



## Mid Atlantic Regional Chapter of the American College of Sports Medicine

45<sup>th</sup> Annual Scientific Meeting, November 4<sup>th</sup>- 5<sup>th</sup>, 2022  
Conference Proceedings

International Journal of Exercise Science, Issue 9, Volume 11



### Evaluation of Cytokine Pattern in Perivascular and Intramuscular Fat During Heart Failure

Maria Canellas da Silva<sup>1</sup>, David J. Song<sup>1</sup>, Yuan Liu<sup>1</sup>, William S. Evans<sup>1</sup>, Sarah Kuzmiak-Glancy<sup>1</sup>, Steven J. Prior<sup>1,2</sup>. <sup>1</sup>University of Maryland, College Park, MD. <sup>2</sup>Baltimore Veterans Affairs Geriatric Research, Education and Clinical Center and Research and Development Service, Baltimore, MD.

Adipose tissue (AT) is responsible for energy storage and release, but also has several endocrine and immunomodulatory actions. AT can secrete a variety of cytokines that play an important role in immune regulation and therefore impact overall body health. Increased fat accumulation is strongly associated with inflammation and the onset of cardiovascular disease including heart failure (HF). TNF $\alpha$  and IL10 are two important pro- and anti-inflammatory cytokines respectively, but their specific effects in HF remain elusive. Moreover, the contribution of AT from different anatomic regions to the immune imbalance seen in HF is not completely understood. **PURPOSE:** Compare secretion of IL-10 and TNF $\alpha$  between intramuscular (IMAT) and perivascular AT (PVAT) from male and female rats with or without HF. **METHODS:** Four-week-old Sprague-Dawley rats underwent transverse aortic constriction (TAC) to induce cardiac pressure overload, hypertrophy, and HF. Forty weeks post-surgery, the rats were sacrificed and IMAT and PVAT samples were collected from the lower limb and aorta, respectively. AT samples were cultured in M199 medium for 24h and conditioned medium was collected for analyses. TNF $\alpha$  and IL-10 were quantified by ELISA in 11 TAC and 9 control (SHAM) rats. Cytokine levels were normalized and expressed as pg of cytokine/g of AT. Statistical analyses were performed using a two-factor ANOVA. **RESULTS:** PVAT secreted higher amounts of IL-10 ( $850 \pm 52$  vs  $95 \pm 45$  pg/g,  $p < 0.01$ ) and TNF $\alpha$  ( $290 \pm 49$  vs  $25 \pm 11$  pg/g,  $P < 0.005$ ) than IMAT from both TAC and SHAM rats, combined. There were no differences in IL-10 secretion between TAC and SHAM for PVAT ( $756 \pm 114$  vs  $774 \pm 113$ ,  $p > 0.05$ ) or IMAT ( $89 \pm 17$  vs  $97 \pm 20$ ,  $p > 0.05$ ). Likewise, TNF $\alpha$  secretion from PVAT ( $251 \pm 123$  vs  $328 \pm 65$ ,  $p > 0.05$ ) and IMAT ( $15 \pm 7$  vs  $34 \pm 23$ ,  $p > 0.05$ ) did not differ between TAC and SHAM samples, respectively. However, when comparing sexes, PVAT from females secreted higher amounts of IL-10 than males ( $1053 \pm 124$  vs  $643 \pm 81$ ,  $p = 0.016$ ). **CONCLUSION:** Compared with IMAT, PVAT secretes greater amounts of both pro- and anti-inflammatory cytokines, with higher secretion of anti-inflammatory IL-10 in females compared with males. Further analysis of additional cytokines is needed to fully elucidate the relationship between AT and inflammation in HF in male and female rats.

Supported by AHA 16SDG30770015