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Suspected caffeine and ephedrine toxicosis resulting from ingestion of an herbal supplement containing guarana and ma huang in dogs: 47 cases (1997-1999).

Ooms TG, Khan SA, Means C. *J Am Vet Med Assoc* 2001;218:225-229.

OBJECTIVE: To describe the clinical signs following ingestion of an herbal supplement containing guarana and ma huang in dogs, estimate minimum dose at which clinical signs of toxicosis and death were reported, and evaluate treatment options. DESIGN: Retrospective study. ANIMALS: 47 dogs with evidence of ingestion of an herbal supplement containing primarily guarana and ma huang. PROCEDURE: Records of dogs that had ingested an herbal supplement containing ma huang and guarana between July 1997 and October 1999 were retrieved from the National Animal Poison Control Center database. Data were retrieved and reviewed regarding signalment, dose ingested, clinical signs, laboratory test results, treatment, and final outcome. Cases were assessed by staff veterinarians as toxicosis or suspected toxicosis on the basis of strength of evidence supporting a diagnosis. RESULTS: Most dogs (80%) developed clinical signs of toxicosis within 8 hours of ingestion, and clinical signs persisted for up to 48 hours. Hyperactivity, tremors, seizures, and behavior changes were reported in 83% of dogs; other signs included vomiting (47%), tachycardia (30%), and hyperthermia (28%). Seventeen percent of the dogs died or were euthanized. Estimated doses of guarana and ma huang ranged from 4.4 to 296.2 mg/kg (1.98 to 133.2 mg/lb) and 1.3 to 88.9 mg/kg (0.58 to 40.0 mg/lb) of body weight, respectively; minimum dose at which death was reported was 19.1 mg of guarana/kg (8.7 mg/lb) and 5.8 mg of ma huang/kg (2.6 mg/lb). CONCLUSIONS AND CLINICAL RELEVANCE: Accidental ingestion of herbal supplements containing primarily guarana and ma huang in dogs can lead to a potentially lethal condition that may require prompt detoxification and supportive treatment for several days. Most dogs recovered with supportive treatment.

Effects of insoluble and soluble dietary fiber on glycemic control in dogs with naturally occurring insulin-dependent diabetes mellitus.

Kimmel SE, Michel KE, Hess RS, Ward CR. *J Am Vet Med Assoc* 2000;216:1076-1081.

OBJECTIVE: To evaluate the effects of diets differing in type and quantity of fiber on glycemic control in dogs with naturally occurring insulin-dependent diabetes mellitus. DESIGN: Prospective randomized crossover controlled trial. ANIMALS: 7 dogs with well-regulated naturally occurring insulin-dependent diabetes mellitus. PROCEDURE: Dogs were fed 1 of 3 diets for 1 month each in 1 of 6 randomized diet sequences. Diets included a low-fiber diet (LF) and 2 high-fiber diets; 1 contained only insoluble fiber (HIF), and 1 contained soluble fiber in addition to insoluble fiber (HSF). Caloric intake was unchanged throughout the study. Glycemic control was assessed after each feeding trial by measuring serum fructosamine concentration and performing 5 serial measurements of blood glucose concentration every 2 hours after the morning feeding and insulin injection. RESULTS: Significant differences were not detected in body weight, required insulin dosage, or albumin concentration among dogs fed the HIF, HSF, and LF diets. Mean and maximum blood glucose concentrations and area under the blood glucose curve were significantly lower in dogs fed the HIF diet, compared with values in the same dogs fed the HSF or LF diet. Fructosamine concentration was significantly lower in dogs fed the HIF or HSF diet, compared with values in the same dogs fed the LF diet. CONCLUSIONS AND CLINICAL RELEVANCE: In dogs with naturally occurring insulin-dependent diabetes mellitus, a dry, high insoluble-fiber diet may aid in glycemic control.

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The feline glaucomas: 82 cases (1995-1999).

Blocker T, Van Der Woerdt A. *Vet Ophthalmol* 2001;4:81-85.

OBJECTIVE: To describe signalment, ophthalmic abnormalities, and response to treatment in cats with glaucoma. DESIGN: Retrospective study. ANIMALS: Eighty-two cats with 93 glaucomatous eyes. CRITERIA FOR INCLUSION: Medical records of all cats with glaucoma presented to the ophthalmology services at two referral specialty hospitals between 1995 and 1999 were reviewed. Cats were included if intraocular pressure (IOP) > 25 mmHg, if buphthalmos was present, or if a shallow anterior chamber was present and IOP > or = 5 mm Hg higher than the contralateral normal eye. RESULTS: Mean +/- SD age was 9.2 +/- 4.4 years. Thirty-one cats were female; 51 were male. Breeds included 69 domestic and 13 pure-bred cats. One eye was affected in 71 cats; both eyes in 11 cats. The most common presenting complaints and ophthalmic abnormalities were cataract, corneal edema, mydriasis, buphthalmos, cloudy eye, and blindness. Mean intraocular pressure in the affected eye was 36.4 +/- 14.7 mmHg. The glaucomas were believed to be secondary in 81 eyes, primary in five eyes, and undetermined in seven eyes. The goal of medical therapy was to maintain IOP in a comfortable range we presumed to be < 30 mm Hg in blind eyes, and to maintain IOP below 25 mmHg to preserve vision in visual eyes. Intraocular pressure was maintained in a comfortable range or normal range in 58% of all eyes using medical therapy alone. Surgery was performed in nine eyes after medical management failed. Sixty-seven eyes were blind, 21 were visual, and five had decreased vision at initial presentation. With treatment, vision was retained in nine eyes, deteriorated in five eyes, and was lost in three eyes. CONCLUSIONS: The glaucomas were most frequently secondary in cats and resulted in blindness prior to presentation in the majority of eyes in our study. Medical management controlled IOP in more than half of the eyes, and maintained vision in almost half of visual eyes.

