

Mobility claims for dog foods

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Functional foods: mobility dog foods

- Health claim
- Therapeutic claim

Substances used for canine mobility support

- Fish oil
- Gelatin hydrolysate
- Beta-1,3/1,6-glucans
- Glucosamine
- Chondroitin sulfate
- Green-lipped mussel
- Boswellia resin
- Mulberry extract
- Elk velvet antler
- Undenaturated type-II collagen
- Curcumin
- Milk protein concentrate
- Methyl sulfonyl methane
- Devil's claw
- Green tea
- Grape skin
- Vitamin E

Functional ingredients used in mobility dog food

- Fish oil
- Gelatin hydrolysate
- Beta-1,3/1,6-glucans
- Glucosamine
- Chondroitin sulfate
- Green-lipped mussel
- Boswellia resin
- Mulberry extract
- Devil's claw
- Green tea
- Grape skin
- Curcumin

Clinical signs of osteoarthritis

- Lameness
- Stiffness
- Reduced movement in joint
- Reluctance or difficulty with exercise
- Crepitus
- Painful, warm, swollen joints
- Muscle atrophy

Mobility foods with healthy mobility/joint claim

- Prevention of joint disease has not (yet) been investigated
- Claims are backed by research in canine patients

EU legislation on therapeutic foods for osteoarthritis (Regulation 1070/2010)

- Particular nutritional purpose: supporting joint metabolism in case of osteoarthritis
- Therapeutic dog food: minimum contents of 3.3% omega-3 fatty acids and 0.38% EPA in dietary dry matter

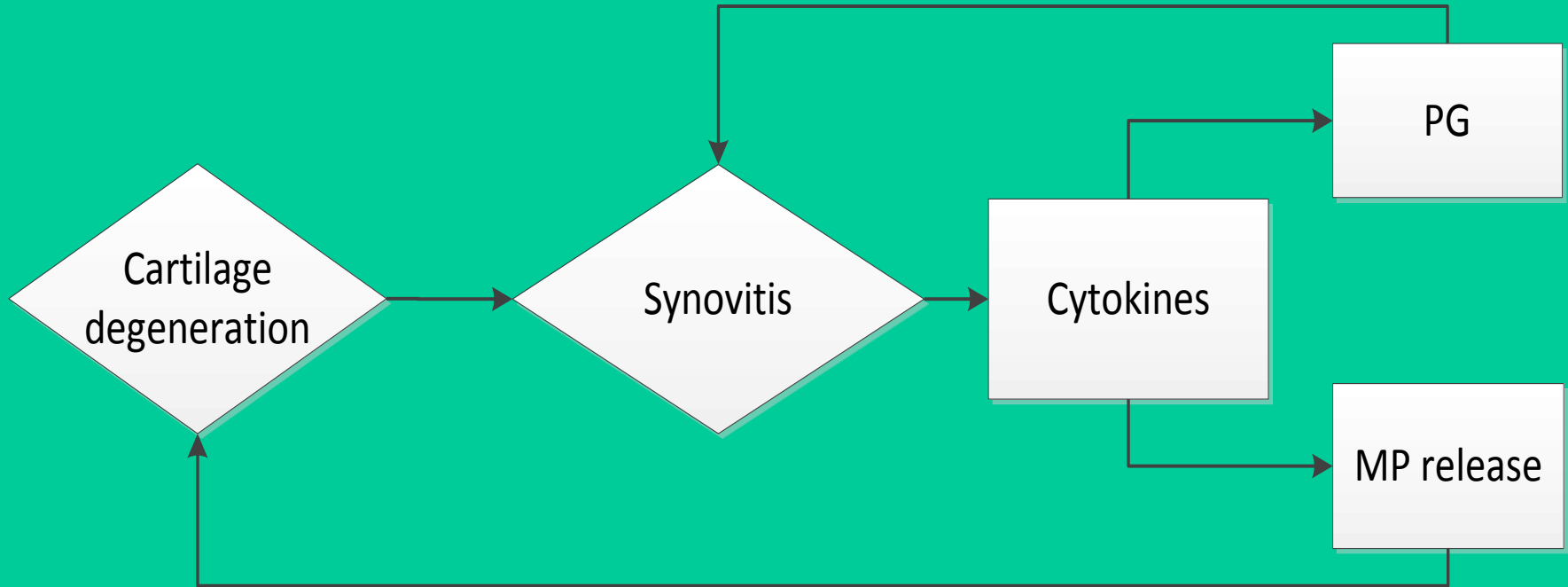
Placebo effects in trials on canine osteoarthritis

