

Fish oil decreases matrix metalloproteinases in knee synovia of dogs with inflammatory joint disease

Rodney A. Hansen^a, ,
, Mary A. Harris^b, G.
Elizabeth Pluhar^c,
Tatiana Motta^d, Sean
Brevard^e, Gregory K.
Ogilvie^f, Martin J.
Fettman^e and Kenneth G.D. Allen^b

Purchase the
full-text article



- ▶ PDF and HTML
- ▶ All references
- ▶ All images
- ▶ All tables



^aDepartment of Health Promotion and Human Performance, Weber State University, Ogden, UT 84408, USA

^bDepartment of Food Science and Human Nutrition, Colorado State University, Fort Collins, CO 80523, USA

^cDepartment of Veterinary Clinical Sciences, College of Veterinary Medicine, University of Minnesota, St Paul, MN 55108, USA

^dDepartment of Biomedical Sciences, Cornell University, Ithaca, NY 14853, USA

^eDepartment of Clinical Sciences, Colorado State University, Fort Collins, CO 80523, USA

^fAngel Care Cancer Center, California Veterinary Specialists, Carlsbad, CA 92008, USA

Received 25 September 2006; revised 17 January 2007; accepted 18 January 2007. Available online 24 May 2007.

Abstract

This study was designed to determine whether dietary fish oil affects the expression and activity of matrix metalloproteinases (MMP), tissue inhibitors of MMP-2 (TIMP-2) and urokinase plasminogen

activator (uPA) in synovial fluid from dogs with spontaneously occurring stifle (knee) instability in a single hind limb resulting from acute cranial cruciate ligament (CCL) injury. Two groups of 12 dogs were fed diets from 1 week prior to surgery on the affected knee to 56 days post-surgery. The fish oil and control diets provided 90 and 4.5 mg, respectively, of combined eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA)/kg body weight per day. Plasma and synovial fluid, from both surgical and nonsurgical knee joints, were obtained at start of the diet (-7), surgery day (0) and 7, 14, 28 and 56 days post-surgery. Plasma total EPA and DHA were significantly increased, and plasma total arachidonic acid (AA) was significantly decreased by the fish oil diet. In synovial fluid from the nonsurgical knee, fish oil treatment significantly decreased proMMP-2 expression at Days 7 and 14, and proMMP-9 expression at Day 56, and uPA activity at 28 days and significantly increased TIMP-2 expression at Days 7 and 28. There were no differences in MMP expression or activity, TIMP-2 expression and uPA activity in the surgical joint synovial fluid at any time throughout the study. These results suggest that dietary fish oil may exert beneficial effects on synovial fluid MMP and TIMP-2 equilibrium in the uninjured stifle of dogs with unilateral CCL injury.

Keywords: Inflammatory joint disease; Dogs; Fish oil; Eicosapentaenoic acid (EPA); Docosahexaenoic acid (DHA); Matrix metalloproteinases