Inhibition of apoptosis and virus replication in feline immunodeficiency virus-infected cells by N-acetylcysteine and ascorbic acid.

Mortola E, Okuda M, Ohno K, et al. *J Vet Med Sci* 1998;60:1187-1193.

Infection of feline immunodeficiency virus (FIV) has been shown to induce apoptosis that might be associated with the lymphocyte depletion in the infected cats. To investigate the inhibitory effect of antioxidants on FIV-induced apoptosis, we examined the effect of N-acetylcysteine (NAC) and ascorbic acid (AA) on apoptosis and virus replication in feline lymphoblastoid (Fel-039) and fibroblastoid (CRFK) cell lines infected with FIV. The treatment with NAC or AA induced a significant inhibition of viral replication and apoptosis in Fel-039 cells and tumor necrosis factor alpha (TNF-alpha)-treated CRFK cells infected with FIV. Both cell lines in the presence of noncytotoxic concentrations of NAC or AA showed in increase of intracellular glutathione (GSH) level, which might protect the cells against oxidative stresses exerted by FIV infection and TNF-alpha treatment. On the basis of these in vitro results, we suggest that antioxidant therapies aimed at restoring depleted GSH level might be effective for inhibition of viral replication and cell death associated with the development of immunodeficiency.

Hepatic cirrhosis associated with long-term primidone therapy in a dog.

EM, Hardy RM. *J Am Vet Med Assoc* 1985;186:978-980.

The anticonvulsant drug, primidone, was believed to be responsible for the development of hepatic cirrhosis in a 9-year-old German Shepherd Dog with idiopathic epilepsy. Marked increases in serum alanine aminotransferase, serum alkaline phosphatase, total bilirubin, and sulfobromophthalein retention, as well as decreases in albumin and BUN supported the diagnosis of hepatic failure. Biochemical abnormalities improved after primidone was discontinued. Previous reports indicated a poor prognosis for anticonvulsant-induced hepatic failure; however, this dog has remained stable for over a year after diagnosis and proper therapy.

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Feline vaccine-associated sarcomas.

McEntee MC, Page RL. *J Vet Intern Med* 2001;15:176-182.

Feline vaccine-associated sarcomas have presented many challenges. Initially, the etiopathogenesis and biological behavior of these tumors had to be characterized, and strategies implemented to move tumors away from problematic sites. Next, diagnostic and treatment recommendations evolved as the biologic behavior of vaccine-associated sarcomas forced early and aggressive intervention. Current therapeutic strategies are expensive, at times debilitating, and frequently fail to effect tumor control. This review summarizes the known history, epidemiology, etiology, and clinical management of vaccine-associated sarcomas after a decade of work. The next challenges must be to find more practical and effective solutions, and to eliminate the cause of vaccine-associated sarcomas.

Immunomodulation therapy for feline leukemia virus infection.

McCaw DL, Boon GD, Jergens AE, et al. *J Am Anim Hosp Assoc* 2001;37:356-363.

Clinically ill feline leukemia virus (FeLV)-infected cats, treated with Staphylococcus protein A (SPA) or oral interferon alpha (IFN), or both, were compared with cats treated with saline (SAL). Nine cats received SPA/SAL, nine received SPA/IFN, 10 received SAL/IFN, and eight received SAL/SAL. Twelve cats survived and completed the 100-week therapy. Significantly more owners of cats treated with SPA/SAL thought their cat's health improved during treatment compared to owners of cats treated with SAL/SAL (P=0.05, pair-wise comparison) or SPA/IFN (P=0.05, pair-wise comparison). No significant differences in body weight, temperature, hematocrit, red blood cell counts, mean corpuscular hemoglobin concentration, reticulocyte counts, white blood cell or neutrophil numbers, lymphocyte concentrations, bone-marrow cytopathology, FeLV status, survival time, activity, or appetite scores were observed. No significant differences in the owners' subjective assessment of their cat's health following treatment with SAL/IFN, SPA/IFN, or SAL/SAL were seen. Therapy with SPA as a single agent results in the owners' subjective impression of improved health of their FeLV-infected cats.

Feline eosinophilic conjunctivitis.

Allgoewer I, Schaffer EH, Stockhaus C, Vogtlin A. *Vet Ophthalmol* 2001;4:69-74.

