

Regulation of bone formation by high glucose in PDL cells

In Ok Jung, Cheng Gao Zhang and Sung Jin Kim*

*Dept of Pharmacology, School of Dentistry, Kyung Hee University Seoul Korea
130-701*

Insulin-dependent or Type 1 diabetes mellitus (IDDM) has been associated with an increased severity of periodontal disease. Since periodontal ligament (PDL) cells play a significant role in maintenance and regeneration of mineralized tissue, the success of procedures, such as guided tissue regeneration, is directly related to the ability of these cells to augment mineralized tissue. In this study, we investigated the time- and dose-dependent effect of high glucose on the proliferation and collagen synthesis of human periodontal ligament (PDL) cells. PDL cells were treated with high glucose (22mM, 33mM, 44mM) for 1 or 2 days. High glucose significantly inhibited proliferation of PDL cells as a time- and dose-dependent manner as evidenced by MTT assay. PDL cells were cultured in high glucose media (22mM, 33mM, 44mM) for 24 h. The ratio of collagen content to total protein was evaluated, and the gene expression of type I collagen was assessed by RT-PCR. The high concentration of glucose inhibited collagen synthesis, a marker of bone formation activity. This study indicated high glucose concentration could alter the metabolism of periodontal ligament cell, leading to alveolar bone destruction.