

Abstract

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Dietary l-carnitine supplementation improves bone mineral density by suppressing bone turnover in aged ovariectomized rats.

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BACKGROUND: Postmenopausal bone loss is a major public health concern. Although drug therapies are available, women are interested in alternative/adjunct therapies to slow down the bone loss associated with ovarian hormone deficiency.

OBJECTIVE: The purpose of this study was to determine whether dietary supplementation of l-carnitine can influence bone density and slow the rate of bone turnover in an aging ovariectomized rat model.

METHODS: Eighteen-month-old Fisher-344 female rats were ovariectomized and assigned to two groups: (1) a control group in which rats were fed ad libitum a carnitine-free (-CN) diet (AIN-93M) and (2) another fed the same diet but supplemented with l-carnitine (+CN). At the end of 8 weeks of feeding, animals were sacrificed and bone specimens were collected for measuring bone mineral content (BMC) and density (BMD) using dual energy X-ray absorptiometry. Femoral microarchitectural properties were assessed by microcomputed tomography. Femoral mRNA levels of selected bone matrix proteins were determined by northern blot analysis.

RESULTS: Data showed that tibial BMD was significantly higher in the rat fed the +CN diet than those fed the -CN (control) diet. Dietary carnitine significantly decreased the mRNA level of tartrate-resistant acid phosphatase (TRAP), an indicator of bone resorption by 72.8%, and decreased the mRNA abundance of alkaline phosphatase (ALP) and collagen type-1 (COL), measures of bone formation by 63.6% and 61.2%, respectively.

CONCLUSION: The findings suggest that carnitine supplementation slows bone loss and improves bone microstructural properties by decreasing bone turnover.

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