OBJECTIVE: To review 12 cases of histologically confirmed feline eosinophilic conjunctivitis, their clinical, cytologic, histologic and electronmicroscopic findings, results on PCR for FeHV-1, treatment and outcome. ANIMALS STUDIED: Twelve naturally occurring cases presented during a period of 26 months. PROCEDURES: Thorough ophthalmologic examination, conjunctival scrapings performed with the cytobrush method; histologic samples from the palpebral conjunctiva; PCR for FeHV-1 on Schirmer Tear Test (STT) strips; saliva and nasal swabs, and retrospective evaluation of all results. RESULTS: The breed most commonly affected was the Domestic Shorthair (n = 8), followed by Persians (n = 2), Somali (n = 1) and Siamese (n = 1). Age at presentation was 1-15 years with a mean age of 7.2 years. Nine cats were castrated males; three cats were females: two of them were spayed. Unilateral (n = 7) or bilateral (n = 5) involvement with depigmentation and erosions of lid margin, blepharospasm, swelling and redness of conjunctiva and third eyelid were the most common clinical findings. Frequency of eosinophils in cytologic samples was more than 10% in every patient. PCR for FeHV-1 on STT was negative in all cases. Histologically, eosinophils, lymphocytes, plasma cells, mast cells and macrophages were involved. On electronmicroscopy, viral particles were not detected. Ten cases needed long-term anti-inflammatory treatment. CONCLUSIONS: The 12 reviewed cases suggest that feline eosinophilic conjunctivitis is a chronic inflammatory uni- or bilateral disease of the adult cat. Typically the lid margin was also involved, and was thickened, depigmented and erosive. Cytological examination of conjunctival scrapings was a valuable tool for detecting eosinophilic conjunctivitis. The cytological findings correlated well with the histopathological findings in our patients. Topical or systemic anti-inflammatory drugs resolved the clinical symptoms in our cases within a short period of time. Neither electronmicroscopy nor PCR were able to detect involvement of FHV1 in the represented cases. The etiopathogenic role of FeHV-1 remains undetermined.

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Dietary fat supplementation and equine plasma lipid metabolism.

Geelen SN, Sloet van Oldruitenborgh-Oosterbaan MM, Beynen AC. *Equine Vet J Suppl* 1999;30:475-478.

Feeding of a fat-rich diet to horses may enhance the flux of fatty acids, in the form of triacylglycerols (TAG), through the circulation into skeletal muscle. This hypothesis was tested indirectly by measuring the concentration of plasma TAG and the activity of lipoprotein lipase (LPL) in post heparin plasma. Six mature horses were fed a high-fat or a control diet according to a cross-over design with feeding periods of 6 weeks. The control diet contained 1.5% fat in the dry matter and the high-fat diet 11.8%. The high-fat diet was formulated by adding soybean oil to the control diet at the expense of an isoenergetic amount of corn starch plus glucose. Both diets consisted of hay and concentrate and were given on a restricted basis. Nine hours after feeding, whole plasma TAG concentration decreased significantly by 84% following fat-supplementation, whereas the whole plasma concentrations of cholesterol and phospholipids were significantly increased by 53% and 26%, respectively. The level of HDL-cholesterol was raised by 54%. The changes in plasma lipids were accompanied by a 79% increase in LPL activity in post heparin plasma. These results indicate that in the fasting state a high-fat diet raises the flux of fatty acids, in the form of TAG, into skeletal muscles as illustrated by the observed decrease in plasma TAG concentrations and increase in LPL activity. It is speculated that the increased flux of fatty acids is associated with an increased oxidative capacity of skeletal muscle which might be advantageous to exercising horses.

Role of duodenal reflux in nonglandular gastric ulcer disease of the mature horse.

Berschneider HM, Blikslager AT, Roberts MC.

Equine Vet J Suppl 1999;29:24-29.

Gastric contents were sampled in horses via nasogastric tube to determine changes in pH and bile salt concentrations during feeding and fasting periods. The horses were rotated through 4 feeding protocols. (1) hay; (2) hay with twice daily grain meals; (3) and (4) fasting preceded by either hay only or hay and grain. Sequential, hourly samples were collected from 3 horses prepared with gastric cannulas. Horses were fed hay twice daily and grain mix either twice daily or in small aliquots dispensed every 90 min. The horses were sampled during normal feeding or after 14 h of feed deprivation. Gastric pH values varied with time, but there was no significant difference between the feeding protocols or the fasting period on mean pH. Bile salt concentrations in fasted animals averaged 0.23-0.44 mmol/l with individual samples greater than 0.9 mmol/l. The bile salt concentrations in fed animals were consistently below 0.2 mmol/l. The effect of bile salt and acid on the stratified squamous gastric mucosa was tested in vitro. Mucosa, stripped of muscle and serosal layers, was mounted in Ussing chambers and the electrical potential difference (PD) across the tissue recorded. Sodium taurocholate or deoxycholate (0.3 mmol/l, bile salt) and/or HCl were added to the mucosal bathing solutions. The bile salt alone had no significant effect. Addition of acid (pH 2.5) to control tissues caused a decrease in the PD, which recovered within 20 min. Addition of acid to tissues exposed to bile salts resulted in a significant decrease in the PD, which did not recover. We conclude that combinations of bile salts and acid are more injurious to the stratified squamous gastric mucosa of the equine than acid alone. Concentrations of bile salts and acid sufficient to alter the electrolyte transport function of this mucosa can be found in the gastric contents of horses deprived of feed for as little as 14 h.

