

Evaluation of the effects of omega-3 fatty acid-containing diets on the inflammatory stage of wound healing in dogs.

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OBJECTIVES: To ascertain the effects of dietary omega-3 (n-3) fatty acids on biochemical and histopathologic components of the inflammatory stage of wound healing. **ANIMALS:** 30 purpose-bred Beagles. **PROCEDURE:** Dogs were allotted to 5 groups of 6. Each group was fed a unique dietary fatty acid ratio of omega-6 to n-3--diet A, 5.3:1; diet B, 10.4:1; diet C, 24.1:1; diet D, 51.6:1; and diet E, 95.8:1. Dogs were fed once daily for 12 weeks, then biopsy specimens were taken from 4-day-old wounds of each dog and analyzed by gas chromatography-mass spectrometry for: prostaglandin E2 (PGE2) metabolites, and ratios of omega-6 to n-3 fatty acids, arachidonic acid (AA) to eicosapentaenoic acid (EPA), adrenic acid to docosahexaenoic acid, and PGE2 to prostaglandin E3 (PGE3) metabolites. **RESULTS:** Qualitative analysis was carried out on AA, EPA, adrenic acid, docosahexaenoic acid, and the major metabolite from the PGE2 and PGE3 pathway. These molecules were further quantified with respect to diet to determine significant differences. By analysis of the AA-to-EPA ratio, diet A was different from diets D and E and diets B and C were different from diet E ($P < 0.05$). By analysis of the PGE2-to-PGE3 metabolite ratio, diet A was different from diet E ($P < 0.05$). Though biochemical analysis indicated dietary dependence, histopathologic data indicated no significant difference with respect to diet groups. **CONCLUSION:** The biochemical component of the inflammatory stage of wound healing can be manipulated by diet. **CLINICAL RELEVANCE:** Omega-3 fatty acid-enriched diets can be used to control inflammation associated with dermatologic conditions.

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