Change of growth pattern and bone mineral density in ovariectomized female rats according to estrogen dosage

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OBJECTIVES

To know the optimal dosage of estrogen to promote pubertal growth spurt without significant decrease of bone mineral density or epiphyseal plate thickness

METHODS

Subject
Fifteen 4-week-old female wild-type Sprague Dawley rats (SD rat) were ovariectomized
Three groups were randomly divided according to injected dosage of estrogen
1. Group 1 as a control (N=5) sesame oil
2. Group 2 as a high dose (N=5) 100μg/kg/week of estradiol depo
3. Group 3 as a super-high dose (N=5) 200μg/kg/week of estradiol depo

For 10 weeks (week 10 - 19)
Subcutaneous injection on posterior neck area

Experiment
1. Anthropometric check
Crown-rump length, body weight check weekly

2. Laboratory check
serum GH level, serum estradiol level using ELISA

3. Bone mineral densities were evaluated with DXA (lunar PIXIms2 densitometer)

4. Pituitary RNA extraction
Quantitative RT-PCR for Gh1

<table>
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<th>Oligonucleotide name</th>
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5. Dissection of proximal tibia
HE staining
Thickness of epiphyseal plate including proliferative zone and hypertrophic zone were checked (20 equally divided site)

RESULTS

CONCLUSIONS

GH secretion and Gh1 gene expression were increased after super-high dose estrogen treatment.

There were tendencies that body weight had negative and bone mineral density had positive relation with estrogen dosage, but with no significant differences.

The thickness of hypertrophic zone in epiphyseal plate was relatively increased after super-high-dose estrogen treatment.

The effects of estrogen on epiphyseal plate in rodents may be different with human