

Dental:

Inhibitory effect of low-level laser irradiation on LPS-stimulated prostaglandin E₂ production and cyclooxygenase-2 in human gingival fibroblasts

Authors: Sakurai, Y.¹; Yamaguchi, M.¹; Abiko, Y.¹

Source: [European Journal of Oral Sciences](#), Volume 108, Number 1, February 2000, pp. 29-34(6)

Publisher: [Blackwell Publishing](#)

Abstract:

It has been reported that lipopolysaccharide (LPS) from periodontal pathogens can penetrate gingival tissues and stimulate the production of prostaglandin E₂ (PGE₂), which is known as a potent stimulator of inflammation and bone resorption. Although biostimulatory effects of low-level laser irradiation such as anti-inflammatory results have been reported, the physiological mechanism is not yet clarified. The purpose of the present study was to determine the effect of laser irradiation on PGE₂ production and cyclooxygenase (COX)-1 and COX-2 gene expression in LPS-challenged human gingival fibroblast (hGF) cells *in vitro*. hGF cells were prepared from healthy gingival tissues and challenged with LPS, and Ga-Al-As diode laser was irradiated to the hGF cells. The amount of PGE₂ released in the culture medium was measured by radioimmunoassay, and mRNA levels were analyzed by reverse transcriptase-polymerase chain reaction (RT-PCR). Irradiation with Ga-Al-As diode low-level laser significantly inhibited PGE₂ production in a dose-dependent manner, which led to a reduction of COX-2 mRNA levels. In conclusion, low-level laser irradiation inhibited PGE₂ by LPS in hGF cells through a reduction of COX-2 mRNA level. The findings suggest that low-level laser irradiation may be of therapeutic benefit against the aggravation of gingivitis and periodontitis by bacterial infection.