

Probiotics (*Bifidobacterium longum*) increase bone mass density and upregulate *Sparc* and *Bmp-2* genes in rats with bone loss resulting from ovariectomy

ABSTRACT

Probiotics are live microorganisms that exert beneficial effects on the host, when administered in adequate amounts. Mostly, probiotics affect the gastrointestinal (GI) tract of the host and alter the composition of gut microbiota. Nowadays, the incidence of hip fractures due to osteoporosis is increasing worldwide. Ovariectomized (OVX) rats have fragile bone due to estrogen deficiency and mimic the menopausal conditions in women. Therefore, this study aimed to examine the effects of *Bifidobacterium longum* (*B. longum*) on bone mass density (BMD), bone mineral content (BMC), bone remodeling, bone structure, and gene expression in OVX rats. The rats were randomly assigned into 3 groups (sham, OVX, and the OVX group supplemented with 1 mL of *B. longum* 108–109 colony forming units (CFU)/mL). *B. longum* was given once daily for 16 weeks, starting from 2 weeks after the surgery. The *B. longum* supplementation increased ($p < 0.05$) serum osteocalcin (OC) and osteoblasts, bone formation parameters, and decreased serum C-terminal telopeptide (CTX) and osteoclasts, bone resorption parameters. It also altered the microstructure of the femur. Consequently, it increased BMD by increasing ($p < 0.05$) the expression of *Sparc* and *Bmp-2* genes. *B. longum* alleviated bone loss in OVX rats and enhanced BMD by decreasing bone resorption and increasing bone formation.