Dietary (n-3) fatty acids from menhaden fish oil alter plasma fatty acids and leukotriene B synthesis in healthy horses.

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The study objective was to determine the effect of feeding corn oil or fish oil to horses on plasma fatty acid profiles and leukotriene B (LTB) synthesis by stimulated peripheral blood neutrophils. Two groups of horses (n = 5) were randomly assigned to diets supplemented with either 3.0% (by weight) corn oil or fish oil for a period of 14 weeks. The ratio of (n-6) to (n-3) fatty acids in oil supplements was 68.1:1 for corn oil and 0.12:1 for fish oil. Production of LTB4 and LTB, by peripheral blood neutrophils stimulated with calcium ionophore A23187 and plasma cholesterol, triacylglycerol, and alpha-tocopherol concentrations were measured. At 12 weeks, horses fed fish oil had increased plasma concentrations of eicosapentaenoic acid (27-fold; 8.5 versus 0.3 g/100 g fatty acids; P < .0001), docosahexaenoic acid (34-fold; 5.1 versus 0.1 g/100 g fatty acids; P < .0001), and arachidonic acid (8.3-fold; 4.1 versus 0.5 g/100 g fatty acids; P < .0001) compared with horses fed corn oil. Neutrophils from horses fed fish oil produced 78-fold (P = .01) more LTB5 and 9.5-fold (P = .003) more LTB4 compared with predietary levels, and 17.6-fold (P = .01) and 3.3-fold (P = .02), respectively, more than horses fed corn oil, and the ratio of LTB5 to LTB4 concentrations was 4.0-fold (P = .002) higher in horses fed fish oil. This study suggests that dietary polyunsaturated fatty acids modulate the leukotriene inflammatory response of horses. If the ratio of LTB5 to LTB4 concentrations is important in determining how inflammatory processes are mediated, then fish oil supplementation may have value in treatment of equine inflammatory diseases.