



3. Nutrigenomics – proving the efficacy of j/d™

Hill's is dedicated to continuous research and innovation in the field of pet nutrition. As part of that, Hill's has pioneered the study and application of 'nutrigenomics':

- Provides a molecular understanding of how nutrients influence gene expression, protein synthesis and metabolic pathways
- Provides a means of assessing the efficacy of a nutritional product

Through nutrigenomics, Hill's is able to prove the mechanism of action and efficacy of specific nutrient combinations in its products.

In the case of Hills™ Prescription Diet™ j/d™ Canine, nutrigenomics shows that:

- EPA is the primary fatty acid incorporated into canine chondrocyte membranes (DHA for cats)
- High levels of EPA present in j/d™ Canine (and DHA in j/d™ Feline) help maintain healthy cartilage by down-regulating the genes that produce cartilage-degrading enzymes



Clinical nutrition to improve quality of life™

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Evidence – supporting the efficacy of Hill's™ Prescription Diet™ j/d™ Canine

1. Feedback from owners feeding j/d™

We'd like to share with you some of the latest score card feedback data received from dog and cat owners in <Germany> and EMEA. As you can see, the results would indicate that Prescription Diet™ j/d™ continues to make a very real difference in quality of life for **your** patients.

See the results for yourself

Scorecard data – EMEA region

Results collated between

XX/XX/XX and XX/XX/XX

Percentage of pets assessed by owners to show improvement in 21 days: XX%

Average starting and finishing mobility scores:

start XX

finish XX

Average overall percentage improvement in mobility score XX%

Scorecard data – Germany

Results collated between

XX/XX/XX and XX/XX/XX

Percentage of pets assessed by owners to show improvement in 21 days: XX%

Average starting and finishing mobility scores:

start XX

finish XX

Average overall percentage improvement in mobility score XX%



BEFORE THE PRODUCT TRIAL



AFTER THE PRODUCT TRIAL

2. Clinical studies – supporting the efficacy of j/d™

Three separate studies assessed the effect of a diet supplemented with high concentrations of omega-3 fatty acids from fish oil on canine OA. All support the efficacy of the high levels of EPA present in Hill's™ Prescription Diet™ j/d™ in helping manage arthritis.

Study 1

Roush JK, Cross AR, Renberg WC, et al.

A multicenter veterinary practice assessment of the effects of omega-3 fatty acids on canine osteoarthritis.

J Am Vet Med Assoc. Accepted for publication.

The objective of this study was to evaluate the utility of Prescription Diet j/d Canine, which is fortified with omega-3 fatty acids for ameliorating clinical signs of osteoarthritis. 38 osteoarthritic dogs were randomly assigned to received Purina Dog Chow (n = 16) or Canine j/d (n = 22) for 90 days. Both foods contained comparable levels of chondroitin sulfate and glucosamine. j/d Canine contained a 39-fold increase in omega-3 fatty acids and a 32-fold decreased omega-6:omega-3 ratio. Owners completed questionnaires about their dogs and investigators collected samples for serum fatty acid determinations and conducted force plate analyses on days 0, 45, and 90. Peak vertical force was the key parameter measured. After the 90-day trial, dogs on j/d Canine showed a significant peak vertical force increment ($P = 0.01$). The % mean change in vertical peak force was significantly different between groups ($P = 0.04$). Additionally, 82% of dogs in the j/d Canine group had improved peak vertical force ($P = 0.003$). More dogs in j/d Canine had less pain on palpation vs. dogs on Purina Dog Chow ($P = 0.05$). Combined clinical evaluations showed more dogs improved when fed j/d Canine ($P = 0.03$). Dogs fed j/d Canine had significantly lower omega-6:omega-3 ratios at 90 days.

Study 2

Roush JK, Cross AR, Renberg WC, et al.

Effects of dietary supplementation with fish oil omega-3 fatty acids on weight bearing in dogs with osteoarthritis.

J Am Vet Med Assoc. Accepted for publication.