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Effect of dietary insoluble fiber on control of glycemia in cats with naturally acquired diabetes mellitus.

Nelson RW, Scott-Moncrieff JC, Feldman EC, et al. *J Am Vet Med Assoc* 2000;216:1082-1088.

OBJECTIVE: To evaluate effects of dietary insoluble fiber on control of glycemia in cats with naturally acquired diabetes mellitus. DESIGN: Randomized controlled crossover trial. ANIMALS: 16 cats with naturally acquired diabetes mellitus. PROCEDURE: Cats were fed a diet high in insoluble fiber (HF) containing 12% cellulose (dry-matter basis) or a diet low in insoluble fiber (LF) for 24 weeks; they were fed the other diet for the subsequent 24 weeks. Caloric intake and insulin treatment were adjusted to maintain stable body weight and control of glycemia, respectively. Cats were allowed an adaptation period of 6 weeks after initiation of a diet, after which control of glycemia was evaluated at 6-week intervals for 18 weeks. Variables assessed included serum glucose concentration measured during the preprandial state, blood glycated hemoglobin concentration, serum glucose concentration measured at 2-hour intervals for 12 hours beginning at the time of the morning insulin injection, 12-hour mean serum glucose concentration, and mean fluctuation in serum glucose concentration from the 12-hour mean serum glucose concentration. RESULTS: Mean daily caloric intake, body weight, or daily insulin dosage did not differ significantly between cats when fed HF and LF diets. Mean preprandial serum glucose concentration, most post-prandial serum glucose concentrations, and the 12-hour mean serum glucose concentration were significantly lower when cats consumed the HF diet, compared with values when cats consumed the LF diet. CONCLUSIONS AND CLINICAL RELEVANCE: These results support feeding a commercially available diet containing approximately 12% insoluble fiber (dry-matter basis) to cats with naturally acquired diabetes mellitus.

Retinal degeneration associated with vitamin E deficiency in hunting dogs.

Davidson MG, Geoly FJ, Gilger BC, et al. *J Am Vet Med Assoc* 1998;213:645-651.

A group of Walker Hounds and Beagles that were fed a diet of table scraps were examined because of slow, progressive loss of vision. Clinical and microscopic features of the disease were correlated to the dogs' micronutrient status. Sensory retinal degeneration, predominantly in the central tapetal fundus, was found in all dogs, and severity of changes varied with age of the dog. Plasma, serum, and tissue concentrations of vitamin E were low in affected dogs (10 to 40% of control values). Lipofuscin accumulation was found on microscopic examination in retinal pigment epithelium, smooth muscle cells of the intestinal tract, and neurons of the CNS. Findings were consistent with nutritional vitamin E deficiency and oxidative injury to photoreceptors of the retina. Changes in these dogs were similar to those described for central progressive retinal atrophy and equine lower motor neuron disease, suggesting these diseases may share a common pathogenesis to vitamin E deficiency.

Association between plasma vitamin E concentration and the risk of equine motor neuron disease.

De la Rua-Domenech R, Mohammed HO, Cummings JF, et al. *Vet J* 1997;154:203-213.

Equine motor neuron disease (EMND) is a neurodegenerative disorder of the somatic lower motor neurons that results in a syndrome of diffuse neuromuscular disease in the adult horse. The aetiology of this disorder is unknown, although prior studies have suggested that a deficiency in the lipid antioxidant vitamin E (alpha-tocopherol) contributes to the development of EMND. This paper describes a case-control study designed to investigate the association between plasma vitamin E levels and the risk of EMND for horses. Signalment, plasma vitamin E levels at the time of referral, and information relative to dietary and management practices were collected from 53 horses diagnosed with EMND and 69 controls. The mean plasma vitamin E concentration in EMND cases was significantly lower than that of control horses. After controlling for other risk factors of EMND, there was a statistically significant association between plasma vitamin E levels and EMND, with the likelihood of the disease increasing as the vitamin E concentration decreased. These findings support the reported role of vitamin E deficiency as one of the risk factors for EMND.

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Taurine modulates arginine vasopressin-mediated regulation of renal function.

Mozaffari MS, Schaffer D. *J Cardiovasc Pharmacol* 2001;37:742-750.

Taurine has been implicated in the regulation of arginine vasopressin (AVP) secretion, and we have previously shown altered renal excretory function in the taurine-depleted rat. To further elucidate the role of taurine in AVP-mediated renal responses, the effects of an antagonist for renal AVP receptors were examined in four groups of conscious rats: control, taurine-supplemented, taurine-depleted, and taurine-repleted. Control and taurine-supplemented rats displayed similar and significant AVP receptor antagonist-induced elevations in fluid excretion, sodium excretion, and free water clearance but a marked reduction in urine osmolality. These effects are consistent with inhibition of endogenous AVP activity. By contrast, in the taurine-depleted rats, the magnitude and the time course of drug-induced renal excretory responses lagged behind those of the control and taurine-supplemented groups. Further, baseline urine osmolality was significantly higher in the taurine-depleted compared with the control or taurine-supplemented groups. However, after administration of the antagonist, taurine-depleted rats manifested a delayed but more marked reduction in urine osmolality, thereby eliminating the baseline differential that existed between the taurine-depleted rats and control or taurine-supplemented groups. Consistent with these observations, plasma AVP was significantly increased in the taurine-depleted compared with the control rats. Interestingly, taurine repletion shifted all responses closer to the control group. Analysis of the data suggests that the effect of the antagonist on renal excretory function is related primarily to altered tubular reabsorption activity. These observations suggest that taurine modulates renal function, and, thereby, body fluid homeostasis, through an AVP-dependent mechanism.