- Shown in many studies
- Magnitude of placebo effect can be similar to that of corrected treatment effect
- Caused by biased evaluation of clinical signs and/or time effects
- Non-controlled, open studies are inconclusive

Effective, functional ingredients in the treatment of canine osteoarthritis

- Fish oil: weak effect
- Gelatin hydrolysate: small effect, but reproducibility unknown
- Beta-1,3/1,6-glucans: weak effect, but reproducibility unknown

Perpetuating cycle of osteoarthritis



Basis for dietary treatment of osteoarthritis

- Reduction of overweight
- Inhibition of inflammation
- Preservation of cartilage-matrix

Glucosamine, chondroitin sulfate, green-lipped mussel and curcumin

- No evidence for efficacy in the treatment of canine osteoarthritis
- Data evaluation and literature references are available on request: beynen@freeler.nl

Glucosamine and chondroitin sulfate

- Substrates for proteoglycan synthesis
- Source: crustacean shells and animal cartilage
- Absorption efficiency: 11 and 5%
- Ineffective in 4 out of 5 double-blind, placebo-controlled trials in osteoarthritic dogs
- Dose: 25-61 and 22-48 mg/kg body weight

Green-lipped mussel

- Powders, oily extracts
- Active principle unknown
- Anti-inflammatory action in model systems
- No or meaningless effect in 5 double-blind, placebo-controlled trials in osteoarthritic dogs
- Dose: 53 or 139 mg/MJ metabolizable energy

Curcumin

- Curcuminoid derivatives reduce inflammation and cartilage breakdown in-vitro
- No effect on lameness in a double-blind, placebo-controlled trial in osteoarthritic dogs
- Induction of skin malodor and yellow coloring of food

Boswellia resin

- Active principle: pentacyclic triterpenic (boswellic) acids
- In-vitro inhibition of inflammation
- One open, non-controlled trial in osteoarthritic dogs

Devil's claw

- Active principle: harpagoside
- In-vitro inhibition of inflammation
- Anecdotal efficacy in dogs with osteoarthritis

Green tea

- Active principle: epigallocatechin gallate (EGCG)
- In-vitro antioxidant activity and inhibition of inflammation
- Study in mice with collagen-induced arthritis

Grape skin extract

- Active principle: resveratrol
- In-vitro antioxidant activity and inhibition of inflammation
- Studies in rabbits with LPS-induced arthritis and mice with carrageenan-induced arthritis

Fish oil and canine osteoarthritis

- Active principle: EPA
- Anti-inflammatory effect
- In-vitro inhibition of cartilage proteoglycan catabolism
- Four randomized, double-blind, controlled trials have assessed changes over time in severity of clinical signs

