Small Animal Article Summaries – FELINE MEDICINE & SURGERY

January-February 2012

Contributor

ISFM
The International Society of Feline Medicine

Small Animal Article Summaries (SAAS) is a veterinarian resource where a range of article summaries can be accessed in one easy location.

The International Society of Feline Medicine (ISFM) was established in 1996 as the veterinary focus for the work of the charity and, together with the American Society of Feline Practitioners, it publishes the Journal of Feline Medicine and Surgery.

Quarantine protects Falkland Islands (Malvinas) cats from feline coronavirus infection.
Feline coronavirus (FCoV) causes feline infectious peritonitis (FIP). Since 2002, when 20 cats on the Falkland Islands were found to be FCoV seronegative, only seronegative cats could be imported. Between 2005-2007, 95 pet and 10 feral cats tested negative by indirect immunofluorescence antibody (IFA) analysis using two strains of type II FCoV, two transmissible gastroenteritis virus assays, an enzyme-linked immunosorbent assay and rapid immunomigration test. Twenty-four samples (23%) showed non-specific fluorescence, mostly attributable to anti-nuclear antibodies (ANA). The reason for ANA was unclear: reactive samples were negative for Erhlichia canis antibodies; seven were feline immunodeficiency virus positive, but 15 were negative. It was not possible to determine retrospectively whether the cats had autoimmune disease, hyperthyroidism treatment, or recent vaccination which may also cause ANA. The FCoV/ FIP-free status of the Falkland Islands cats should be maintained by FCoV testing incoming cats. However, ANA can complicate interpretation of IFA tests.


A retrospective study of serum beta-hydroxybutyric acid in 215 ill cats: clinical signs, laboratory findings and diagnoses.
Serum concentrations of beta-hydroxybutyric acid (sBHBA) are increased in cats with diabetes mellitus (DM), diabetic ketoacidosis (DKA) and hepatic lipidosis (HL). This study assessed sBHBA as a diagnostic tool in 215 consecutively-enrolled ill cats in the general population in a veterinary hospital. At the time of presentation, sBHBA was within the reference range in 158/215 (73.5%) cats (median 0.27; range 0.00-0.49 mmol/L) and elevated in 57/215 (26.5%) cats (median 0.87; range 0.51-21.45 mmol/L). Compared to cats with normal sBHBA, those with increased sBHBA had higher frequencies of anorexia, weight loss, icterus, polyuria/polydipsia, hyperbilirubinaemia, hypertriglyceridaemia, pancreatitis, HL, DM and DKA. They had higher concentrations of bilirubin and triglycerides and lower concentrations of potassium, chloride and total protein. There were positive correlations (P<0.01) between sBHBA and urinary glucose (r=0.42) and ketones (r=0.76), but there were no group differences in dipstick levels of urinary ketones. Cats with DM/DKA and with HL had significantly higher sBHBA compared to other cats. Receiver operator characteristics analysis of sBHBA as a predictor of HL showed that sBHBA was a good predictor of HL. Increased sBHBA occurs frequently in ill cats and provides useful diagnostic information, especially in DM/DKA and HL.


Correction of craniodorsal coxofemoral luxation in cats and small breed dogs using a modified Knowles technique with the braided polyblend TightRope systems.
OBJECTIVES: To report the surgical technique and short-term radiographic and functional outcome data for a series of client owned, small breed dogs and cats treated for traumatic craniodorsal coxofemoral luxation using open reduction and internal fixation with the Arthrex Mini TightRope (mTR) and TightRope (TR) systems. METHODS: Data were collected retrospectively from the clinical case records, including the initial clinical and radiographic findings, surgical technique, and postoperative short-term clinical and radiographic data. Functional data collected after the six weeks reassessment were obtained via owner questionnaire. RESULTS: Four cats (mTR = 4) and five small breed dogs (mean weight 15 kg; TR = 4, mTR = 1) were included. Median time to postoperative weight bearing was one day. Median lameness score at six weeks postoperatively was 0 out of 5. Coxofemoral joint congruity was radiographically confirmed at the six weeks postoperative visit. Telephone follow-up (at a median of 16 weeks) revealed all animals had returned to their previous level of activity. Complications were minor, and limited to postoperative swelling (n = 1). CLINICAL SIGNIFICANCE: Clinical use of the Arthrex Mini TightRope and TightRope systems can be recommended for traumatic craniodorsal coxofemoral luxation in this novel application as short-term results are at least comparable to existing surgical techniques. Long-term follow-up studies are needed.


Molecular diagnostics of hematologic malignancies in small animals.


Vector-borne diseases in client-owned and stray cats from Madrid, Spain.
The role of various vector-borne pathogens as a cause of disease in cats has not been clearly determined. The current study
evaluated risk factors, clinical and laboratory abnormalities associated with Ehrlichia spp., Anaplasma spp., Neorickettsia spp., Leishmania spp., and Bartonella spp. infection or exposure in 680 client-owned and stray cats from Madrid, Spain. Our results indicate that a large portion (35.1%) of the cat population of Madrid, Spain, is exposed to at least one of the five vector-borne pathogens tested. We found seroreactivity to Bartonella henselae in 23.8%, to Ehrlichia canis in 9.9%, to Anaplasma phagocytophilum in 8.4%, to Leishmania infantum in 3.7%, and to Neorickettsia risticii in 1% of the feline study population. About 9.9% of cats had antibody reactivity to more than one agent. L. infantum DNA was amplified from four cats (0.6%), B. henselae DNA from one cat (0.15%), and B. claridgeiae DNA from another cat (0.15%).


**Sequence variation and mRNA expression of the TWIST1 gene in cats with mammary hyperplasia and neoplasia.**

In humans, a germline mutation (c.309C>G) in the TWIST1 oncogene may predispose to breast cancer and its expression has been associated with tumour progression and metastasis. In this study, the feline TWIST1 gene was screened for sequence variations in 37 neoplastic and eight hyperplastic mammary gland lesions from cats. In addition, mRNA levels were examined in 15 mammary tumours and three cases of mammary hyperplasia by quantitative real-time reverse-transcriptase PCR. Feline mammary carcinomas had significantly lower levels of expression of TWIST1 mRNA than benign mammary tumours. No variations were identified in the TWIST1 coding region in feline mammary tumours and the mutation described in humans was not detected. However, two germline variants in the TWIST1 gene intron were identified in four and three carcinomas, respectively: GQ167299:g.535delG and GQ167299:g.460C>T. There was no association between these sequence alterations and TWIST1 mRNA levels.


**Sinonasal and sino-orbital aspergillosis in 23 cats: aetiology, clinicopathological features and treatment outcomes.**

Aetiology, clinicopathological findings and treatment outcomes were documented in 23 cats (1.5-13 years of age) with sinonasal (SNA, n=6) or sino-orbital (SOA, n=17) aspergillosis. Cases recruited retrospectively and prospectively were included if fungal hyphae were identified on cytological or histological examination and the fungal pathogen was identified by PCR and DNA sequencing (ITS1 or ITS1-5.8S-ITS2 regions, rDNA gene cluster). Fungal culture was positive in 22/23 cases. In cases of SNA, the fungal pathogen was Aspergillus fumigatus (n=4), Neosartorya fischeri or A. lentulus (n=1) or a non-specified Neosartorya spp. (n=1). In all cases of SOA (n=17), the fungal pathogen was identified as Neosartorya spp. Nine cats had brachycephalic conformation. Cats with SNA were more likely to be infected with A. fumigatus and had a better prognosis than cats with SOA.


**Evaluation of the automated hematology analyzer Sysmex XT-2000iV &trade; compared to the ADVIA(R) 2120 for its use in dogs, cats, and horses. Part II: Accuracy of leukocyte differential and reticulocyte count, impact of anticoagulant and sample aging.**

