

Oral Abstract

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Transgenic expression of human FSH in female mice has an anabolic effect on bone

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Recent studies observed that female mice deficient in the FSH beta-subunit or receptor are protected from bone loss despite oestrogen deficiency, suggesting that FSH directly causes bone loss (1). We previously developed a human FSH-expressing transgenic (tg-FSH) mouse model that features progressively increasing levels of circulating human FSH with advancing age (from 2.7 IU/L in 5-wk-old mice to 6 IU/L in 6-month-old mice) (2), independent of pituitary secretion, while serum estradiol levels remain normal. This model provides a unique opportunity to determine the in-vivo effects of increased FSH activity on bone distinct from the effects of oestrogen deficiency.

We performed microcomputed tomography of the L3 vertebra and the tibia of 6-month-old female tg-FSH and wild-type (WT) mice (n=40).

Trabecular bone volume (BV/TV) was increased by 31% in the vertebrae ($p=0.012$), and by 60% in the tibiae ($p=0.041$) of tg-FSH, compared to WT mice. This was mostly due to increased trabecular number (Fig.1). Tibial cortical bone area (+9%, $p=0.009$) and cortical thickness (+7%, $p=0.039$) were significantly increased in tg-FSH animals while tibial lengths were similar. Changes in the different skeletal sites were correlated, consistent with a systemic effect.

Our study demonstrates an anabolic effect of human FSH on mouse bone. While the mechanism of this effect remains uncertain, our data do not support the concept that FSH directly causes bone loss.

1. Sun L, et al. Cell 2006; 125: 247-60.

2. McTavish KJ, et al. Endocrinology 2007; 148: 4432-9.

