

研究業績 英文表記

和文	
表題	96 時間の単回の絶食がもたらすラットの骨密度と骨質の変化について
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英文	
Title	Changes in bone density and bone quality caused by single fasting for 96 hours in rats
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Abstract	<p>Background: Young women occasionally engage in dietary restrictions accompanied by fasting for the purpose of losing weight, but such restrictions have various effects on body functions. The recent increase in the number of people suffering from osteoporosis has become a major social problem mainly in industrialized countries. Therefore, we think it is important to understand the effects of fasting on bone vulnerability, especially to bone quality. Methods: Animals used male Wister rats weighing 130g (6 weeks of age), and were divided into a control group (n=5) and a fasting group (n=6). The experimental period was 14 days, the control group had ad libitum food throughout the experimental period, the fasted group was fasted for 4 days, and then, had ad libitum food for 10 days. In this study, parameters related to bone fragility due to three-dimensional bone architecture were determined on Contrast enhanced micro-CT images of the lumbar spine and were used as a method for the evaluation of bone quality. In addition, a time-course observation of each individual was carried out during the fasting period and later upon resuming food intake. Cross-sectional images of all vertebrae were obtained from radiographic computed tomography and were analyzed by using Latheta software ver.3.0 (Hitachi-Aloka). Results: Our findings showed that while single fasting for 96 h did not cause any major change in the macroscopic morphology of bone, it caused a marked decrease in bone density. In addition, the minimum cross-sectional moment, which indicated the "strength against bending" as well as the polar moment that indicated the "strength against torsion" were both lower than in non-fasted rats. Further, after resumption of feeding, bone mineral content in the fasting group recovered rapidly and starting at day 4 after resumption of feeding, there was no difference with the control group. On the other hand, the values of the minimum cross-sectional moment and polar moment did not recover, and the difference with the control group increased during the feeding period. Discussion: On the basis of this study, the authors estimate that the fasting-induced decrease in bone minimum cross-sectional moment and polar moment may have been due to changes affecting some factors involved in bone quality, and thus could be useful as a parameter in future studies aimed at elucidating bone quality. At least, in the case where bone change accompanied with a change in macroscopic distribution of mineral components occurs, the values of minimum cross-sectional moment and polar moment are considered to be bone parameters that will provide valuable information to elucidate bone quality.</p>
keyword	Bone density, Bone quality, Contrast enhanced micro-CT, Fasting, Lumbar vertebrae, Rat, The minimum cross-sectional moment, The polar moment.

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