

Effects of Night Fat Eating and Resistance Training on Ovariectomy-induced Muscle Loss
in Aging Rats

Kun-Chih Chen¹, Shio-Chwen Tsai¹, Ching-Hung Lin², Szu-Hsien Yu³

¹Institute of Sports Sciences, University of Taipei, Taipei, Taiwan

²Physical Education Office, Yuan Ze University, Taoyuan, Taiwan

³Department of Leisure Industry and Health Promotion, National Ilan University, Ilan, Taiwan

*Corresponding author: perry810352@gmail.com

Abstract

Introduction: Menopause will accelerate loss of muscle mass and strength, and having high-fat diet during night time may lead to obesity. This study was to investigate the effects of night fat eating(NF) and resistance training(RT) on muscle mass and muscle strength in ovariectomized (OVX) simulate menopause rats.

Methods: 56 female Sprague-Dawley rats (24 weeks) were divided into 5 groups: sham operation (SHAM; n = 10), OVX group (n = 11), OVX+RT (n = 12), OVX+NF (n = 11) and OVX+NF+RT (n = 12). Within 8 weeks intervention, all rats were given normal chow diet for 8 hours during dark phase. NF groups were given high-fat diet for 2 hours at the beginning light phase. RT groups performed climbing resistance training at the beginning light phase every 2 days. Oral glucose tolerance test (OGTT), insulin level, and the muscle strength test were determined after intervention.

Results: After 8 weeks of intervention, Compared to OVX group, OVX+NF had higher energy intake, but was lower in OVX+RT. OVX+RT had significant increase in muscle mass and muscle strength, and lower AUC area in OGTT test; OVX+NF had significant loss in both muscle mass and strength, increase in body fat percentage, blood glucose and insulin level. Compared to OVX+NF, relative muscle strength of flexor digitorum profundus (FDP) and flexor hallucis longus (FHL) in OVX+NF+RT were significantly increase, decrease fat percentage, blood glucose and insulin level.

Conclusions: Resistance training could improve night fat eating on muscle mass and strength in OVX female rats.

Keywords: Menopause, High fat diet, Ladder-climbing training