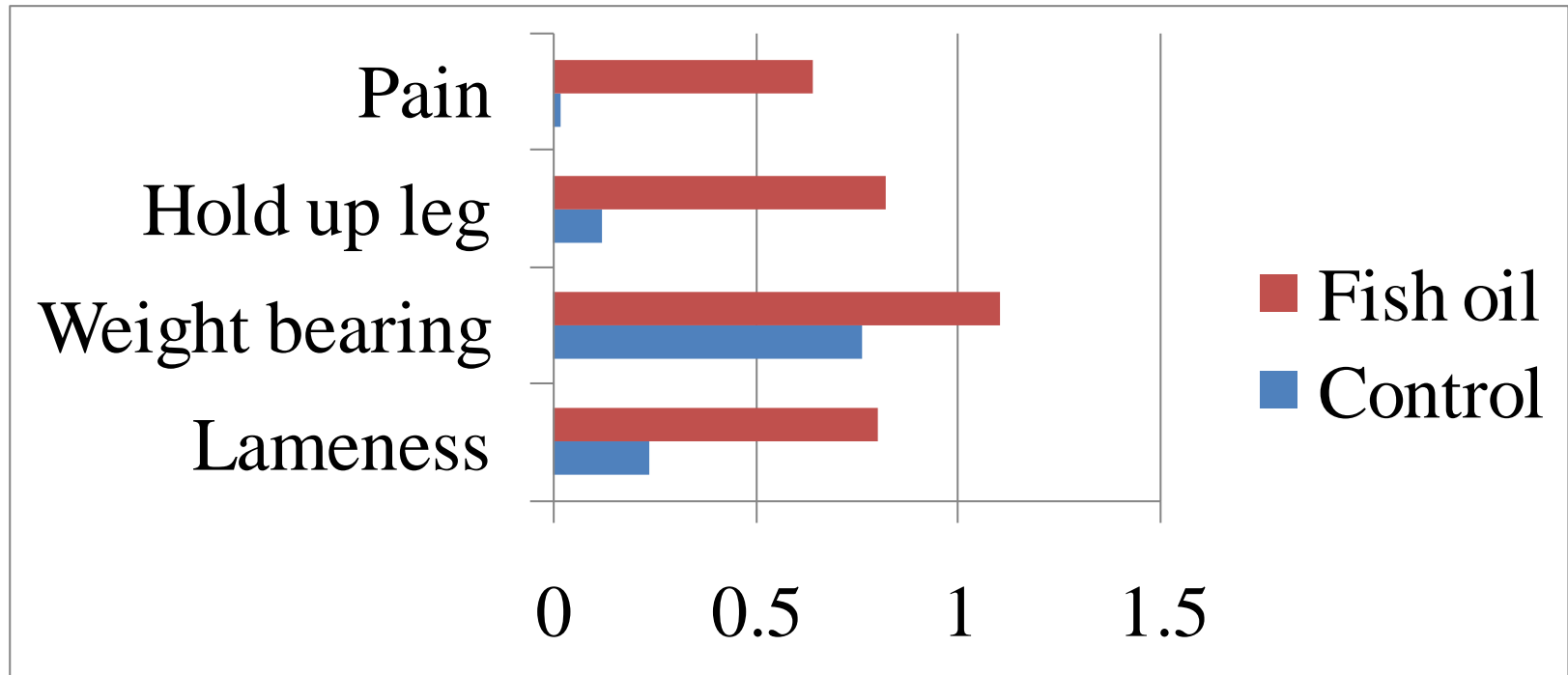
Osteoarthritis signs in dogs given fish oil in capsules or diets: improvement effect versus baseline

Authors	Placebo	Fish oil	Effect
Roush et al., 2010	0.5	0.9	0.4
Hjelm-Björkman et al., 2012	0.2	0.3	0.1
Moreau et al., 2013	1.0	1.8	0.8
Mehler et al., 2016	0.1	4.3	4.2
Changes on a (standardized) 0-10 scale			

Design of clinical trial (Roush et al., 2010)

- Double-blinded, placebo-controlled trial
- Client-owned dogs; 16 or 22 per treatment
- Dry and canned foods without or with 0.4% EPA on a dry matter basis for 90 days
- Assessment by veterinarians of lameness, weight bearing, reluctance to hold up contralateral limb and pain on a 1-5 scale

Improvement versus baseline of clinical osteoarthritis after feeding fish oil (Roush et al. 2010)