The automated laser-based hematology analyzer Sysmex XT-2000iV provides a 5-part differential count and specific cytograms that are of great interest for large veterinary laboratories. The aim of the study was to validate the Sysmex XT-2000iV compared to the laser-based hematology analyzer ADVIA(R) 2120 and manual differential in dogs, cats, and horses as well as the impact of anticoagulant (heparin, ethylenediamine tetra-acetic acid [EDTA], and citrate) and storage at 22 degrees C and 4 degrees C. Consecutive fresh K(3)-EDTA blood samples from 216 cats, 314 dogs, and 174 horses were included. The impact of anticoagulant and sample storage was assessed in specimens obtained from an additional 9 cats, 10 dogs, and 10 horses. Agreement between both analyzers was excellent to good except for monocytes and canine reticulocytes. Spearman rank correlation coefficients (r (s)) between Sysmex XT-2000iV and manual differential were good to fair and ranged from 0.91 (cat lymphocytes) to 0.44 (cat monocytes). Hematocrit value (Hct), mean corpuscular hemoglobin (MCH), MCH concentration (MCHC; all: P < 0.001), and mean corpuscular volume (MCV; P < 0.01) were higher in canine citrated blood compared to heparin and EDTA. In cats, lymphocytes and monocytes were lower in heparinized blood compared to EDTA (P < 0.05), whereas in horses no significant effect was seen. Regarding storage time and temperature, white and red blood cell counts, hemoglobin, and MCH were stable. Hct, MCV, and MCHC were influenced by erythrocyte swelling. Differential count remained stable for 24 hr (22 degrees C) and nearly 72 hr (4 degrees C) except for monocytes. The overall performance of the Sysmex XT-2000iV was excellent and compared favorably with that of the ADVIA 2120. A special strength was the excellent detection of feline eosinophils.
*Evaluation of the impedance analyzer PocH-100iV Diff for analysis of canine and feline blood.*
**BACKGROUND:** An automated impedance-based in-house hematology analyzer, the PocH-100iV Diff, which provides a 3-part leukocyte differential count that includes eosinophils, recently has been introduced. **OBJECTIVES:** The aims of this study were to validate results from the PocH-100iV Diff for dogs and cats and evaluate the impact of the anticoagulant used and sample storage conditions. **METHODS:** Blood samples collected in K(3) EDTA from 153 cats and 150 dogs were included in the comparison study. The reference analyzer was the ADVIA 2120 hematology analyzer, and manual differential leukocyte counts and PCV were the manual reference methods. **RESULTS:** Coefficients of variation were <3% except for platelet counts and feline differential and eosinophil counts. Correlation between analyzers was good to excellent except for hemoglobin (HGB) concentration in dogs and RBC indices for both species. Biases were close to 0 except for MCHC and platelet counts. Correlation with manual counts was good for lymphocytes and OTHR cells (combined neutrophil and monocyte counts) and fair and poor for feline and canine eosinophil counts, respectively. Estimated sensitivity and specificity for detection of eosinophilia were, respectively, 50% and 98% for cats and 34% and 77% for dogs. A significant anticoagulant effect was seen for MCV in cats and for HCT, MCH, MCHC, and platelet, OTHR, and eosinophil counts in dogs. RBC and WBC counts, HGB concentration, and MCHC were stable for 72 h. HCT, MCV, MCHC, and platelet counts were affected by sample storage (dogs > cats; 22 degrees C > 4 degrees C). **CONCLUSIONS:** The PocH-100iV Diff is a suitable in-house instrument. A strength is its specific, but moderately sensitive, detection of feline eosinophils.

*Renal disease in cats infected with feline immunodeficiency virus.*
**BACKGROUND:** Feline immunodeficiency virus (FIV) and human immunodeficiency virus (HIV) infection cause similar clinical syndromes of immune dysregulation, opportunistic infections, inflammatory diseases, and neoplasia. Renal disease is the 4th most common cause of death associated with HIV infection. **OBJECTIVE:** To investigate the association between FIV infection and renal disease in cats. **ANIMALS:** Client-owned cats (153 FIV-infected, 306 FIV-noninfected) and specific-pathogen-free (SPF) research colony cats (95 FIV-infected, 98 FIV-noninfected). **METHODS:** A mixed retrospective/prospective cross-sectional study. Blood urea nitrogen (BUN), serum creatinine, urine specific gravity (USG), and urine protein:creatinine ratio (UPC) data were compared between FIV-infected and FIV-noninfected cats. In FIV-infected cats, total CD4+ and CD8+ T lymphocytes were measured using flow cytometry, and CD4+:CD8+ T lymphocyte ratio was calculated. Renal azotemia was defined as a serum creatinine >/= 1.9 mg/dL with USG <= 1.035. Proteinuria was defined as a UPC > 0.4 with an inactive urine sediment. **RESULTS:** Among the client-owned cats, no association was detected between FIV infection and renal azotemia (P = .24); however, a greater proportion of FIV-infected cats were proteinuric (25.0%, 16 of 64 cats) compared to FIV-noninfected cats (10.3%, 20 of 195 cats) (P < .01). Neither neuter status nor health status were risk factors for proteinuria in FIV-infected cats, but UPC was positively correlated with the CD4+:CD8+ T lymphocyte ratio (Spearman’s rHO = 0.37, P = .01). Among the SPF research colony cats, no association was detected between FIV infection and renal azotemia (P = .21) or proteinuria (P = .25). **CONCLUSIONS AND CLINICAL IMPORTANCE:** Proteinuria but not azotemia was associated with natural FIV infection.

*Osteoarthritis in the cat: 2. how should it be managed and treated?*
**PRACTICAL RELEVANCE:** Osteoarthritis (OA) is very common in the cat and in many cases is associated with significant long-term pain, which limits mobility and activity, and severely compromises the animal’s quality of life. **CLINICAL CHALLENGES:** The treatment of chronic arthritic pain is a major challenge and many analgesic drugs used in other species are not licensed, not available or not tested for use in the cat. Many older cats with painful OA have some degree of chronic kidney disease (CKD) and many clinicians are reluctant to use non-steroidal anti-inflammatory drugs (NSAIDs) in these animals because of the potential for nephrotoxicity. **EVIDENCE BASE:** There are several publications that show that meloxicam is an effective NSAID for the cat and can be used long-term. It is easy to administer and there is published evidence that meloxicam can actually slow the progression of CKD in this species. Many other drugs are used to treat chronic pain in the cat but there is no documented evidence of their efficacy in OA. Unlike the dog, there is limited evidence for the effectiveness of omega-3 fatty acid-rich diets in managing feline OA and further work is required. There is no published data as yet for the usefulness or otherwise of nutraceuticals (glucosamine and chondroitin) in managing feline OA; studies in the authors’ clinic suggest some pain-relieving effect. Research into environmental enrichment as a way of improving quality of life in cats with painful OA is lacking, but it is an approach worth using where possible. Modifications to the environment (eg, provision of comfortable bedding and ramps) are also important.
**ISFM Feline Abstracts • Jan-Feb 2012**


**Osteoarthritis in the cat: 1. how common is it and how easy to recognise?**

**PRACTICAL RELEVANCE:** Osteoarthritis (OA) is very common, particularly in older cats, but its clinical significance has largely gone unrecognised until recently. As in other species, OA is often painful and appropriate treatment is required to improve the animal’s quality of life. Most cases appear to be primary or idiopathic. It is important for the clinician to actively seek these cases in the practice population. **CLINICAL CHALLENGES:** The recognition of chronic arthritic pain is a major challenge since most cats will not exhibit lameness. The main features of feline OA are changes in behaviour and lifestyle, which develop gradually and which owners tend to interpret as simply being the effects of old age. A meaningful physical orthopaedic examination can be difficult to achieve. A lack of familiarity with feline joint radiographs, and the fact that major cartilage pathology can be present in the absence of any bony change, mean that radiographic identification of OA in the cat can also be problematic. **CLIENT QUESTIONNAIRE:** The recognition of chronic arthritic pain in the cat is based on owner questionnaires designed to elicit information about changes in mobility, activity levels, grooming habits and general demeanour. **EVIDENCE BASE:** Several publications now report on the significance of behavioural and lifestyle changes as indicators of chronic arthritic pain in the cat. However, there is not as yet a fully validated owner-based questionnaire for recognising chronic pain in the cat. Furthermore, the aetiopathogenesis of feline OA still requires detailed investigation. Such studies are likely to make a major contribution to comparative rheumatology, since feline OA, more so than the canine disease, shows many similarities with human OA.


**Three pathogens in sympatric populations of pumas, bobcats, and domestic cats: implications for infectious disease transmission.**

Anthropogenic landscape change can lead to increased opportunities for pathogen transmission between domestic and non-domestic animals. Pumas, bobcats, and domestic cats are sympatric in many areas of North America and share many of the same pathogens, some of which are zoonotic. We analyzed bobcat, puma, and feral domestic cat samples collected from targeted geographic areas. We examined exposure to three pathogens that are taxonomically diverse (bacterial, protozoal, viral), that incorporate multiple transmission strategies (vector-borne, environmental exposure/ingestion, and direct contact), and that vary in species-specificity. Bartonella spp., Feline Immunodeficiency Virus (FIV), and Toxoplasma gondii IgG were detected in all three species with mean respective prevalence as follows: puma 16%, 41% and 75%; bobcat 31%, 22% and 43%; domestic cat 45%, 10% and 1%. Bartonella spp. were highly prevalent among domestic cats in Southern California compared to other cohort groups. Feline Immunodeficiency Virus exposure was primarily associated with species and age, and was not influenced by geographic location. Pumas were more likely to be infected with FIV than bobcats, with domestic cats having the lowest infection rate. Toxoplasma gondii seroprevalence was high in both pumas and bobcats across all sites; in contrast, few domestic cats were seropositive, despite the fact that feral, free ranging domestic cats were targeted in this study. Interestingly, a directly transmitted species-specific disease (FIV) was not associated with geographic location, while exposure to indirectly transmitted diseases - vector-borne for Bartonella spp. and ingestion of oocysts via infected prey or environmental exposure for T. gondii - varied significantly by site. Pathogens transmitted by direct contact may be more dependent upon individual behaviors and intra-specific encounters. Future studies will integrate host density, as well as landscape features, to better understand the mechanisms driving disease exposure and to predict zones of cross-species pathogen transmission among wild and domestic felids.