Effect of magnesium-deficient diet on serum and urine magnesium concentrations in healthy cats.

Norris CR, Christopher MM, Howard KA, Nelson RW.

Am J Vet Res 1999;60:1159-1163.

OBJECTIVE: To evaluate the efficacy of using serum total and ionized magnesium (Mg) concentrations and urine Mg concentrations to identify Mg deficiency in cats. ANIMALS: 6 healthy castrated male cats. PROCEDURE: A Mg-replete diet was fed for 37 days, followed by a Mg-deficient diet for 37 days. On days 1, 3, and 7 of the last week of each diet, serum ionized and total Mg concentrations were determined; in addition, urine Mg concentration was determined each day of the last week. Serum total and ionized Mg concentrations were compared with urine Mg concentration, amount of Mg excreted during 24 hours (24-hour urine Mg excretion), ratio of urine Mg concentration to urine creatinine concentration (Umg:Ucr), and urinary fractional excretion of Mg (FEmg) to determine which variable best predicted Mg status. RESULTS: Cats fed Mg-deficient diets had significantly lower serum total and ionized Mg concentrations and 24-hour urine Mg excretion values, compared with cats fed Mg-replete diets. Serum total Mg concentration was the best predictor of Mg status. Twenty-four-hour urine Mg excretion was a repeatable, reliable measurement and had the best correlation with serum total Mg concentration. Serum total Mg concentration also correlated with urine Mg concentration, Umg:Ucr, and FEmg. CONCLUSIONS AND CLINICAL RELEVANCE: Serum total and ionized Mg concentrations can be used to identify cats with dietary-induced Mg deficiencies. Twenty-four-hour urine Mg excretion and urine Mg concentration correlated best with serum total Mg concentration and, therefore, may be the most useful urine variables for identifying Mg deficiency.

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Maintenance energy requirements and the effect of diet on performance of racing Greyhounds.

Hill RC, Bloomberg MS, Legrand-Defretin V, et al. *Am J Vet Res* 2000 ;61:1566-1573.

OBJECTIVES: To determine maintenance energy requirements and effect of diet on performance of racing Greyhounds. ANIMALS: 7 adult racing Greyhounds. PROCEDURE: Dogs were fed a higher fat and protein (HFP) or a lower fat and protein (LFP) diet for 8 weeks in a crossover design. Dogs were exercised for 15 minutes twice daily in a paddock and raced 500 m twice weekly. Blood gas, hematologic, and serum biochemical analyses were performed before and after racing, and race times were compared at the end of each diet period. RESULTS: Mean race time was significantly shorter (32.81+/-0.65 seconds vs. 33.05+/-0.71 seconds), and mean racing speed over 500 m was significantly faster (15.25+/-0.30 vs. 15.13+/-0.30 m x s(-1)) when dogs were fed the HFP diet than when they were fed the LFP diet. Diet had little or no effect on results of blood gas, hematologic, and serum biochemical analyses, except that Hct was 4% greater before and after racing when the HFP diet was fed than when the LFP diet was fed. Mean SD metabolizable energy intake from weeks 1 through 16 was 155+/-9 kcal x kg(-0.75) x d(-1). CONCLUSIONS AND CLINICAL RELEVANCE: Racing Greyhounds ran faster when fed a diet containing higher fat and protein and lower carbohydrate contents. Their maintenance metabolizable energy requirement was slightly higher than that of moderately active dogs.

Diagnosis and management of canine claw diseases.

Mueller RS. *Vet Clin North Am Small Anim Pract* 1999;29:1357-1371.

The diagnostic workup for canine claw disease consists of a good history and complete clinical examination which may provide clues for a possible underlying disorder. In dogs with claw disease but no other clinical or historical signs, further recommended diagnostic procedures include cytological evaluation of impression smears or discharge from the claw fold, bacterial culture and sensitivity testing, biopsy of the claw matrix, and an elimination diet for 6 to 8 weeks. If no underlying disease can be identified, trial treatment with essential fatty acid supplementation, vitamin E, or a combination of doxycycline hydrochloride and niacinamide may be useful. In some patients, onychectomy of all claws may be considered.

Changes in thyroid function in puppies fed a high iodine commercial diet.

Castillo VA, Lalia JC, Junco M, et al. *Vet J* 2001;161:80-84.

