The importance of prostaglandin E2 in periodontal disease

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Abstract

This investigation focuses on the changes in the concentrations of cyclooxygenase (CO) products present within the crevicular fluid in naturally-progressing periodontitis in the beagle and the effects of various non-steroidal anti-inflammatory drugs (NSAIDs) on these metabolite levels and disease progression. Six groups of 5-6 beagles with periodontitis were followed for 6 months to determine the pretreatment rate of radiographic bone loss. At baseline, groups of animals were placed on soft chow to promote disease progression. Groups were treated with either placebo, three different formulations of systemic ibuprofen, systemic naproxen or topical flurbiprofen. During the 6-month treatment phase, crevicular fluid (CF) samples and radiographs were taken at regular intervals. Radioimmunoassay of CF samples from untreated animals demonstrated a steady increase in prostaglandin E2 (PGE2) over baseline values. At 1 month, CF-PGE2 levels increased 2-fold over baseline and, by 6 months, had reached a 5- to 6-fold elevation. Crevicular fluid thromboxane B2 (CF-TxB2) levels rapidly reached a 4- to 5-fold peak over baseline at 1 month and subsequently dropped to a 2-fold elevation for the remainder of the study. The rate of bone loss (BLOSS) in untreated animals increased 38% during the 6-month period, as compared to baseline pretreatment BLOSS rates. Overall, there was a significant depression in the CF levels of both PGE2 and TxB2 in all NSAID-treated groups. All NSAID treatments significantly retarded BLOSS, ranging from 21.0-36.9% of the control BLOSS rate. Furthermore, CO activation represents a major regulatory step in bone destruction and may thereby serve as an important site for pharmacological modulation.