The objective of the study was to determine the effect of food containing high levels of omega-3 fatty acids and a low omega-6:omega-3 ratio on clinical signs of osteoarthritis. A randomized, double-blind, controlled clinical study was conducted, including 131 client-owned dogs with osteoarthritis in 1 or more joints. The dogs were randomly assigned to be fed Purina Dog Chow or Prescription Diet j/d Canine formula for 6 months. The j/d Canine formula contained a 39-fold increase in total omega-3 concentration and a 32-fold decreased omega-6:omega-3 ratio compared to Purina Dog Chow. Neither dog owners nor onside clinical investigators knew which foods dogs were fed. For baseline purposes, owners completed a questionnaire that detailed their dog's arthritic condition. Investigators evaluated pets and collected samples for CBC, serum biochemistry, and serum fatty acid determinations at the onset of the study. All assessments were repeated at 6, 12, and 24 weeks. By the end of the study, the dogs fed j/d Canine formula had significantly improved ability to rise from resting position and in running and playing at 6 weeks and improvements in walking at 12 and 24 weeks compared to control dogs. Also, dogs fed j/d Canine had significantly higher serum concentrations of total omega-3 fatty acids, significantly lower concentrations of arachidonic acid, and significantly lower omega-6:omega-3 ratios at 6, 12, and 24 weeks.

Study 3

Fritsch DA, Allen TA, Dodd CE, et al.

A multicenter study of the effect of a therapeutic food supplemented with fish oil omega-3 fatty acids on the Carprofen dosage in dogs with osteoarthritis.

J Am Vet Med Assoc. Accepted for publication.

The investigation was conducted as a 90-day prospective, randomized (dietary treatments), double masked, controlled study in 35 veterinary hospitals in the United States. OA was diagnosed based on compatible history, clinical signs and radiographic evidence of arthritis in one or more joints on the clinically affected limb. To be eligible for inclusion, dogs also had to be a least 1 year of age, weigh 25 pounds or more, consume dry food and be free of systemic disease as determined by history physical examination, complete blood count (CBC), serum biochemistry analysis and urinalysis. Exclusion criteria included acute traumatic injuries, complicating disease conditions, preexisting conditions for which corrective surgery was anticipated during the feeding period and recent intraarticular injection or arthrocentesis.

Dogs satisfying the inclusion/exclusion criteria were randomly assigned to receive either a typical commercial dog food or a test food for 12 weeks. The test foods contained a 39-fold increase in total omega-3 fatty acid concentration and a 39-fold increase in

eicosapentaenoic acid (EPA) concentration compared to the control foods. Owners could feed either a dry food or a combination of dry plus canned foods of the control or test formulas.

Pet owner and veterinary clinical evaluations were completed at 0, 3, 6, 9 and 12 weeks. The pet owner evaluation consisted of a standardized questionnaire which included assessments of the frequency and severity of the following signs: difficulty rising from rest, limping, stiffness, soreness when touched, vocalizing in pain, aggression, lagging behind on walks, reluctance in running, walking, jumping, climbing stairs, playing, and general activity. Based on these activities, pet owners were also asked to provide an overall assessment of the severity of their pet's pain. The veterinary clinical assessment consisted of careful evaluation of the following parameters; reluctance to bear weight, lameness, reduced range of motion, pain on palpation of the affected joint, and reluctance to hold up the contralateral limb.

All dogs were being administered the NSAID carprofen to help manage clinical signs of OA. At each evaluation period, the veterinarian considered the results of the orthopedic examination and the pet owner's assessment to determine if lowering the dose of carprofen was feasible. Pet owners reported a decrease in severity for 10 of 15 individual arthritic signs during the first 21 days of feeding the test food. Pet owners also observed significantly greater pain reduction in dogs consuming the test food compared to the control food.

Carprofen dose reductions were possible in 43% of dogs consuming the test food versus 32% of dogs eating the control food. Carprofen dose increases were necessary in 11% of the dogs consuming the control food and in only 2% of dogs consuming the test food. For the group receiving the test food the mean carprofen dose reduction was 25%. Significantly greater reductions in carprofen dose (mg/lb body weight) were possible in the dogs consuming the test food compared with the control group.



A dog participating in force plate analysis.
For illustration purposes only.