**Risk of anaesthetic mortality in dogs and cats: an observational cohort study of 3546 cases.**

OBJECTIVE: To evaluate the anaesthetic death risk for dogs and cats in a French private practice. **STUDY DESIGN:** Observational cohort study. **ANIMAL POPULATION:** All small animals anesthetised at the Centre Hospitalier Veterinaire des Cordeliers between April 15th, 2008 and April 15th, 2010. **METHODS:** General anaesthesia was defined as a drug-induced unconsciousness characterised by a controlled and reversible depression of the central nervous system and analgesia, sufficient to allow endotracheal intubation. Patient outcome (alive or dead) was assessed at the end of anaesthesia defined as the meeting point of the return of consciousness, rectal temperature >36 degrees C and ability to maintain sternal recumbency. Death occurring during anaesthesia was recorded. Relationship between anaesthetic death and ASA status, species, age, nature of the procedure, anaesthetic protocol and occurrence of epidural administration of a combination of morphine and bupivacaine were analysed. **RESULTS:** During the study period 3546 animals underwent general anaesthesia. The overall death rate in the present study was 1.35% (48 in 3546, 95% CI 0.96-1.75). The death rate of healthy animals (ASA 1 and 2) was 0.12% (3 in 2602 95% CI 0.02-0.34). For sick animals (ASA status 3 and over), the overall death rate was 4.77% (45 in 944 95% CI 3.36-6.18). The death rates in the ASA 3, 4 and 5 categories were 2.90%, 7.58% and 17.33%, respectively. The main factor associated with increased odds of anaesthetic death in ASA categories 3 and over was poor
health status (ASA physical status classification). The nature of the procedure the patient underwent and epidural administration of a combination of morphine and bupivacaine were not correlated with the occurrence of death during anaesthesia. Neither species nor age effects were detected. CONCLUSION AND CLINICAL RELEVANCE: Specific factors were associated with increased odds of anaesthetic death, especially poor health status. Efforts must be directed towards thorough preoperative patient evaluation and improvement of clinical conditions if possible. Identification of risk factors before anaesthesia should lead to increased surveillance by trained staff. This could result in better outcomes.


[Clinical usability and practicability of Alfaxalone for short-term anaesthesia in the cat after premedication with Buprenorphine].

Objective of this clinical study was to assess the anaesthetic quality (induction and recovery) and utility of short term alfaxalone anaesthesia in healthy and diseased cats. Cardiopulmonary effects and the influence on haematological and biochemical blood parameters were evaluated. MATERIAL AND METHODS: Twenty feline patients (ASA1-4) were anaesthetized with alfaxalone for various short surgical or diagnostic procedures. Heart rate, breathing rate, end-tidal CO2 partial pressure, arterial oxygen saturation, mean arterial blood pressure and the body temperature were measured and recorded every 10 minutes. Before, after and 6 hours after anaesthesia venous blood samples were taken and haematologic and blood chemistry parameters were determined. Recovery time and quality were assessed by a numerical rating scale. RESULTS: Anaesthetic induction was rapid and smooth in all cats. Spontaneous respiration was maintained in all cats. Cardiopulmonary parameters mostly remained within a clinically tolerable range. Noticeable was a high heart rate (mean >190 bpm) at the beginning of anaesthesia lasting up to 10 minutes. Statistically significant changes (p<0.05) occurred in some haematologic parameters (RBC, haemoglobin, haematocrit and MCV decreased), electrolytes and venous acid-base-status (bicarbonate, chloride and base excess increased, sodium and potassium decreased) and blood chemistry parameters (alanine aminotransferase, glutamate dehydrogenase and creatinine decreased). None of these changes appeared to have clinical relevance. Recovery was smooth in the majority of cats. Mild signs of hyperexcitability (muscle tremor, short term opisthotonus and hyperacusis) occurred in individual animals. The duration of recovery varied between 21 and 93 minutes. CONCLUSION AND CLINICAL RELEVANCE: Alfaxalone by repeated intravenous injection is suitable for short-term diagnostic and surgical procedures in cats. Because of its minor cardiovascular effects and slight respiratory depression, it is also well tolerated by patients with increased anaesthetic risk (ASA 3 and 4).


Olfactory neuroblastoma in dogs and cats - a histological and immunohistochemical analysis.

Olfactory neuroblastoma (ONB) was identified in 13 dogs and nine cats. The tumours were subjected to microscopical examination and were graded using a human pathological grading system. In the canine and feline tumours there was more necrosis and higher mitotic activity (mitotic index and Ki67 labelling index) than reported in human ONB. Rosettes were a common feature of feline ONBs. A significant correlation was observed between the histological grade and the Ki67 labelling index. The histopathological diagnosis of ONB was confirmed immunohistochemically by demonstration of the neuronal marker neuron-specific enolase (NSE). Two other neuron-specific antibodies specific for microtubule-associated protein-2 (MAP-2) and neuronal nuclei antigen (NeuN) were evaluated. MAP-2 expression proved to have higher specificity than labelling for NSE. NeuN expression was less sensitive and of limited practical value.


Severe systemic hypertension in a cat with pituitary-dependent hyperadrenocorticism.

A seven-year-old Burmese cat was presented with sudden onset blindness. On physical examination, the cat had bilateral retinal detachment and severe systemic hypertension. Further clinical investigations revealed pituitary-dependent hyperadrenocorticism. Antihypertensive therapy was discontinued when the hypertension resolved after bilateral adrenalectomy. Systolic blood pressure remained normal until 19 months post-operatively when systemic hypertension recurred and was attributed to chronic kidney disease. The cat was euthanased 47 months after initial presentation. A pituitary adenoma was identified at post-mortem examination. This case illustrates that systemic hypertension can occur secondary to hyperadrenocorticism in the cat.


Do hypoallergenic cats and dogs exist?

**Effects of increases in dietary fat intake on plasma lipid and lipoprotein cholesterol concentrations and associated enzyme activities in cats.**

OBJECTIVE: To determine the effects of increases in dietary intake of polyunsaturated and saturated fatty acids on plasma lipid and lipoprotein concentrations and activity of associated enzymes in healthy domestic cats. ANIMALS: 16 healthy adult sexually intact female cats. PROCEDURES: A baseline diet (40% energy from fat) and 4 test diets, with increased amounts of fat (51% and 66% energy from fat) from the addition of polyunsaturated and saturated fatty acids, were fed for 6 weeks each. Plasma cholesterol, triglyceride, and lipoprotein cholesterol concentrations, along with activities of lipoprotein lipase, hepatic lipase, and lecithin-cholesterol acyl transferase, were measured at the end of each feeding period. RESULTS: Diet, amount of fat, or ratio of polyunsaturated to saturated fatty acids had no effect on plasma concentrations of cholesterol, triglycerides, and very-low-density or high-density lipoproteins or the activity of lecithin-cholesterol acyl transferase. Low-density lipoprotein concentrations were significantly lower in cats fed a high-fat diet containing polyunsaturated fatty acids. Lipoprotein concentration and hepatic lipase activity were significantly higher in cats fed the fat-supplemented diets, and this was unrelated to whether diets were enriched with polyunsaturated or saturated fatty acids. CONCLUSIONS AND CLINICAL RELEVANCE: Diets containing up to 66% of energy from fat were tolerated well by healthy cats and did not affect plasma lipid concentrations. Therefore, high-fat diets probably will not contribute to hypercholesterolemia or hypertriglyceridemia in cats.


**Cytauxzoon sp. infection in the first endemic focus described in domestic cats in Europe.**

Information about epidemiological and clinicopathological aspects of domestic cat infection by species of Cytauxzoon other than Cytauxzoon felis is limited and it has rarely been reported. Following the detection of clinical cytauxzoonosis in three cats from Trieste (Italy), an epidemiological study was carried out in colony (n=63) and owned (n=52) cats from the same city to investigate the prevalence of Cytauxzoon sp. infection and to assess clinicopathological findings and variables associated with this infection. Cytauxzoon sp. infection was detected by 18S rRNA gene PCR in 23% (27/118) and by blood smear examination in 15% (18/118) of domestic cats. The 18S rRNA gene sequences obtained were 99% identical to the Cytauxzoon sp. sequences deposited in GenBank((R)) from Spanish, French and Mongolian wild and domestic cats. Erythroparasitemia was observed mainly in apparently healthy cats. Cytauxzoon sp. infection was statistically associated with the colony group and the outdoor life style. No statistical association was found between positivity by PCR and breed, gender, age, presence of ticks and/or fleas, clinical status, laboratory findings such as anemia, FIV and/or FeLV status and mortality rate. Persistence of the infection was monitored and documented in four clinical cases. We reported the first clinicopathological description of naturally occurring Cytauxzoon sp. infection in domestic cats living in Italy. The predominance of subclinical erythroparasitemia and the evidence of persistent infection support the hypothesis that the domestic cat might serve as a reservoir host for this infection.