Abnormally low (131)I uptakes were noticed in dogs fed with commercial diets at the University Animal Clinic in Buenos Aires, but the total iodine content of eight different commercial diets examined was found to provide an iodine intake above daily requirements. To investigate this anomaly, 18 dogs were distributed into three groups, fed either: (1) a home-prepared diet; (2) a commercial diet; (3) a home-prepared diet supplemented with potassium iodide equivalent to that found in the commercial diet. The(131)I uptake in dogs of groups B and C was significantly decreased, as was basal serum thyroxine (T(4)) and free thyroxine (FT(4)), whereas urinary iodide excretion and serum thyroid stimulating hormone (TSH), were increased. The thyroid releasing hormone (TRH)-TSH test showed an increased response in dogs from group B, while the TRH-T(4)test was inhibited in both groups B and C. The results demonstrate that the excessive amount of iodine present in some commercial diets in Argentina causes a significant impairment of thyroid function and hypothyroidism.

Effect of dietary factors on the detection of fecal occult blood in cats.

Tuffli SP, Gaschen F, Neiger R. *J Vet Diagn Invest* 2001;13:177-179.

Eight different diets were each fed to 6 cats to evaluate the effect on a guaiac and an o-tolidine fecal occult blood test. Fecal samples were collected from day 5 through day 7. Canine blood or pure cottage cheese were used as positive and negative controls, respectively. One hundred thirty-four fecal samples were analyzed. The dry fish (capelin) and vegetable (tapioca) diet and the pure cottage cheese diet had only negative results in both tests, whereas a canned chicken and cereal (rice) diet had negative results in all fecal samples in the o-tolidine tablet test and in 10 of 16 fecal samples in the guaiac paper test. All other fecal samples from cats eating 6 other diets and the canine blood additive were positive in both fecal occult blood tests. These results indicate that occult blood tests based on o-tolidine and guaiac are clinically useful, but cats need to be on a strict diet before the tests are used.

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Effects of diets with different calcium and phosphorus contents on the skeletal development and blood chemistry of growing Great Danes.

Schoenmakers I, Hazewinkel HA, Voorhout G, et al. *Vet Rec* 2000;147:652-660.

The skeletal development of three groups of great dane dogs, fed a diet composed according to the published nutritional requirements for dogs (controls) or with increased calcium or calcium and phosphorus content, was examined radiographically, histologically and biochemically. The diets were fed from the time the dogs first began eating food in addition to their dam's milk, until they were 17 weeks old. Thereafter, the calcium and phosphorus intakes of the dogs in the high calcium groups were normalised for a further 10 weeks. The dogs fed the high calcium diet without a proportionally high phosphorus intake became hypercalcaemic and hypophosphataemic, and had severe disturbances in skeletal development, growth, and mineralisation which were typical for rickets. After their calcium intake was normalised the lesions of rickets resolved but osteochondrotic lesions became apparent. The dogs fed the high calcium and phosphorus diet became slightly hypophosphataemic, their growth was retarded, and they had disturbances in skeletal development resembling osteochondrosis, which had only partly resolved after 10 weeks on the normal calcium and phosphorus diet.

Canine zinc-responsive dermatosis.

Colombini S. *Vet Clin North Am Small Anim Pract* 1999;29:1373-1383.

Zinc is important in a multitude of biological functions, including regulation of the immune response, modulation of keratogenesis and wound healing, maintenance of normal reproductive function, and acuity of taste and smell. Zinc-responsive dermatosis is an uncommon disease of dogs resulting from either an absolute or relative deficiency in zinc. Dermatological lesions are characterized by erythema, alopecia, scales, and crusts that primarily affect the head. Two forms of the disease exist: a familial form affecting Alaskan Malamutes and Siberian Huskies and a form that affects growing puppies fed zinc-deficient or oversupplemented diets. The history, clinical signs, and skin biopsy results are typically diagnostic. Life-long zinc supplementation is usually necessary in the familial form of the disease, although dietary correction alone may be curative in the second form. Lethal acrodermatitis is a rare inherited disorder of Bull Terriers that does not respond to zinc supplementation and is invariably fatal.

Obesity induced by a high-fat diet is associated with reduced brain insulin transport in dogs.

Kaiyala KJ, Prigeon RL, Kahn SE, et al. *Diabetes* 2000;49:1525-1533.

Insulin transported from plasma into the central nervous system (CNS) is hypothesized to contribute to the negative feedback regulation of body adiposity. Because CNS insulin uptake is likely mediated by insulin receptors, physiological interventions that impair insulin action in the periphery might also reduce the efficiency of CNS insulin uptake and predispose to weight gain. We hypothesized that high-fat feeding, which both reduces insulin sensitivity in peripheral tissues and favors weight gain, reduces the efficiency of insulin uptake from plasma into the CNS. To test this hypothesis, we estimated parameters for cerebrospinal fluid (CSF) insulin uptake and clearance during an intravenous insulin infusion using compartmental modeling in 10 dogs before and after 7 weeks of high-fat feeding. These parameters, together with 24-h plasma insulin levels measured during ad libitum feeding, also permitted estimates of relative CNS insulin concentrations. The percent changes of adiposity, body weight, and food intake after high-fat feeding were each inversely associated with the percent changes of the parameter k1k2, which reflects the efficiency of CNS insulin uptake from plasma ($r = -0.74, -0.69, -0.63$; $P = 0.015, 0.03$, and 0.05, respectively). These findings were supported by a non-model-based calculation of CNS insulin uptake: the CSF-to-plasma insulin ratio during the insulin infusion. This ratio changed in association with changes of k1k2 ($r = 0.84$, $P = 0.002$), body weight ($r = -0.66$, $P = 0.04$), and relative adiposity ($r = -0.72$, $P = 0.02$). By comparison, changes in insulin sensitivity, according to minimal model analysis, were not associated with changes in k1k2, suggesting that these parameters are not regulated in parallel. During high-fat feeding, there was a 60% reduction of the estimated CNS insulin level ($P = 0.04$), and this estimate was inversely associated with percent changes in body weight ($r = -0.71$, $P = 0.03$). These results demonstrate that increased food intake and weight gain during high-fat feeding are associated with and may be causally related to reduced insulin delivery into the CNS.

