学位論文内容の要約

Histological alteration of bone specific-blood vessels in murine long bones with intermittent PTH administration

(PTH 間歇投与によるマウス長管骨における骨特異的血管の組織学的変化)

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Intermittent administration of parathyroid hormone (PTH) promotes preosteoblastic proliferation and differentiation into osteoblasts, which are coupled with osteoclasts, finally resulting in enhanced bone formation. Endomucin^{high}-positive bone-specific blood vessels have been reported to interact with osteoblastic cells to form new bones. However, it is still veiled whether PTH can affect the distribution of bone-specific blood vessels and other cell- types which surround the blood vessels. In this study, we have attempted to histologically examine bone-specific blood vessels after the intermittent PTH administration. Six weeks-old C57BL/6J mice received vehicle (control group) or 20 μg/kg/day of human PTH [1-34] (hPTH; PTH group) for 2 weeks. Mice were fixed with aldehyde solution, and the femora and tibiae were used for immunohistochemical analyses. Gene expression of the control and PTH-administered bone was examined by RT-PCR. In the control group, numbers of endomucin-positive/EphB4-positive blood vessels were observed, while few numbers of αSMA-reactive blood vessels were seen. After PTH administration, the numbers of endomucin-positive/EphB4-positive blood vessels increased, and the vascular diameters were markedly-expanded when compared to the control group. Of note, numbers of blood vessels which accompany αSMA-positive cells were increased in the PTH group, and were divided into two histologically distinct types: the blood vessels surrounded by ALP-reactive/αSMA-positive cells that were closed to the bone surface, and the blood vessels associated only with αSMA-positive cells that showed a long cell shape with extending thin cytoplasmic processes. To summarize, the intermittent administration of hPTH [1-34] may affect not only osteoblastic cells, but also bone-specific blood vessels.