake and sub-sarcolemma proteins such as Dystrophin and Plakoglobin, and increase signal transduction of Akt kinase.

TRF and ADF diets have elicited beneficial health effects. TRF and ADF may uncovering the therapeutic potential of caloric restriction to prevent or improve the prognosis of age-related diseases such as sarcopenia.

BIO

Eli Carmeli, P.T., Ph.D., Full Professor, received his license PT from Wingate Institute (1980), BPT degree from the Sackler Faculty of Medicine at Tel Aviv University

(1988), and his PhD degree (direct tract) from the Rappaport Faculty of Medicine at the Technion in Haifa (1993). Eli did his post-doc at the University of Florida, in Gainesville (1993-1994). Eli started his academic career in 1994 as a 'senior lecturer' at Nova Southeastern University, Ft Lauderdale, Florida. In 1998 he joined the PT Department at Tel Aviv University. Eli served as the chairperson of the PT Department at Tel Aviv University in 2004-2008. In 2013 he joined University of Haifa where he worked in a full-time tenure tract position at the Physical Therapy Department, Faculty of Social Welfare and Health Sciences until his retirement in October 2023. Eli served as Chairperson of the Master degree program at University of Haifa in 2013-2016 and between 2016-2019 he served as the chairperson of the PT Department at University of Haifa. He served for 6 years as the Editor-in-Chief of the IPS (Israeli Physiotherapy Society) Magazine. Eli is an editorial team member in several journals such as Isokinetics and Exercise Science, International Journal of Therapy & Rehabilitation, and TSW Child Health & Human Development. Eli has more than 140 publications in referee journals as published in PubMed in 2023, and Scopus H Index is 30.

Eli is one of the founders of BioXtreme. He designed the company's therapy protocol, established the clinical trials and acts as a consultant on clinical issues.

His research is focusing on aging of skeletal muscle. In addition, he involves in three other topics:

Sensory –motor characteristics among adults with intellectual disabilities

Exercise first and diet later" as a means to enhance metabolic outcomes and life quality of the older frail obese

Error-augmentation concept as a possible technique for improvement of motor performance among Stroke survivors.