**Clinicopathological variables predicting progression of azotemia in cats with chronic kidney disease.**

BACKGROUND: Chronic kidney disease (CKD) is common in geriatric cats, but often appears to be stable for long periods of time. OBJECTIVES: To describe CKD progression and identify risk factors for progression in newly diagnosed azotemic cats. ANIMALS: A total of 213 cats with CKD (plasma creatinine concentration > 2 mg/dL, urine specific gravity < 1.035) were followed up until progression occurred or for at least 1 year; 132, 73, and 8 cats were in International Renal Interest Society (IRIS) stages 2, 3, and 4, respectively. METHODS: Progression was defined as a 25% increase in plasma creatinine concentration. Logistic regression was used to assess variables at diagnosis that were associated with progression within 1 year. Changes in IRIS stage during follow-up also were described. Cases that remained in stages 2 or 3, but did not have renal function assessed in the last 60 days of life, were excluded from analysis of the proportion reaching stage 4. RESULTS: Of the cats, 47% (101) progressed within 1 year of diagnosis. High plasma phosphate concentration and high urine protein-to-creatinine ratio (UPC) predicted progression in all cats. Low PCV and high UPC independently predicted progression in stage 2 cats, whereas higher plasma phosphate concentration predicted progression in stage 3 cats; 19% (18/94) of cats diagnosed in stage 2; and 63% (34/54) of cats diagnosed in stage 3 reached stage 4 before they died. CONCLUSIONS: Proteinuria, anemia, and hyperphosphatemia may reflect more progressive kidney disease. Alternatively, they may be markers for mechanisms of progression such as tubular protein overload, hypoxia, and nephrocalcinosis.
The use of darbepoetin to stimulate erythropoiesis in anemia of chronic kidney disease in cats: 25 cases.
BACKGROUND: Anemia is present in 30-65% in cats with chronic kidney disease (CKD) and few long-term treatment options exist. Darbepoetin is effective in treating anemia of kidney disease in humans and may be used in cats. HYPOTHESIS/OBJECTIVE: To evaluate the use of darbepoetin, a recombinant analog of human erythropoietin, to stimulate erythropoiesis, and to effectively treat anemia of kidney disease in cats. ANIMALS: Twenty-five of 66 cats that received >/>=2 doses of darbepoetin at the Animal Medical Center between January 2005 and December 2009 were included in this study. METHODS: Cats were included in the study if they received darbepoetin and follow-up data were available for at least 56 days and had CKD as a primary clinical diagnosis. Cats were excluded if they were treated with darbepoetin but did not have kidney disease. Response to treatment was defined as reaching or exceeding a target packed red blood cell volume or hematocrit of 25%. RESULTS: Fourteen of 25 cats responded. Thirteen of those 14 cats received a dosage of 1 mg/kg/wk or higher. Presumptive adverse effects included vomiting, hypertension, seizures, and fever. CONCLUSIONS AND CLINICAL RELEVANCE: Darbepoetin is effective for treatment of anemia of kidney disease in cats. Pure red cell aplasia appears to be less common with darbepoetin than with epoetin usage.

Increased incidence of thoracic wall deformities in related Bengal kittens.
Clinical records made during routine vaccinations were compared between populations of domestic shorthair cats and Bengal kittens. An increased incidence (12/244) of thoracic wall deformity was detected amongst the Bengal kittens. Deformities detected were: pectus excavatum (five), unilateral thoracic wall concavity (six) and scoliosis (one). Five-generation pedigrees were analysed for the affected kittens that showed a high degree of common ancestry indicating the likelihood of a familial cause.

The use of haemostatic gelatin sponges in veterinary surgery.
OBJECTIVES: To describe the use of absorbable gelatin sponges as haemostatic implants in clinical veterinary surgical cases and to document any related postoperative complications. METHODS: Practice databases were searched for the product names “Gelfoam” and “Spongostan”. Patient records were retrieved and data regarding patient signalment, surgical procedure, National Resource Council (NRC) wound classification, source of haemorrhage, pre- and postoperative body temperature, postoperative complications, time to discharge and details of any postoperative imaging were recorded and reviewed. Follow-up information was obtained by repeat clinical examination or telephone interview with either the owner or referring veterinary surgeon. Cases with incomplete surgical records or those which were not recovered from anaesthesia were excluded from the analysis. RESULTS: Fifty cases (44 dogs and 6 cats) satisfied the inclusion criteria. Satisfactory haemostasis was achieved in 49 cases with one case requiring reoperation during which a second gelatin sponge was used. There were no detected hypersensitivity responses or confirmed postoperative complications relating to the use of gelatin sponges during the follow-up period (median 13 months). CLINICAL SIGNIFICANCE: This is the first review of the use of gelatin sponges in clinical veterinary surgery and suggests that gelatin sponges are safe to use in cats and dogs.

Hematologic abnormalities in the small animal cancer patient.
Veterinarians will encounter hematologic abnormalities routinely while treating small animal cancer patients. Some of these abnormalities, such as monoclonal gammopathy, are relatively rare and highly associated with specific neoplasms. Thus, their detection should compel a search for underlying cancer. Other hematologic abnormalities, such as anemia or thrombocytopenia, are very common in cancer patients, and their identification should prompt clinicians to consider the different mechanisms by which they may have arisen and whether further diagnostic tests are needed to fully characterize their etiology. Although cancer-related hematologic abnormalities are frequently described in the veterinary literature, the incidence, prevalence, and clinical significance of these abnormalities are less well-defined. Anemia and coagulopathies are major causes of morbidity and mortality in human cancer patients, and may have a tremendous impact on disease progression and tumor response to antineoplastic therapy. It is plausible that the same is true for veterinary cancer patients, given the pathological and biological similarity between human and small animal tumors. Future studies should address the epidemiology and clinical significance of these, and perhaps other, hematologic abnormalities in order to determine whether therapeutic intervention to correct them may improve patient outcomes.

Evaluation and clinical application of platelet function testing in small animal practice.
Tests that evaluate many aspects of platelet function have been applied in both human and veterinary medicine for the monitoring of treatment with platelet function inhibitors and for detection of platelet function abnormalities (inherited or acquired). Interspecies variation in the response to various platelet agonists is an important consideration when methods that have been developed for people are applied in other species. At the present time, many of these assays are not readily available in standard veterinary practice. Advanced platelet function testing for veterinary patients is offered at select academic institutions. Discussion with a specialist is recommended when considering the use of these tests, and the relative strengths and limitations of each assay should be considered in the interpretation of test results.

**Magnetic resonance imaging of normal nasal cavity and paranasal sinuses in cats.**
A detailed description of the nasal cavity and paranasal sinuses in clinically normal cats using magnetic resonance imaging (MRI) is presented. The heads of seven normal cats were imaged using a 1.5-T MR unit and two sequences spin echo (SE) T1-weighted and fast spin echo (FSE) T2-weighted. Eighteen relevant MR scans were taken in the transverse (12 scans) and dorsal (six scans) planes. Anatomical structures were identified and labelled using anatomical texts, sectioned specimen heads and previous studies. MR scans revealed the soft-tissue structure of the head. Identified relevant anatomical structures seen on MRI will assist clinicians to better understand MR images and evaluate pathological conditions that affect the nasal region.

**Complex and open fractures: a straightforward approach to management in the cat.**
**CLINICAL CHALLENGES:** Cats often present with traumatic injuries of the limbs, including complex and open fractures, frequently as a result of road traffic accidents. On initial assessment, complex and open fractures may appear to require expertise beyond the experience of the general practitioner and, in some cases, referral to a specialist may be indicated or amputation should be considered. **PRACTICAL RELEVANCE:** Many cases, however, can be managed using straightforward principles. This review describes a logical and practical approach to treating such injuries. It discusses general principles of fracture management, highlights the treatment of open fractures, and describes the use of external skeletal fixation for stabilisation of both open and complex fractures. **EQUIPMENT:** Most fractures can be stabilised using equipment and expertise available in general practice if the basic principles of fracture fixation are understood and rigorously applied. **EVIDENCE BASE:** Many textbooks and journal articles have been published on the management of fractures in companion animals, presenting case studies, case series and original biomechanical research. The simple strategy for managing complex injuries that is provided in this review is based on the published literature and the author’s clinical experience.

**Lame cats: masters of disguise.**

**ULTRASONOGRAPHIC CHARACTERIZATION OF THE FELINE CARDIA AND PYLORUS IN 34 HEALTHY CATS AND THREE ABNORMAL CATS.**
A prospective study was performed in 34 fasted healthy cats to describe the normal ultrasonographic anatomy of the cardia and pylorus. Measurements were obtained for the caudal esophageal wall thickness (Ew), cardia wall thickness (Cw), pyloric wall thickness (Pw), thickness of the pyloric muscularis (Mp), length of the thicker part of the proximal duodenal submucosa (Dl). Among the 34 cats, 24 were examined using a linear transducer, and 10 with a microconvex transducer. Ew and Cw could be measured in 70% of the cats when a linear transducer was used, in 100% of the cats when a microconvex probe was used, Pw and Mp could be measured in 100% of the cats whatever probe was used. The submucosa of the most proximal part of the duodenum was thicker in half of the cats in longitudinal section. The muscularis layer of the pylorus was triangular in longitudinal section and thicker than the muscularis of the proximal duodenum. The mean for Ew, Cw, Pw, Mp, and Dl was 4.9 mm (SD = 1.1), 5 mm (SD = 0.6), 4.4 mm (SD = 0.6), 2.5 mm (SD = 0.5), and 4.7 mm (SD = 2.38), respectively. Three cats with abnormalities of the cardia and pylorus are also described to illustrate clinical implications.