Effect of fish oil = 0.4 units

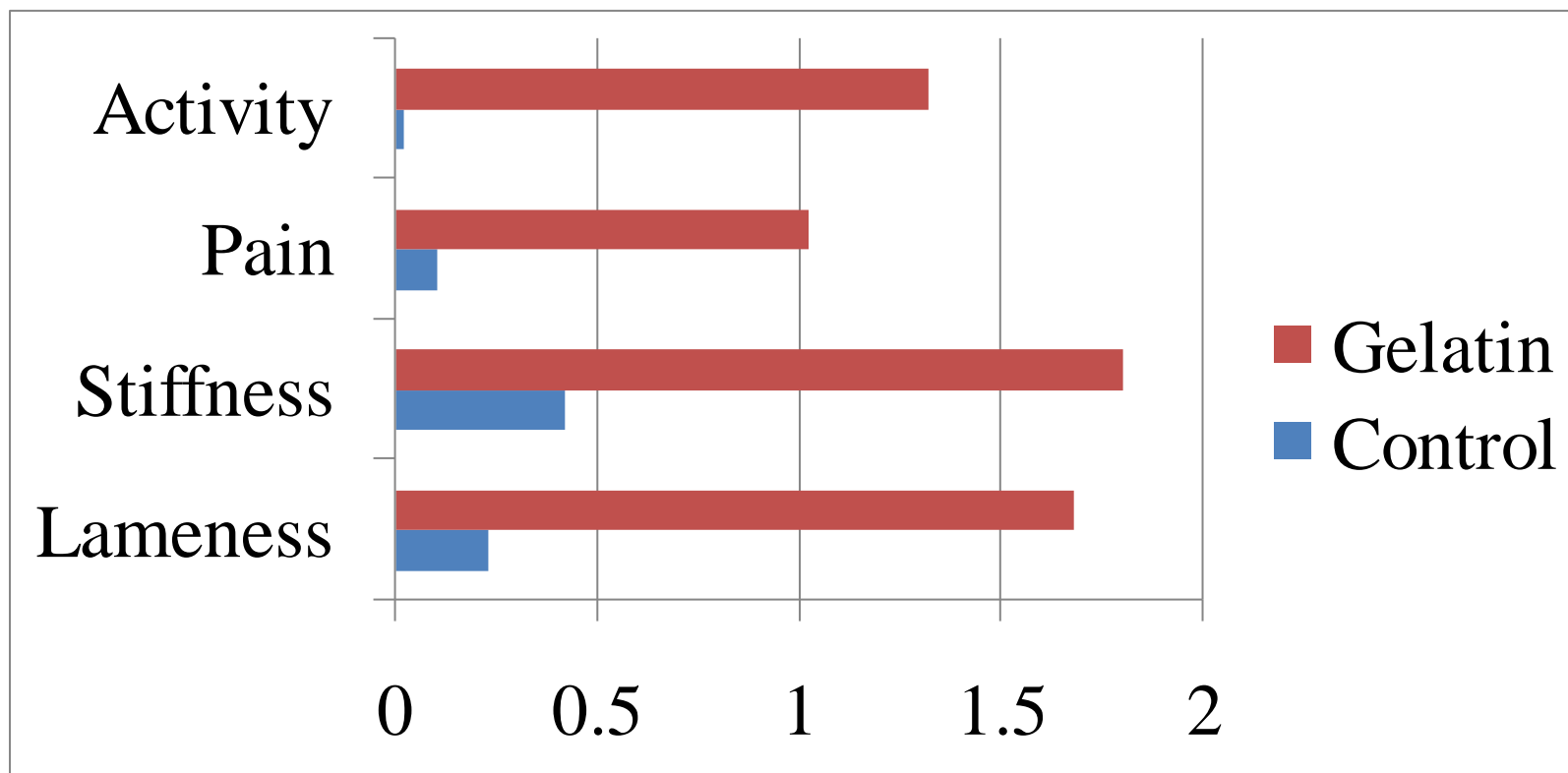
Gelatin hydrolysate and canine osteoarthritis

- Source: bone and skin of swine and cattle
- Supply of substrates for collagen synthesis:
glycine, proline, hydroxyproline
- Inhibition of matrix metalloproteinase-3 activity

Design of clinical trial with gelatin hydrolysate (Beynen et al., 2010)

- Double-blinded, placebo-controlled trial
- Privately owned dogs; 15 per treatment
- Identical, dry diet
- 10 g per day of either gelatin hydrolysate (Rousselot ASF) or soya protein isolate for 8 weeks
- Questionnaire (activity, stiffness, lameness, pain on a 0-10 scale)

Improvement versus baseline of clinical osteoarthritis after feeding gelatin hydrolysate



Effect of gelatin hydrolysate = 1.3 units

Effective, functional ingredients in the treatment of canine osteoarthritis

- Fish oil: weak effect
- Gelatin hydrolysate: small effect, but reproducibility unknown
- Beta-1,3/1,6-glucans: weak effect, but reproducibility unknown
- Combination might work synergistically