

Effect of type of dietary polyunsaturated fatty acid supplement (corn oil or fish oil) on immune responses in healthy horses.

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Abstract

The objective of this study was to compare effects of dietary polyunsaturated fatty acid supplementation (corn oil or fish oil) on selected immune responses in normal horses. Two groups of horses (n = 5) were randomly assigned a dietary supplement with either 3.0% corn oil or fish oil for a period of 14 weeks. Plasma fatty acid profiles were monitored to ensure uptake of dietary fatty acids. Cell-mediated immunity was assessed by a delayed-type hypersensitivity (DTH) skin test to keyhole limpet hemocyanin (KLH), and humoral immunity was assessed by measuring antibody titers to KLH. Production of prostaglandin E2 (PGE2), expression of tumor necrosis factor-alpha (TNF-alpha), and phagocytosis of latex beads by bronchoalveolar lavage fluid (BALF) cells were also assessed. Lipopolysaccharide (LPS)-stimulated BALF cells from horses fed corn oil showed a higher production of PGE2 compared with those from horses fed fish oil at 6 and 12 weeks. Production of TNF-alpha by LPS-stimulated BALF cells was higher in both groups of horses at 6, 8, and 12 weeks compared with pretrial values, and phagocytic activity of BALF cells was higher at 8 and 12 weeks, however, there were no differences between the 2 groups of horses. The DTH skin test and antibody titers to KLH revealed no differences between horses fed corn or fish oil. Based on these studies, dietary polyunsaturated fatty acids modulate the inflammatory response of horses. Both fatty acid supplements increased production of the proinflammatory cytokine TNF-alpha, whereas only corn oil increased production of the proinflammatory eicosanoid PGE2 by LPS-stimulated BALF cells.

It is possible that fish oil, because it did not increase production of PGE2, could have value in the treatment of equine recurrent airway obstruction or other equine inflammatory diseases.