Osteoporosis and related fractures are serious health concerns for postmenopausal women (1). Menopause is associated with increased visceral adiposity and insulin resistance (IR). IR may lead to hyperglycemia and accumulation of advanced glycation end products (AGEs) in bone. AGG accumulation makes bone more brittle and likely to fracture (2). Soy might improve bone health postmenopause by direct effects of phytoestrogens on bone or by increasing insulin sensitivity, blood glucose homeostasis, and preventing AGA accumulation (3).

**METHODS – CONT.**

**ABSTRACT**

Osteoporosis is linked to increased regional microstructural effects of reproductive hormone loss. Menopause is associated with decreased muscle mass. Therefore, a positive association between reduced muscle mass and increased fracture risk is hypothesized. The study objective was to determine if weight-bearing exercise would slow down the bone loss and collagen turnover in ovariectomized rats. Methods: 16 female Sprague-Dawley rats, 5 weeks of age, were randomly assigned to 2 groups. Ovariectomy (OVX) and age-matched sham operations (SHM) were performed on day 0. Groups were trained on a treadmill three times per week for 20 weeks. Results: The BV/TV of the femoral neck and femoral head were attenuated in OVX-CORN compared to SHM-CORN rats. In addition, the SMI, Tb.Th, and degree of anisotropy (DA) increased with OVX, respectively. Bone turnover was evaluated using the fluorometer, and the results showed significant differences among the treatment groups. Conclusions: Muscle loss is significantly correlated with bone loss (r=0.476, p=0.0494). The study suggests that weight-bearing exercise may provide benefits for bone health in postmenopausal rats.

**RESULTS – CONT.**

**BACKGROUND**

- Osteoporosis and related fractures are serious health concerns for postmenopausal women (1).
- Menopause is associated with increased visceral adiposity and insulin resistance (IR).
- IR may lead to hyperglycemia and accumulation of advanced glycation end products (AGEs) in bone.
- AGG accumulation makes bone more brittle and likely to fracture (2).
- Soy might improve bone health postmenopause by direct effects of phytoestrogens on bone or by increasing insulin sensitivity, blood glucose homeostasis, and preventing AGA accumulation (3).

**PURPOSE**

To evaluate the effects of ovariectomy (OVX) and a soy protein-based diet (SOY) on advanced glycation end-product (AGE) content of the tibia in female, low capacity running (LCR) rats. A secondary purpose is to see how AGE content is related to bone mass, bone turnover and biomechanical properties of the tibia.

**EXPERIMENTAL DESIGN**

- Female low capacity running rats (LCR) used as a rodent model of menopause
- At 28 weeks of age, animals underwent ovariectomy (OVX) or sham surgery (SHM).
- Animals were then fed a soy-protein-based diet (SOY) or corn-gluten-based protein meal (CORN) until sacrifice at 52 weeks of age.

**STATISTICAL ANALYSES**

- A two-way ANOVA was used to measure the main effects of SHM vs. OVX and CORN vs. SOY.
- LSD post-hoc analysis performed where there was a significant interaction.
- Linear regression was used to examine relationships between AGE content, bone turnover and biomechanics.
- Data are mean ± SEM; P<0.05 significant.
- SPSS (v.23.0; Chicago, IL).

**RESULTS**

**METHODS – CONT.**

- Bone strength was assessed using torsional loading to failure.
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**REFERENCES & FUNDING**


**CONCLUSIONS**

In the ovariectomized LCR rat model of menopause, AGE accumulation does not appear to be a significant contributor to the deleterious skeletal changes.

**AGE content was negatively associated with bone resorption.**