Functional Role of CKIP-1 for Bone Formation Reduction During Aging: Micro CT analysis

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Abstract

Background: Bone metabolism is a dynamic balance, consisting two major courses: bone resorption and bone formation. Bone loss during aging is an age-associated process. There are several aspects changing with age in bone, including bone mechanical behavior, bone mineral matrix, bone proteins, genetic and molecular signaling in bone cells physiology. Based on the above factors, when the formation decreases, it leads to a disorder disease: osteoporosis, characterized by low bone mineral density and degenerating microstructure, resulting in increased risks of bone fractures. Many previous studies aim on how to reduce bone resorption, but there is a study shows that Smurf1 has an important role in inhibiting osteoblast activity but not influencing osteoclast activity. And Ckip-1(casein kinase-2 interacting protein-1) can reinforce the process. This thesis focuses on CKIP-1 functional role in regulating bone formation and the results are discussed on the basic of micro CT data analysis.

Aim: Evaluate the functional role of CKIP-1 in regulating bone formation through BMP signaling pathway in established osteoporosis rats model on bone hismophometric parameters.

Methods: The bodies of tibia and femur were obtained from thirty-six six-month-old female rats which had been divided into either CKIP-1 knockout(KO;n=18) group or CKIP-1 wild type(WT;n=18) group. According to rats age, a timeline was divided into three parts: 4 months, 6 months and 8 months. Every time point included two groups(KO=6; WT=6). Ten days and three days before sacrificed, Calcein green(10mg/kg)and xylenol orange(30mg/kg)would be injected intraperitoneally in all the rats to symbol the surface of bone formation. After sacrifice, the tibia and femur bodies would be scanned and reconstructed as 3D images by micro CT.
**Results:** Figure decrease in micro CT parameters during aging is attenuated in KO group.

**Conclusion:** The negatively functional role of CKIP-1 in monitoring bone formation in aging bone can be a good way and high specificity regulate bone formation.

**Keywords:** CKIP-1(Casein kinase-2 interacting protein-1); KO groups(knockout); WT groups(wild type); Micro CT.
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