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**LS-11-P-1519 Defective bone microstructure in the tibial secondary spongiosa of Goto-Kakizaki diabetic rats**

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Type 1 diabetes mellitus has been known to induce bone microstructural defect, low bone density, and osteoporosis, but the findings from type 2 diabetes mellitus (T2DM) remain controversial. Here, bone microstructure was investigated in female young growing Goto-Kakizaki diabetic rats by using computer-assisted bone histomorphometric analysis. This rat strain was non-obese and hyperglycemic, and exhibited T2DM with insulin resistance. Two doses of 10 mg/kg calcein (a fluorescent dye) were injected subcutaneously on day 7 and 1 prior to euthanasia to stain mineralizing bone surface. The tibiae were removed, sectioned, and finally processed for Goldner’s trichrome staining. The results showed that the tibial secondary spongiosa of diabetic rats had lower trabecular bone volume, trabecular thickness, and osteoblast surface than the wild-type rats, but osteoblast morphology appeared normal. Analysis of calcein labeling under a fluorescent microscope revealed lower mineralizing surface, mineral apposition rate, and bone formation rate in diabetic rats as compared to the wild-type rats. Active osteoclasts were also observed in the tibial metaphases of diabetic rats, agreeing with a histomorphometric finding that osteoclast surface was greater in diabetic rats than wild-type rats. Therefore, the present study has provided evidence that T2DM was associated with defective bone microstructure, presumably due to the suppression of osteoblast-mediated bone formation and enhancement of osteoclast-mediated bone resorption.

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