The functional assessment of kefir on the postponement of bone loss in ovariectomized mice

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ABSTRACT

Postmenopausal women would be more prone to osteoporosis, because the ovary was atrophied and unable secret enough estrogen and isoflavones, which can promote the growth of osteoblasts and inhibit the activity of osteoclast. In previous studies, casein phosphopeptides (CPPs) were found that exhibit the ability to bind calcium and to enhance calcium absorption into the body. CPPs may be the functional materials to postpone the bone loss. Kefir is a kind of fermented milk with various bioactivities reported in many previous research papers. However, there is few osteoporosis-related papers published. Therefore, this study was conducted to verify the bioactivity of osteoporosis prevention in kefir. Experiment were divided into two part (1) the assessment of kefir on the postponement bone loss in the old aged ovariectomied mice. Eight-week-old B6 ovariectomized mice was used to be the animal model to simulate menopause women. There were five treatment, including ovariectomized groups (Water / OVX), sham groups (Water / Sham), calcium and carbonate supplement groups (Ca / OVX), kefir supplement groups (Kefir / OVX) and kefir combined with calcium carbonate supplement groups (Kefir + Ca / OVX). Mice were sacrificed after 16 months treatment. Micro-CT was used to analyze trabecular bone in the knee growth plates. Result showed that three-dimensional structure, proportion of bone volume/tissue volume (BV / TV), trabecular bone mineral density (BMD), trabecular thickness degree (Tb.Th), trabecular number (Tb.N), trabecular separation (Tb. Sp) and cortical bone density (BMD),did not had significant difference between various treatments. (2) the assessment of kefir on the postponement bone loss in the ovariectomied mice. Four-month old sexual matured and ovariectomied mice were used. There were five treatment as described above. Mice were sacrificed after 2 months treatment. The results of Micro-CT showed that the Kefir / OVX group was significantly different compared with the other group in three-dimensional structure of trabecular bone in knee growth plate. In the proportion of bone tissue and bone volume/tissue volume (BV / TV), Kefir / OVX was about 75% higher than Water / OVX ,group. In trabecular bone mineral density (BMD), Kefir / OVX group was 27% higher than Water / OVX group. In trabecular bone thickness (Tb.Th) and trabecular bone number (Tb.N), Kefir / OVX group was 24% and 55% higher than Water / OVX group. In trabecular bone separation (Tb.Sp), Water / OVX group was 75% higher than Kefir / OVX group. In addition, the result of SEM showed that the Kefir / OVX group was higher then the other groups. Kefir / OVX group has the highest amount of trabecular bone in five groups. According to the results described above, kefir exhibited the ability of postponement bone loss.

Keywords : ovariectomized mice、kefir、computerized tomography、scanning electron microscopy

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