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Effect of fish oil, arginine, and doxorubicin chemotherapy on remission and survival time for dogs with lymphoma: a double-blind, randomized placebo-controlled study.

Ogilvie GK, Fettman MJ, Mallinckrodt CH, et al.
Cancer 2000;88:1916-1928.

BACKGROUND: Polyunsaturated n-3 fatty acids have been shown to inhibit the growth and metastasis of tumors. This double-blind, randomized study was designed to evaluate the hypothesis that polyunsaturated n-3 fatty acids can improve metabolic parameters, decrease chemical indices of inflammation, enhance quality of life, and extend disease free interval and survival time for dogs treated for lymphoblastic lymphoma with doxorubicin chemotherapy. METHODS: Thirty-two dogs with lymphoma were randomized to receive one of two diets supplemented with menhaden fish oil and arginine (experimental diet) or an otherwise identical diet supplemented with soybean oil (control diet). Diets were fed before and after remission was attained with up to five dosages of doxorubicin. Parameters examined included blood concentrations of glucose, lactic acid, and insulin in response to glucose and diet tolerance tests; alpha-1 acid glycoprotein; tumor necrosis factor; interleukin-6; body weight; amino acid profiles; resting energy expenditure; disease free interval (DFI); survival time (ST); and clinical performance scores. RESULTS: Dogs fed the experimental diet had significantly ($P < 0.05$) higher mean serum levels of the n-3 fatty acids docosahexaenoic acid (C22:6) and eicosapentaenoic acid (C20:5) compared with controls. Higher serum levels of C22:6 and C20:5 were associated with lesser ($P < 0.05$) plasma lactic acid responses to intravenous glucose and diet tolerance testing. Increasing C22:6 levels were significantly ($P < 0.05$) associated with longer DFI and ST for dogs with Stage III lymphoma fed the experimental diet. CONCLUSIONS: Fatty acids of the n-3 series normalize elevated blood lactic acid in a dose-dependent manner, resulting in an increase in DFI and ST for dogs with lymphoma.

Dietary lutein stimulates immune response in the canine.

Kim HW, Chew BP, Wong TS, et al. *Vet Immunol Immunopathol* 2000;74:315-327.

The possible immuno-modulatory action of dietary lutein in dogs is not known. Female Beagle dogs (17-18-month old; 11.4+/-0.4kg body weight) were supplemented daily with 0, 5, 10 or 20mg lutein for 12 weeks. Delayed-type hypersensitivity (DTH) response to saline, phytohemagglutinin (PHA) and a polyvalent vaccine was assessed on Weeks 0, 6 and 12. Blood was sampled on Weeks 0, 2, 4, 8 and 12 to assess (1) lymphocyte proliferative response to PHA, concanavalin A (Con A), and pokeweed mitogen (PWM), (2) changes in peripheral blood mononuclear cell (PBMC) populations, (3) interleukin-2 (IL-2) production and (4) IgG and IgM production. After the completion of 12-week study, we continued to collect the blood weekly up to 17 weeks to evaluate the changes in immunoglobulin production upon first and second antigenic challenges on Weeks 13 and 15. Plasma lutein+zeaxanthin was undetectable in unsupplemented dogs but concentrations increased ($P<0.05$) rapidly on Week 2 in lutein-supplemented dogs. Thereafter, concentrations generally continued to increase in dose-dependent manner, albeit at a much slower rate. Dogs fed lutein had heightened DTH response to PHA and vaccine by Week 6. Dietary lutein increased ($P<0.05$) lymphocyte proliferative response to all three mitogens and increased the percentages of cells expressing CD5, CD4, CD8 and major histocompatibility complex class II (MHC II) molecules. The production of IgG increased ($P<0.05$) in lutein-fed dogs after the second antigenic challenge. Lutein did not influence the expression of CD21 lymphocyte marker, plasma IgM or IL-2 production. Therefore, dietary lutein stimulated both cell-mediated and humoral immune responses in the domestic canine.

Abstracts

Recently Published Abstracts

Evaluation of urinary carnitine and taurine excretion in 5 cystinuric dogs with carnitine and taurine deficiency.

Sanderson SL, Osborne CA, Lulich JP, et al. *J Vet Intern Med* 2001;15:94-100.

