



**HAL**  
open science

## Sex-specific effects of endocrine IGF-1 on skeletal morphology and peak bone acquisition

Sébastien Elis, Yingjie Wu, Hayden-William Courtland

► **To cite this version:**

Sébastien Elis, Yingjie Wu, Hayden-William Courtland. Sex-specific effects of endocrine IGF-1 on skeletal morphology and peak bone acquisition. 91. Annual Conference on Endocrine System Diseases, Jun 2009, Washington, United States. 2009, 91st Annual Conference on Endocrine System Diseases (Endo 2009). hal-02752822

**HAL Id: hal-02752822**

**<https://hal.inrae.fr/hal-02752822>**

Submitted on 3 Jun 2020

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



# Sex-Specific Effects of Endocrine IGF-1 on Skeletal Morphology and Peak Bone Acquisition

Sebastien Elis, Yingjie Wu, Hayden-William Courtland, Hui Sun, Valerie Williams, Karl Jepsen and Shoshana Yakar

Division of Endocrinology, Diabetes and Bone disease, Mount Sinai School of Medicine, New York, NY 10029



MOUNT SINAI SCHOOL OF MEDICINE

## BACKGROUND

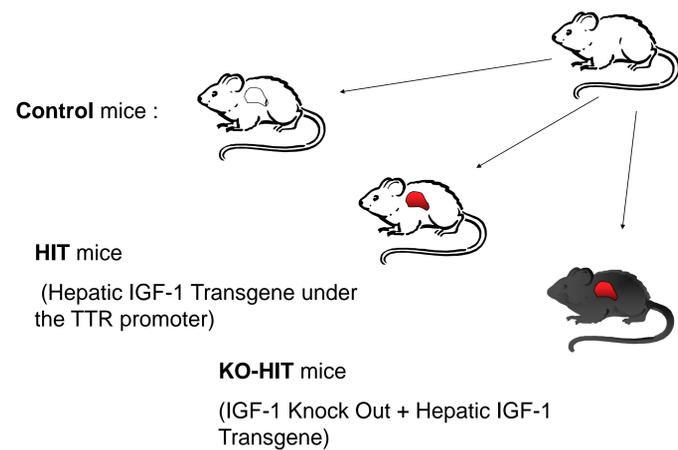
IGF-1 acts on the growing skeleton in an endocrine and autocrine/paracrine manner. IGF-1 null mice exhibit significant impairment of skeletal growth and development. Here, we studied whether increased levels of endocrine (serum) IGF-1 can rescue the severe skeletal phenotype of both male and female IGF-1 null mice. We performed skeletal analyses of three mouse models: 1) control mice, which express normal levels of autocrine/paracrine and endocrine IGF-1, 2) mice which express autocrine/paracrine IGF-1 as in control, but also overexpress *Hepatic IGF-1 transgene* (HIT), and 3) IGF-1 null mice that overexpress the *Hepatic IGF-1 transgene* (KO-HIT) and, thus, overexpress endocrine IGF-1.

## AIM

This study aimed at defining the sex-specific skeletal response to increased levels of serum IGF-1 in the presence or absence of tissue IGF-1.