**Cryptosporidium species screening using Kinyoun technique in domestic cats with diarrhea.**
Cryptosporidium is a coccidian that can lead to diarrhea, especially in immunosuppressed individuals. Retroviruses are considered a primary cause of immunosuppression in cats. Fecal specimens and blood collected from the 60 cats were evaluated for the presence of acid-fast cryptosporidia in three consecutive stool samples and for feline leukemia virus (FeLV) antigen and feline immunodeficiency virus (FIV) antibody by ELISA testing. Five animals (8.33%) shedding oocysts were found, one was both FIV- and FeLV-negative and four were FeLV-positive.


Slowly progressive lymphohistiocytic meningoencephalomyelitis in 21 adult cats presenting with peculiar neurological signs.
Twenty-one cats presented with a history of slowly progressive neurological signs characterised by a stiff extended tail, behavioural changes, and spastic and ataxic gait. All cats had outdoor access and lived in the same geographical rural area in north-east Scotland. Histological findings were consistent with lymphohistiocytic meningoencephalomyelitis. Immunohistochemistry ruled out 15 pathogens and showed a significant expression of the interferon-inducible Mx protein, suggesting an as yet unidentified infective or environmental immunogenic trigger as the possible causative agent. The latency of onset (mean 9 years), the very slow progression of clinical signs (mean 11 months) and the peculiar clinical presentation (particularly the posture of the tail) have not been reported previously in cats with lymphohistiocytic meningoencephalomyelitis.

Canine parvovirus—a review of epidemiological and diagnostic aspects, with emphasis on type 2c.
Canine parvovirus type 2 (CPV-2) emerged in late 1970s causing severe epizootics in kennels and dog shelters worldwide. Soon after its emergence, CPV-2 underwent genetic evolution giving rise consecutively to two antigenic variants, CPV-2a and CPV-2b that replaced progressively the original type. In 2000, a new antigenic variant, CPV-2c, was detected in Italy and rapidly spread to several countries. In comparison to the original type CPV-2, the antigenic variants display increased pathogenicity in dogs and extended host range, being able to infect and cause disease in cats. Epidemiological survey indicate that the newest type CPV-2c is becoming prevalent in different geographic regions and is often associated to severe disease in adult dogs and also in dogs that have completed the vaccination protocols. However, the primary cause of failure of CPV vaccination is interference by maternally derived immunity. Diagnosis of CPV infection by traditional methods has been shown to be poorly sensitive, especially in the late stages of infections. New diagnostic approaches based on molecular methods have been developed for sensitive detection of CPV in clinical samples and rapid characterisation of the viral type. Continuous surveillance will help assess whether there is a real need to update currently available vaccines and diagnostic tests.

Therapeutic benefit of melatonin in experimental feline uveitis.
Uveitis is a frequent ophthalmic disorder which constitutes one of the main causes of blindness in domestic cats. The aim of this report was to analyze the effect of melatonin on experimentally induced uveitis in cats. Bacterial lipopolysaccharide (LPS) was injected intravitreally into one eye from intact cats, while the contralateral eye was injected with vehicle. Melatonin was orally administered every 24 hr to a group of ten cats, from 24 hr before until 45 days after intravitreal injections. Eyes were evaluated by means of clinical evaluation, intraocular pressure (IOP), blood-ocular barrier integrity (via measurement of protein concentration and cell content in samples of aqueous humor [AH]), electroretinogram (ERG), and histological examination of the retinas. In LPS-treated eyes, several clinical signs were observed until day 45 postinjection. The treatment with melatonin significantly decreased clinical signs and prevented the reduction in IOP induced by LPS. In LPS-injected eyes, melatonin significantly preserved the blood-ocular barrier integrity, as shown by a decrease in the number of infiltrating cells and protein concentration in the AH. Mean amplitudes of scotopic ERG a- and b-waves were significantly reduced in eyes injected with LPS, whereas melatonin significantly prevented the effect of LPS. At 45 days after injection, LPS induced alterations in photoreceptors and at the middle portion of the retina, whereas melatonin preserved the retinal structure. These results indicate that melatonin prevented clinical, biochemical, functional, and histological alterations induced by LPS injection. Thus, melatonin might constitute a useful tool for the treatment of feline uveitis.

Strategies of exploitation of mammalian reservoirs by Bartonella species.
ABSTRACT: Numerous mammal species, including domestic and wild animals such as ruminants, dogs, cats and rodents, as well as humans, serve as reservoir hosts for various Bartonella species. Some of those species that exploit non-human mammals as reservoir hosts have zoonotic potential. Our understanding of interactions between bartonellae and reservoir hosts has been greatly improved by the development of animal models for infection and the use of molecular tools allowing large scale mutagenesis of Bartonella species. By reviewing and combining the results of these and other approaches we can obtain a comprehensive insight into the molecular interactions that underlie the exploitation of reservoir hosts by Bartonella species, particularly the well-studied interactions with vascular endothelial cells and erythrocytes.


Histology and morphometry of the testes of adult domestic cats (Felis catus).
Testicles of 30 mongrel cats were analyzed histologically and morphometrically, divided into three groups: G1 (1-2 years old), G2 (over 2 and up to 4 years old) and G3 (over 4 and up to 6 years old). After orchietomy and histopathology, the morphometric parameters studied were: thickness of the tunica albuginea (72 mum) and seminiferous epithelium (77.19 mum), perimeter (53.81; 90.57 mum), (54.80; 101.07 mum); area (174.23; 494.55 mum(2)), (176.68; 629.70 mum(2)); maximum diameter (14.94; 28.02 mum), (14.76; 31.66 mum); minimum diameter (13.25; 21.92 mum), (13.30; 24.52 mum); and shape factor (index for regularity of the format) (1.36; 1.36), (1.39; 1.35) of the nucleus and cytoplasm of spermatogonia and Leydig cells, respectively. The results can be used for comparative studies and contribute knowledge concerning the height of the seminiferous epithelium, thickness of the tunica albuginea and size of spermatogonia and Leydig cells.


Recent advances in the risk assessment of melamine and cyanuric acid in animal feed.
Melamine can be present at low levels in food and feed mostly from its legal use as a food contact material in laminates and plastics, as a trace contaminant in nitrogen supplements used in animal feeds, and as a metabolite of the pesticide cyromazine. The mechanism of toxicity of melamine involves dose-dependent formation of crystals with either endogenous uric acid or a structural analogue of melamine, cyanuric acid, in renal tubules resulting in potential acute kidney failure. Co-exposure to melamine and cyanuric acid in livestock, fish, pets and laboratory animals shows higher toxicity compared with melamine or cyanuric acid alone. Evidence for crystal formation between melamine and other structural analogs i.e. ammelide and ammeline is limited. Illegal pet food adulterations with melamine and cyanuric acid and adulteration of milk with melamine resulted in melamine-cyanuric acid crystals, kidney damage and deaths of cats and dogs and melamine-uric acid stones, hospitalisation and deaths of children in China respectively. Following these incidents, the tolerable daily intake for melamine was re-evaluated by the U.S. Food and Drug Administration, the World Health Organisation, and the Scientific Panel on Contaminants in the Food Chain of the European Food Safety Authority (EFSA). This review provides an overview of toxicology, the adulteration incidents and risk assessments for melamine and its structural analogues. Particular focus is given to the recent EFSA risk assessment addressing impacts on animal and human health of background levels of melamine and structural analogues in animal feed. Recent research and future directions are discussed.


Pharmacokinetics of dexmedetomidine administered intravenously in isoflurane-anesthetized cats.
OBJECTIVE: To determine the pharmacokinetics of dexmedetomidine administered as a short-duration IV infusion in isoflurane-anesthetized cats. ANIMALS: 6 healthy adult domestic female cats. PROCEDURES: Dexmedetomidine hydrochloride was injected IV (10 mug/kg over 5 minutes [rate, 2 mug/kg/min]) in isoflurane-anesthetized cats. Blood samples were obtained immediately prior to and at 1, 2, 5, 6, 7, 10, 15, 30, 60, 90, 120, 240, and 480 minutes following the start of the IV infusion. Collected blood samples were transferred to tubes containing EDTA, immediately placed on ice, and then centrifuged at 3,901 x g for 10 minutes at 4 degrees C. The plasma was harvested and stored at -20 degrees C until analyzed. Plasma dexmedetomidine concentrations were determined by means of liquid chromatography-mass spectrometry. Dexmedetomidine plasma concentration-time data were fitted to compartmental models. RESULTS: A 2-compartment model with input in and elimination from the central compartment best described the disposition of dexmedetomidine administered via short-duration IV infusion in isoflurane-anesthetized cats. Weighted mean +/- SEM apparent volume of distribution of the central compartment and apparent volume of distribution at steady-state were 402 +/- 47 mL/kg and 1,701 +/- 200 mL/kg, respectively; clearance and terminal half-life (harmonic mean +/- jackknife pseudo-SD) were 6.3 +/- 2.8 mL/min/kg and 198 +/- 75 minutes, respectively. The area under the plasma concentration curve and maximal plasma concentration were 1,061 +/- 292 min*ng/mL and 17.6 +/- 1.8 ng/mL, respectively. CONCLUSIONS AND CLINICAL
RELEVANCE: Disposition of dexmedetomidine administered via short-duration IV infusion in isoflurane-anesthetized cats was characterized by a moderate clearance and a long terminal half-life.


