

An acute injection of *Porphyromonas gingivalis* lipopolysaccharide modulates the OPG/RANKL system and interleukin-6 in an ovariectomized mouse model

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Abstract

Background/aims: In the present study, we attempted to develop a simulated model to explore the causal effects of periodontal pathogens on skeletal homeostasis in postmenopausal osteoporosis. Methods: Fifty-three female adult ICR mice were randomly assigned to an experimental group (ovariectomized) or a control group. A single injection of *Porphyromonas gingivalis* lipopolysaccharide (*P. gingivalis*-LPS, ATCC 33277) or *Escherichia coli* lipopolysaccharide (*E. coli*-LPS) was administered intraperitoneally 4 weeks after an ovariectomy. Concentrations of interleukin-6 (IL-6), osteoprotegerin (OPG), and the receptor activator of nuclear factor-kappaB ligand (RANKL) in serum were subsequently analyzed using an enzyme-linked immunosorbent assay (ELISA). Results: Under stimulation with *P. gingivalis*-LPS or *E. coli*-LPS, the concentration of OPG rose in both groups. The serum level of RANKL showed a decreasing trend 24 h after the injection in both groups. After injection of *P. gingivalis*-LPS in both the experimental and control animals, the OPG : RANKL ratio increased 24 h after the booster (22.26-620.99, $P < 0.05$). The serum level of IL-6 in the experimental group significantly increased 1-6 h after administration of *E. coli*-LPS and 1-3 h after administration of *P. gingivalis*-LPS ($P < 0.05$). Conclusions: A single booster injection of *P. gingivalis*-LPS induced short-term changes in OPG, RANKL, and IL-6 serum levels in this ovariectomized mouse model.