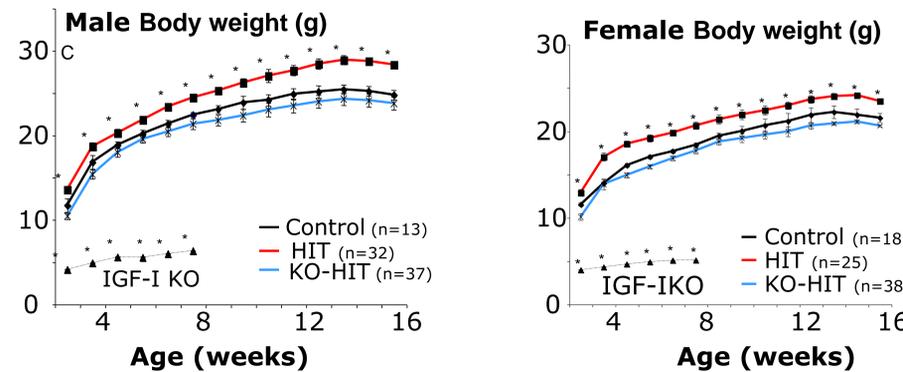
## MOUSE MODELS

### Crossing strategy

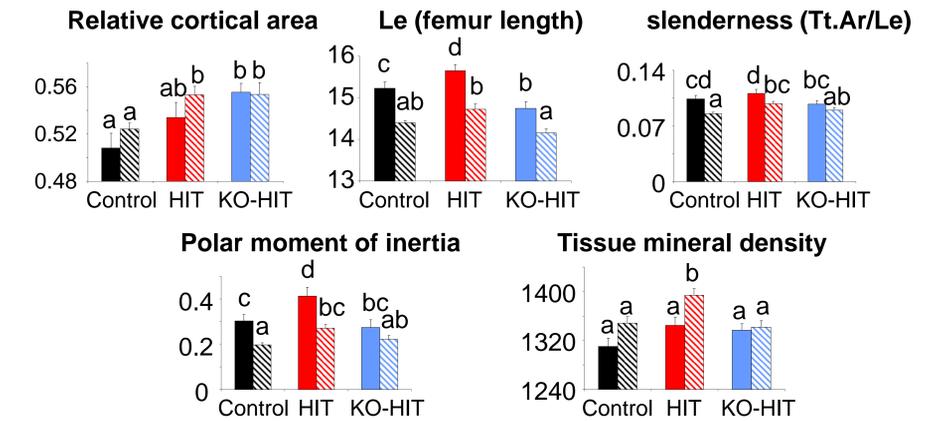


We performed longitudinal analyses of three mouse models: 1) control mice, which express normal levels of autocrine/paracrine and endocrine IGF-1; 2) Hepatic IGF-1 transgenic (HIT) mice, which express normal levels of autocrine/paracrine IGF-1 but overexpress endocrine IGF-1 and 3) IGF-1 null mice, which do not express autocrine/paracrine IGF-1 but overexpress endocrine IGF-1 (KO-HIT)

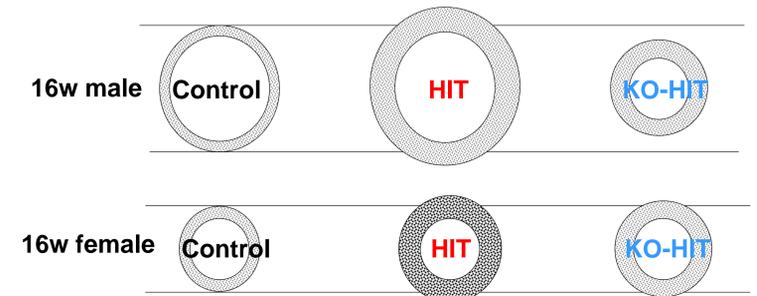
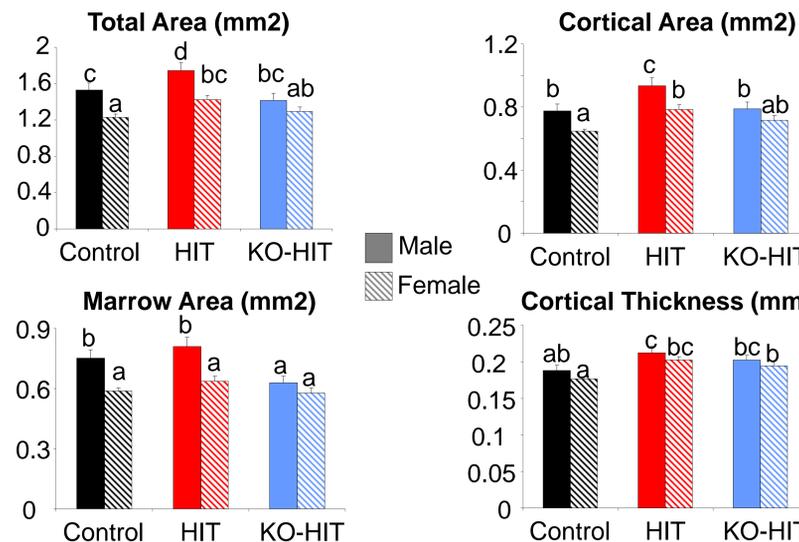
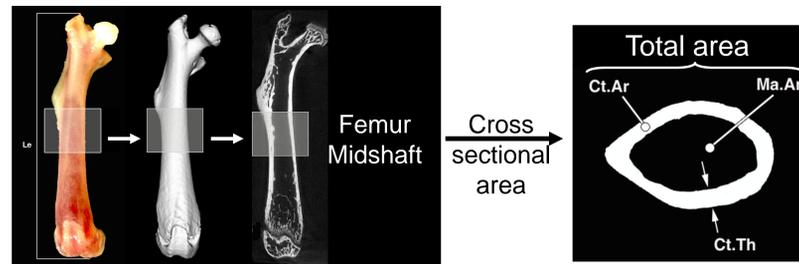
## RESULTS



Control mice: local IGF1 normal + endocrine IGF1 normal  
 HIT mice : local IGF1 normal + endocrine IGF1 increased  
 KO-HIT mice : no local IGF1 + endocrine IGF1 increased



### Bone morphology at 16w Micro Computational Tomography



## CONCLUSIONS

These data suggest that in the absence of tissue IGF-1, increased levels of serum IGF-1 are sufficient to rescue the body weight and transverse bone size in both male and female mice (KO-HIT). However, we show that in the absence of tissue IGF-1, increased levels of serum IGF-1 in males are insufficient for normal longitudinal bone growth.

## GRANTS

National Institutes of Health : R01AR055141- R01AR054919

In KO-HIT female, bones are intermediate of control and HIT  
 In KO-HIT male bones are significantly smaller than HIT (trend to be smaller than control)