

4036008 SCEP/M : MAJOR : PHYSIOLOGY OF EXERCISE ; M.Sc.

(PHYSIOLOGY OF EXERCISE)

KEY WORDS : EXERCISE TRAINING / VITAMIN E SUPPLEMENTATION /
DIABETES MELLITUS / SCAVENGING ENZYMES

PIYANAT BUNNITIGON : EFFECTS OF EXERCISE TRAINING AND
ANTIOXIDANT SUPPLEMENTATION ON STREPTOZOTOCIN INDUCED
DIABETES IN RATS. THESIS ADVISORS: BUARONG LEWCHALERM-
WONGSE, M.Sc., KK SHIDA PANG, Ph.D., CHAIVAT TOSKULKAO, D.V.M.,
Ph.D., VIJITTRA LEARDKAMOLKARN Ph.D. 177 p. ISBN 974-664-935-3.

This study investigated the effect of long-term exercise training and/or vitamin E supplementation on the onset and severity of diabetes induced by streptozotocin (STZ), and on skeletal muscle antioxidant enzymes (superoxide dismutase-SOD, glutathione peroxidase-GPX, catalase-CAT). 64 male Sprague-Dawley rats were divided into 8 groups: sedentary, exercise trained (12 weeks running on motor driven treadmill, 1 hr/day, 5 days/week), vitamin E supplemented (12 weeks daily i.g. feeding of 70 IU/kg BW/day of alpha-tocopherol acetate), and exercise trained plus vitamin E supplemented groups, with and without diabetic induction by injection of 35 mg/kg BW of STZ. Onset and severity of diabetes were determined by measuring plasma glucose level for 6 consecutive days after STZ injection. Scavenging enzymes and lipid peroxidation, using malondialdehyde (MDA) as an indicator, were measured in the gastrocnemius muscle, 7 days after STZ.

Vitamin E supplemented diabetic rats had levels of plasma glucose that were significantly lower than sedentary diabetic rats, throughout 7 days of measurement. Although the training program employed in this study is sufficient to cause physiological adaptation to exercise training, indicated by lowered resting heart rate and increased in citrate synthase activity, the trained diabetic rats showed no improvement in diabetic condition in both onset and severity when compared to sedentary diabetic rats. Plasma glucose level in exercise trained plus vitamin E supplemented diabetic rats was higher than in vitamin E supplemented-diabetic rats but was still lower than that in sedentary-diabetic rats.

Our results suggest a beneficial effect of vitamin E supplementation. However, exercise training itself did not appear to improve the diabetic condition although there was a beneficial effect in increasing selected muscle scavenging enzymes in exercise trained diabetic rats and non-diabetic rats.