**Establishment of diagnostic criteria for feline nonflea-induced hypersensitivity dermatitis.**

Hypersensitivity dermatitides (HD) are commonly seen in cats, and they are usually caused by environmental, food and/or flea allergens. Affected cats normally present with one of the following clinical reaction patterns: head and neck excoriations, usually symmetrical self-induced alopecia, eosinophilic skin lesions or mililiary dermatitis. Importantly, none of these clinical presentations is considered to be pathognomonic for HD skin diseases, and the diagnosis of HD is usually based on the exclusion of other pruritic diseases and on a positive response to therapy. The objectives of this study were to propose sets of criteria for the diagnosis of nonflea-induced HD (NFHD). We recruited 501 cats with pruritus and skin lesions and compared clinical parameters between cats with NFHD (encompassing those with nonflea, nonfood HD and those with food HD), flea HD and other pruritic conditions. Using simulated annealing techniques, we established two sets of proposed criteria for the following two different clinical situations: (i) the diagnosis of NFHD in a population of pruritic cats; and (ii) the diagnosis of NFHD after exclusion of cats with flea HD. These criteria sets were associated with good sensitivity and specificity and may be useful for homogeneity of enrolment in clinical trials and to evaluate the probability of diagnosis of NFHD in clinical practice. Finally, these criteria were not useful to differentiate cats with NFHD from those with food HD.


**Association of urinary cadmium excretion with feline hypertension.**

Fifty client-owned senior cats (32 normotensive and 18 hypertensive) with renal function ranging from normal to moderately reduced were recruited into a prospective cross-sectional study exploring the association of urinary cadmium excretion and hypertension in cats. Heparinised plasma samples were collected and analysed for routine biochemical parameters. Urine samples were collected via cystocentesis and were analysed for cadmium concentrations using inductively coupled plasma mass spectrometry (ICP-MS). Blood pressure was measured using the Doppler method. Urinary cadmium concentrations were indexed to urinary creatinine concentration. Comparison of urinary cadmium excretion was made between hypertensive and normotensive cats. The median (range) urinary cadmium concentration standardised to urinary creatinine concentration (UCdCr) in the normotensive and hypertensive cats was 0.08 (0.02 to 0.37) and 0.12 (0.02 to 1.38) nmol/mmol creatinine. The UCdCr was significantly higher in hypertensive compared with normotensive cats (P=0.016). UCdCr and plasma creatinine concentration remained independent predictors of hypertensive status in a logistic regression model. UCdCr and plasma creatinine concentration were not correlated (r=−0.01, P=0.956). These data suggest cadmium exposure and accumulation in cats may play a role in the development of feline hypertension.


**The contribution of cat owners’ attitudes and behaviours to the free-roaming cat overpopulation in Tel Aviv, Israel.**

The attitudes and behaviours of cat owners in regard to treatment of cats may have a cumulative effect on the food availability, reproduction, density and welfare of the free-roaming cat population and thus also on the extent of cat overpopulation. Understanding this is thus a vital step in the a priori planning of cat management programs on any scale, as well as in developing public education programs on this issue. Although recent years have seen an accumulation of knowledge in regard to cat owners’ attitudes and behaviours, the findings vary among countries and locations and in Israel this has never been investigated systematically. Using a questionnaire provided to cat owners in veterinary clinics, this study aimed at identifying those attitudes and behaviours that may be contributing to cat overpopulation in Tel Aviv, Israel, and at exploring the socio-economic factors that influence this problem. The findings show that the influential factors can be predicted from the cat owners’ socio-economic status, mainly education and income, as well as gender and age. A consistency in those cat owner behaviours that contribute to cat overpopulation was also uncovered, revealing a sub-population of individuals who persist in the undesirable behaviours. Finally, a strong relationship between attitude and consequent behaviour was demonstrated, indicating the importance of education and targeted publicity as a means to influence attitudes and thereby change behaviours in this respect. We propose several measures by which to reduce the current extent of cat owners’ contribution to the cat overpopulation: discouraging unwanted owner behaviours such as abandonment of their cats and allowing them to breed; promoting awareness of the neutering option among cat caretakers; and increasing pre-adoption neutering rates in shelters. Regional and national laws promoting responsible pet ownership need to be enacted. By improving the current level of knowledge and awareness among cat owners regarding cat overpopulation issues, and encouraging a more responsible attitude, cat owners’ bond with their cats could be strengthened,
as well as their bond with and contribution to their environment.


**Closed reduction and percutaneous fixation of sacroiliac luxations in cats using 2.4 mm cannulated screws - a cadaveric study.**

OBJECTIVES: To describe fluoroscopically assisted percutaneous placement of 2.4 mm cannulated screws for fixation of artificially induced sacroiliac luxations in cats, and to evaluate the success of this technique in restoration of normal pelvic anatomy. METHODS: Fluoroscopically assisted closed reduction and percutaneous fixation of sacroiliac luxations using 2.4 mm cannulated screws was performed in cadavers of 12 cats. Pre- and postoperative radiographs and postoperative computed tomographic scans were used to evaluate screw placement, screw purchase within the sacral body, reduction of the sacroiliac joint, pelvic canal diameter ratio, and hemipelvic canal width ratio. RESULTS: Mean total surgical time was 6 minutes and 10 seconds +/- 53 seconds and mean total time of fluoroscopic screening for each procedure was 44 seconds +/- 6 seconds. Mean percent of reduction was 98.33% and mean screw purchase within the sacral body was 73%. Eleven out of 12 screws were placed in a satisfactory location in the sacral body. Pelvic canal diameter ratio and hemipelvic canal width ratio indicated successful restoration of the pelvic anatomy. CLINICAL SIGNIFICANCE: Our results confirm that fluoroscopically assisted percutaneous placement of 2.4 mm cannulated screws is a feasible technique for fixation of sacroiliac luxations in cats. Mechanical properties of this fixation technique need to be evaluated before the use in clinical patients.


**Erythroleukemia in a retrovirus-negative cat.**

CASE DESCRIPTION: A 5-year-old spayed female cat was evaluated because of lethargy of 3 days’ duration, acute respiratory distress, and anemia. CLINICAL FINDINGS: Physical examination revealed the cat was in good body condition but had pale mucous membranes and elevated heart and respiratory rates. Results of hematologic analysis indicated the cat had severe anemia (Hct, 0.07 L/L; reference range, 0.28 to 0.49 L/L) and marked rubricytosis (19.0 x 10^9 cells/L; reference value, 0 cells/L). Results of serologic and PCR assays for detection of FeLV and FIV and PCR assays for detection of Mycoplasma spp were negative. Cytologic evaluation of a bone marrow aspirate and histologic evaluation of a biopsy specimen revealed a predominance of rubriblasts and rubricytes with granulocytopenia. Cytologic evaluation of fine-needle aspirates of the spleen and liver also revealed numerous rubriblasts. TREATMENT AND OUTCOME: The cat received transfusions of packed RBCs, and supportive treatment was administered. Analysis of test results yielded a diagnosis of acute myeloid leukemia (erythroid subtype). Because of continued hemolysis and anemia in combination with the diagnosis of erythroleukemia (which has a poor prognosis), the cat was euthanized. CLINICAL RELEVANCE: To the authors’ knowledge, erythroleukemia has only been reported in cats infected with FeLV. However, results of all diagnostic assays for FeLV were negative in the cat reported here, which suggested that erythroleukemia can develop in cats in the absence of FeLV infection.


