**2B09-3 Effects of estrogen deficiency on skeletal muscle in female**

Yuriko Kitajima, Shinya Masuda, Tsubasa Hisamatsu, Daiki Seko, Yusuke Ono
Nagasaki University Graduate School of Biomedical Sciences

**Purpose:** Insufficient energy intake in female athletes leads to loss of body-weight that causes hypoestrogenic menstrual abnormality. Prolonged estrogen deficiency affects various types of estrogen receptor expressing tissues including bone: loss of bone mineral density resulting in stress fracture. Although estrogen receptor is also expressed in skeletal muscle, the effect of prolonged estrogen deficiency on skeletal muscle remains unclear. Satellite cells play important roles in muscle repair and regeneration. In this study, we investigated the effect of estrogen deficiency on skeletal muscle and satellite cells in female mice.

**Methods:** Six weeks old C57BL/6 female mice were ovariectomised (OVX). Sham operated mice were used as a control. Samples were obtained after 2, 4, 8, and 24 weeks after OVX. Fibre types in tibialis anterior (TA) muscle were determined by immunohistochemistry. Muscle function was assayed by grip test. Single myofibres associated with satellite cells were isolated from extensor digitorum longus muscle, cultured for 3 days in mitogen-rich medium in floating condition, and immunostained. Muscle injury was induced by cardiotoxin injection into TA muscle and muscles were obtained at 14 days after injury.

**Results:** Cross sectional area of individual myofibres was significantly decreased in OVX in a time-period dependent manner. Consistent with this result, reduced muscle strength was also observed 24 weeks after OVX. OVX mice exhibited a slow-to-fast fiber conversion. The number of satellite cells per myofibre was unchanged, whereas proliferation and differentiation abilities in satellite cells were markedly declined in OVX mice when cultured. Indeed, muscle regeneration was compromised in OVX.

**Discussion:** Our results demonstrated that estrogen is necessary to maintain the functions in both muscle and satellite cells in female. Thus, estrogen deficiency may influence muscular strength and endurance as well as muscle repair and regeneration in female athletes.

**Key words:** Estrogen deficiency; Skeletal muscle; Female; Satellite cell; Fibre type

**2B09-4 Relationships between intramuscular fat and body composition and blood profiles in obese boys and girls**

Hiroshi Akima¹, Kenji Togashi²
¹Nagoya University, ²Mie University

**Purpose:** The purpose of this study is to assess relationship between intramuscular fat (IMF) index in thigh muscles and body composition, e.g. visceral fat cross-sectional area (CSA), abdomen subcutaneous fat CSA and muscle CSA, and blood profiles in obese boys and girls.

**Methods:** Twenty-four obese boys and girls participated in the study. Computed tomography images of the abdomen and thigh were taken to measure visceral fat CSA, abdomen subcutaneous fat CSA, muscle CSAs and IMF index, which was expressed as gray scale level of the CT images, of the quadriceps femoris (QF), hamstrings (HM) and adductors (AD). GOT, urinary acid, total cholesterol, FFA, and HbA1c were measured from blood sample.

**Results and Discussion:** IMF index in HM (1066.3 ± 5.5) was significantly higher than QF (1079.4 ± 3.7) and AD (1072.9 ± 5.1). As a result of stepwise linear regression analysis, none of independent variables were selected to explain IMF index of QF. Visceral fat CSA and FFA were selected for IMF index of HM (R = 0.693, P < 0.01) and visceral fat CSA was selected for IMF index of AD (R = 0.483, P < 0.05). These results suggest that fat depot within HM and AD was coordinated with depot visceral and abdominal subcutaneous fat in obese boys and girls.