Five client owned dogs with cystinuria were diagnosed with carnitine and taurine deficiency while participating in a clinical trial that used dietary management of their urolithiasis. Stored 24-hour urine samples collected from the cystinuric dogs before enrollment in the clinical diet trial were quantitatively evaluated for carnitine and taurine. These results were compared to those obtained from 18 healthy Beagles. Both groups of dogs were fed the same maintenance diet for a minimum of 2 weeks before 24-hour urine collection. The protocol used for 24-hour urine collections was the same for cystinuric dogs and healthy Beagles except that cystinuric dogs were catheterized at baseline, 8 hours, 12 hours, and at the end of the collection, whereas Beagles were catheterized at baseline, 8 hours, and at the end of the collection. Three of 5 dogs with cystinuria had increased renal excretion of carnitine. None of the cystinuric dogs had increased renal excretion of taurine, but cystinuric dogs excreted significantly less ($P < .05$) taurine in their urine than the healthy Beagles. Carnitinuria has not been recognized previously in either humans or dogs with cystinuria, and it may be 1 risk factor for developing carnitine deficiency. Cystinuric dogs in this study were not taurinuric; however, cystine is a precursor amino acid for taurine synthesis. Therefore, cystinuria may be 1 risk factor for developing taurine deficiency in dogs. We suggest that dogs with cystinuria be monitored for carnitine and taurine deficiency or supplemented with carnitine and taurine.

Effect of oral melatonin administration on sex hormone, prolactin, and thyroid hormone concentrations in adult dogs.

Ashley PF, Frank LA, Schmeitzel LP, et al. *J Am Vet Med Assoc* 1999;215:1111-1115.

OBJECTIVE: To determine the effect of oral melatonin (MT) administration on serum concentrations of sex hormones, prolactin, and thyroxine in dogs. DESIGN: Prospective study. ANIMALS: 8 male and 8 female adult sexually intact dogs. PROCEDURE: 5 male and 5 female dogs were treated with MT (1.0 to 1.3 mg/kg [0.45 to 0.59 mg/lb] of body weight), PO, every 12 hours for 28 days; the other 6 dogs were used as controls. Blood samples were collected on days 0, 14, and 28, and serum concentrations of estradiol-17 beta, progesterone, testosterone, androstenedione, 17-hydroxyprogesterone (17-HP), dihydroepiandrostenedione sulfate (DHEAS), prolactin, and thyroxine were determined. On day 5, serum MT concentrations were measured before and periodically for up to 8 hours after MT administration in 4 treated dogs. RESULTS: Female dogs treated with MT had significant decreases in serum estradiol, testosterone, and DHEAS concentrations between days 0 and 28. Male dogs treated with MT had significant decreases in serum estradiol and 17-HP concentrations between days 0 and 28. Serum MT concentrations increased significantly after MT administration and remained high for at least 8 hours. Prolactin and thyroxine concentrations were unaffected by treatment. CONCLUSIONS AND CLINICAL RELEVANCE: Melatonin is well absorbed following oral administration and may alter serum sex hormone concentrations.

Abstracts

Recently Published Abstracts

Effect of age, breed and dietary omega-6 (n-6): omega-3 (n-3) fatty acid ratio on immune function, eicosanoid production, and lipid peroxidation in young and aged dogs.

Kearns RJ, Hayek MG, Turek JJ, et al. *Vet Immunol Immunopathol* 1999;69:165-183.

The focus of this study was to examine the influence of age and diet on various parameters of immune function in young and old Fox Terriers and Labrador Retrievers. Eighteen young and old dogs were utilized for this study. Young and old dogs were fed a basal diet containing an (n-6):(n-3) ratio of 25:1 for sixty days (Phase I). Half of the dogs were then switched to a diet with an (n-6):(n-3) ratio of 5:1, and all were maintained on their respective diets for an additional sixty days (Phase II). Results from these studies revealed an age-associated decline in several immune parameters measured. Both these breeds demonstrated a reduction in sheep red blood cell titers, as well as in their ability to respond to different mitogens. Interestingly, this decline was greater in Fox Terriers, suggesting a decrease in cellular proliferative capacity in lymphocytes isolated from the larger breed. Neither cytokine production or DTH response was affected by age. Diet and breed interactions resulted in a significant increase in T- and B-cell mitogen responsiveness. In contrast, supplementation with n-3 fatty acids did not affect IL-1, IL-6 or TNF-alpha production. Supplementation with n-3 fatty acids resulted in increased PGE3 production from peritoneal macrophages but had no effect on PGE2 production from peripheral blood mononuclear cells or peritoneal macrophages. The n-3 fatty acid supplementation did not influence alpha-tocopherol status although older dogs had significantly lower serum alpha-tocopherol concentrations. Oxidative status of these dogs was assessed by serum levels of malondialdehyde (MDA) and 4-hydroxynonenal (4-HNE). Feeding an n-3-enriched diet did not affect 4-HNE levels but significantly decreased MDA levels in old dogs. In summary, this study indicates that feeding a diet containing an (n-6):(n-3) fatty acid ratio of 5:1 had a positive, rather than a negative, effect on the immune response of young or geriatric dogs.