**Fiber fermentability effects on energy and macronutrient digestibility, fecal parameters, postprandial metabolite responses, and colon histology of overweight cats.**

Considering the different potential benefits of divergent fiber ingredients, the effect of 3 fiber sources on the energy and macronutrient digestibility, fermentation product formation, postprandial metabolite responses, and colon histology of overweight cats fed kibble diets was compared. Twenty-four healthy adult cats were assigned in a complete randomized block design to 2 groups of 12 animals, and 3 animals from each group were fed 1 of 4 of the following kibble diets: control (CO; 11.5% dietary fiber), beet pulp (BP; 26% dietary fiber), wheat bran (WB; 24% dietary fiber), and sugarcane fiber (SF; 28% dietary fiber). Digestibility was measured by the total collection of feces. After 16 d of diet adaptation and an overnight fasting, blood glucose, cholesterol, and triglyceride postprandial responses were evaluated for 16 h after continued exposure to food. On d 20, colon biopsies of the cats were collected under general anesthesia. Fiber addition reduced food energy and nutrient digestibility. Out of all of the fiber sources, SF had the lowest dietary fiber digestibility (P < 0.05), causing the largest reduction of dietary energy digestibility (P < 0.05). The higher fermentability of BP resulted in reduced fecal DM and pH, greater fecal production [g/(cat*d); as-is], and greater fecal concentration of acetate, propionate, and lactate (P < 0.05). For most fecal variable, WB was intermediate between BP and SF, and SF was similar to the control diet except for an increased fecal DM and a firmer feces production for the SF diet (P < 0.05). Postprandial evaluations indicated reduced glucose mean concentration and area under the glucose curve in cats fed the SF diet (P < 0.05). Colon mucosa thickness, crypt area, lamina propria area, goblet cell area, crypt mean size, and crypt in bifurcation did not vary.
such veterinary hospitals, and nosocomial infections are a concern. The objectives of this study were to determine whether

In the USA, small animal veterinary hospitals (SAVHs) commonly keep resident cats living permanently as pets within their facilities. Previously, multi-drug resistant (MDR) enterococci were found as a contaminant of multiple surfaces within such veterinary hospitals, and nosocomial infections are a concern. The objectives of this study were to determine whether


Cachexia and sarcopenia: emerging syndromes of importance in dogs and cats.

Cachexia is the loss of lean body mass (LBM) that affects a large proportion of dogs and cats with congestive heart failure (CHF), chronic kidney disease (CKD), cancer, and a variety of other chronic diseases. Sarcopenia, the loss of LBM that occurs with aging, is a related syndrome, although sarcopenia occurs in the absence of disease. As many of the diseases associated with muscle loss are more common in aging, cachexia and sarcopenia often are concurrent problems. Both cachexia and sarcopenia have important clinical implications because they are associated with increased morbidity and mortality. The pathophysiology of these 2 syndromes is complex and multifactorial, but recent studies have provided new information that has helped to clarify mechanisms and identify potential new targets for treatment. Newly identified mechanisms and pathways that mediate cachexia appear to act by increasing energy requirements, decreasing energy intake, impairing nutrient absorption, and causing metabolic alterations. Whereas cachexia and sarcopenia are important areas of research for drug development in people, they are only beginning to be recognized in veterinary medicine. Greater awareness and earlier diagnosis will help provide practical approaches to managing body weight and lean tissue in dogs and cats, as well as more directed targets for treatment.


Integrative taxonomy at work: DNA barcoding of taeniids harboured by wild and domestic cats.

In modern taxonomy, DNA barcoding is particularly useful where biometric parameters are difficult to determine or useless owing to the poor quality of samples. These situations are frequent in parasitology. Here, we present an integrated study, based on both DNA barcoding and morphological analysis, on cestodes belonging to the genus Taenia, for which biodiversity is still largely underestimated. In particular, we characterized cestodes from Italian wildcats (Felis silvestris silvestris), free-ranging domestic cats (Felis silvestris catus) and hybrids populations. Adult taeniids were collected by post-mortem examinations of the hosts and morphologically identified as Taenia taeniaeformis. We produced cox1 barcode sequences for all the analysed specimens, and we compared them with reference sequences of individuals belonging to the genus Taenia retrieved from GenBank. In order to evaluate the performance of a DNA barcoding approach to discriminate these parasites, the strength of correlation between species identification based on classical morphology and the molecular divergence of cox1 sequences was measured. Our study provides clear evidence that DNA barcoding is highly efficient to reveal the presence of cryptic lineages within already-described taeniid species. Indeed, we detected three well-defined molecular lineages within the whole panel of specimens morphologically identified as T. taeniaeformis. Two of these molecular groups were already identified by other authors and should be ranked at species level. The third molecular group encompasses only samples collected in Italy during this study, and it represents a third candidate species, still morphologically undescribed.


Neurological lameness in the cat: common causes and clinical approach.

PRACTICAL RELEVANCE: Neurological causes of lameness are infrequently seen in cats but they are an important consideration when an obvious orthopaedic cause cannot be identified. Monoparetic cats are also frequently presented for veterinary investigation with the main complaint being lameness. CLINICAL CHALLENGES: Neurological causes of lameness may be difficult to determine without access to advanced imaging modalities, electrodiagnostics or cerebrospinal fluid analysis. AUDIENCE: This review, aimed at all veterinarians who treat cats, sets out to describe the specific approach to cats with lameness that cannot be attributed to an orthopaedic cause. It describes the diagnosis and management of the most common neurological conditions responsible for lameness or monoparesis in cats.


Resident Cats in Small Animal Veterinary Hospitals Carry Multi-Drug Resistant Enterococci and are Likely Involved in Cross-Contamination of the Hospital Environment.

In the USA, small animal veterinary hospitals (SAVHs) commonly keep resident cats living permanently as pets within their facilities. Previously, multi-drug resistant (MDR) enterococci were found as a contaminant of multiple surfaces within such veterinary hospitals, and nosocomial infections are a concern. The objectives of this study were to determine whether
resident cats carry MDR enterococci and to compare the feline isolates genotypically to those obtained from SAVH surfaces in a previous study. Enterococcal strains (n = 180) were isolated from the feces of six healthy resident cats from different SAVHs. The concentration of enterococci ranged from 1.1 x 10(5) to 6.0 x 10(8) CFU (g(-1)) of feces, and the population comprised Enterococcus hirae (38.3 +/- 18.6%), E. faecium (35.0 +/- 14.3%), E. faecalis (23.9 +/- 11.0%), and E. avium (2.8 +/- 2.2%). Testing of phenotypic resistance to 14 antimicrobial agents revealed multi-drug resistance (>/=3 antimicrobials) in 48.9% of all enterococcal isolates with most frequent resistance to tetracycline (75.0%), erythromycin (50.0%), and rifampcin (36.1%). Vancomycin resistant E. faecalis (3.9%) with vanB not horizontally transferable in vitro conjugation assays were detected from one cat. Genotyping with pulsed-field gel electrophoresis demonstrated a host-specific clonal population of MDR E. faecalis and E. faecium. Importantly, several feline isolates were genotypically identical or closely related to isolates from surfaces of cage door, thermometer, and stethoscope of the corresponding SAVHs. These data demonstrate that healthy resident cats at SAVHs carry MDR enterococci and likely contribute to contamination of the SAVH environment. Proper disposal and handling of fecal material and restricted movement of resident cats within the ward are recommended.


Use of porcine small intestinal submucosa for corneal reconstruction in dogs and cats: 106 cases.
OBJECTIVES: To describe the efficacy of porcine small intestinal submucosa in corneal reconstructive surgery in dogs and cats through a large retrospective study. METHODS: A retrospective evaluation of 106 cases of surgical reconstruction of the cornea with small intestinal submucosa seen between May 2005 and January 2010 was carried out. The corneal defect was filled by microsurgical grafting of porcine small intestinal submucosa. The biomaterial implant was deposited in one or several layers depending on the depth of the defect. The animals were examined 3, 6 and 12 weeks after surgery.
RESULTS: Vision was preserved in all eyes at three months post-surgery. In 74 cases (69.8%) the corneal scar was either transparent or discrete, whilst in 32 cases (30.2%) a mild or marked scar was observed. Minor complications occurred in 9 cases (8.5%) with partial integration of the small intestinal submucosa and in 24 cases (22.6%) with faint or mild corneal pigmentation, without impairing vision. In cases followed over a period longer than three months, major complications occurred in five dogs resulting in vision impairment because of pronounced pigmentation. CLINICAL SIGNIFICANCE: Corneal grafting of porcine small intestinal submucosa is an effective method for corneal reconstruction resulting in corneal transparency in most cases. It is an excellent alternative to conventional conjunctival grafts.


Discovery of drugs that possess activity against feline leukemia virus.
Feline leukemia virus (FeLV) is a gammaretrovirus that is a significant cause of neoplastic-related disorders affecting cats worldwide. Treatment options for FeLV are limited, associated with serious side effects, and can be cost-prohibitive. The development of drugs used to treat a related retrovirus, human immunodeficiency virus type 1 (HIV-1), has been rapid, leading to the approval of five drug classes. Although structural differences affect the susceptibility of gammaretroviruses to anti-HIV drugs, the similarities in mechanism of replication suggest that some anti-HIV-1 drugs may also inhibit FeLV. This study demonstrates the anti-FeLV activity of four drugs approved by the US FDA (Food and Drug Administration) at non-toxic concentrations. Of these, tenofovir and raltegravir are anti-HIV-1 drugs, while decitabine and gemcitabine are approved to treat myelodysplastic syndromes and pancreatic cancer, respectively, but also have anti-HIV-1 activity in cell culture. Our results indicate that these drugs may be useful for FeLV treatment and should be investigated for mechanism of action and suitability for veterinary use.


Hips, elbows and stifles: common joint diseases in the cat.
PRACTICAL RELEVANCE: Cats commonly present with joint disease and trauma. A methodical approach to diagnostics and treatment can aid the clinician in the management of these cases. CLINICAL CHALLENGES: Cats with joint disease may present with a vague history owing to their independent nature, and gait assessment is often challenging when compared with the dog. Knowledge of feline-specific anatomy is important to avoid over- or misinterpretation of physical examination or imaging findings. AUDIENCE: This review of feline joint disease focuses on the more common, non-traumatic conditions of the hip, stifle and elbow. It aims to provide first opinion clinicians with a guide to decision making that will assist them in achieving a diagnosis and formulating a management strategy. EVIDENCE BASE: There is an extensive body of original articles and textbooks in the published literature relating to aspects of feline joint disease. This article combines information from key companion animal and feline-specific references together with the author’s clinical experience to provide a practical overview of joint disease, and highlight important differences between cats and dogs in terms of presentation and treatment.
**Amino acids in cat fallopian tube and follicular fluids.**

Aminograms of tubal and follicular fluids were obtained using fluids collected by aspiratory puncture from six cats. The amino acids were separated and quantified by high-performance liquid chromatography analysis. The serum of the cats was used as control. The three most prevalent amino acids quantified in cat tubal fluid were glycine, glutamic acid, and taurine. Their mean concentrations were 840 μmol/l (μmol), 808 μmol and 596 μmol, respectively. The three most prevalent amino acids quantified in cat follicular fluid were alanine, glutamine, and taurine. Their mean concentrations were 359 μmol, 351 μmol, and 258 μmol, respectively. This result is consistent with aminograms of tubal fluid previously determined in other mammals. As previously observed in other species and humans, glycine was quantitatively the most abundant and most prevalent free amino acid in cat tubal fluid. The total quantity of amino acids in tubal fluid was similar in cats and other species. However, in contrast with other species studied, hypotaurine was not detected in tubal and follicular fluids of female cats.

**High polybrominated diphenyl ether levels in California house cats: house dust a primary source?**

Polybrominated diphenyl ethers (PBDEs) are brominated flame retardants that act as endocrine disruptors, affecting thyroid hormone homeostasis. As a follow-up to a recent study showing high PBDE levels in household cats and linking PBDE levels with cat hyperthyroidism, we measured PBDEs, polychlorinated biphenyls (PCBs), and organochlorinated pesticides (OCPs) in serum samples from 26 California household cats (16 hyperthyroid, 10 controls) using liquid-liquid extraction and high-resolution gas chromatography/high-resolution mass spectrometry. In the present pilot study, we found that PBDE levels in California house cats were extremely high (SigmaPBDEs median = 2,904 ng/g lipid; range, 631-22,537 ng/g lipid). This is approximately 50 times higher than levels in California residents (SigmaPBDEs geomean = 62 +/- 8.9 ng/g lipid, National Health and Nutrition Examination Survey), who have among the highest human levels in the world. Polybrominated diphenyl ethers congeners patterns (BDE-99 major congener, BDE-209 significant) differed markedly from patterns found in California residents (BDE-47 major) or wildlife but resembled patterns found in house dust. Polychlorinated biphenyls and OCPs in cats were highly correlated, consistent with a shared dietary source or pathway of exposure, but did not correlate with PBDEs. This suggests a different source or pathway of exposure for PBDEs, which was most likely house dust. The authors found no evidence that linked levels of PBDEs, PCBs, or OCPs with hyperthyroidism. This may be because of the small sample size, competing or confounding risk factors, or complicated causal mechanisms.

**A USA300 variant and other human-related methicillin-resistant Staphylococcus aureus strains infecting cats and dogs in France.**

OBJECTIVES: To characterize methicillin-resistant Staphylococcus aureus (MRSA) clinical strains from cats and dogs in France, and to compare the clones identified with the distribution of French human MRSA. METHODS: Susceptibilities to antimicrobials were assessed by disc diffusion. Resistance and virulence genes were screened using a microarray-based assay. Isolates were additionally characterized by Smal macrorestriction analysis and spa typing. RESULTS: From 2006 to 2010, the proportion of MRSA infections in pets in France was low (1.8%), but most isolates (87.0%, 20/23) belonged to human clones. The most common clones were the Lyon clone (69.6%, 16/23), the livestock-associated CC398 (3.0%, 3/23) and the Geraldine clone (8.7%, 2/23). Interestingly, we report the first USA300 clone infecting a European dog, which was probably imported by a US patient. CONCLUSIONS: Over a 5 year period, the proportion of MRSA infections in pets in France was low (1.8%), but most isolates (87.0%, 20/23) belonged to human clones. The most common clones were the Lyon clone (69.6%, 16/23), the livestock-associated CC398 (13.0%, 3/23) and the Geraldine clone (8.7%, 2/23). Interestingly, we report the first USA300 clone infecting a European dog, which was probably imported by a US patient. CONCLUSIONS: Over a 5 year period, the proportion of MRSA infections in pets appears low (<2%) in France, but the distribution of the clones mostly mirrors the epidemiology of human invasive clones. These data highlight the role of pets as both victims and reservoirs of endemic, epidemic and/or invasive MRSA.

**Effect of pimobendan on the clinical outcome and survival of cats with non-taurine responsive dilated cardiomyopathy.**

This retrospective study was designed to assess the effect of pimobendan on the median survival time (MST) of cats with non-taurine responsive dilated cardiomyopathy (DCM). Thirty-two client-owned cats with a left ventricular internal dimension at end systole (LVIDs) >14 mm, a fractional shortening (FS) <28% and a lack of response to taurine therapy were included over a 9-year period (2001-2010). These cats were divided into pimobendan (n=16) and non-pimobendan (n=16) treatment groups. All cats received standard treatment with frusemide, taurine and benazepril or enalapril. Nine cats
Calcium channel blocker toxicity in dogs and cats.

In the non-pimobendan group also received digoxin. The MST of the pimobendan group (49 days; range 1 to >502 days) was four times that of the non-pimobendan group (12 days; 1 to 244 days). The difference in survival between the two groups was statistically significant (P = 0.048). Hypothermia and FS <20% were associated with a poor prognosis. No adverse effects to pimobendan were noted.


Renal transitional-cell carcinoma in two cats with chronic kidney disease.
Two 12-year-old cats were diagnosed with chronic kidney disease (CKD) based on physical examination, clinicopathologic data and, in one case, abdominal ultrasound findings. Approximately 1 year after the initial diagnosis of CKD both cats developed renal transitional cell carcinoma (TCC) - bilateral in one cat. Based on post-mortem examination, one cat had no evidence of metastasis and the other had metastasis to the large intestine, heart and lungs. This is the first report of de novo bilateral renal TCC in a cat, as well as the first report of renal TCC developing in cats with previous history of confirmed CKD.

Characterization of Pseudomonas aeruginosa isolates from dogs and cats in Japan: current status of antimicrobial resistance and prevailing resistance mechanisms.
Seventy-three Pseudomonas aeruginosa isolates were collected from dogs and cats in Japan to investigate antimicrobial susceptibility and resistance mechanisms to anti-pseudomonal agents. Resistance rates against orbifloxacin, enrofloxacin, ciprofloxacin, cefotaxime, aztreonam and gentamicin were 34.2, 31.5, 20.5, 17.8, 12.3 and 4.1%, respectively. The degree of resistance to cefotaxime, orbifloxacin, and enrofloxacin was greatly affected by efflux pump inhibitors, indicating overexpression of efflux pump contributes to these resistances. Notably, orbifloxacin and enrofloxacin resistance was observed even in isolates without mutations in the target sites. This is the first report on cephalosporin- and fluoroquinolone-resistant isolates of P. aeruginosa from Japanese companion animals.

Open-label trial of a multi-strain synbiotic in cats with chronic diarrhea.
This study was designed to test the hypothesis that in cats with chronic diarrhea the daily administration of a proprietary synbiotic (Proviabile-DC) would result in an improvement in stool character, as assessed by the owner. Adult cats with chronic diarrhea were recruited for the study and screened for systemic diseases. Fecal flotation, wet mount, immunofluorescence assay (IFA) for Giardia and Cryptosporidium species, and Trichomonas species polymerase chain reactions (PCRs) were used to screen for intestinal parasitism. The synbiotic was administered for 21 days; otherwise, no changes were made to ongoing treatment(s) or diet. The severity of the diarrhea was assessed using a standardized fecal scoring system and the owner’s subjective perception before, and after, supplementation. The mean fecal score for the 53 cats completing the study decreased from 6.0 to 4.4, representing a significantly (P <0.001) firmer stool character. Seventy-two percent of owners perceived an improvement in their cat’s diarrhea following a 21-day course of synbiotic supplementation.

Clinical efficacy of the acyclic nucleoside phosphonate 9-(2-phosphonylmethoxypropyl)-2,6-diaminopurine (PMPDAP) in the treatment of feline immunodeficiency virus-infected cats.
In in vitro studies, the acyclic nucleoside phosphonate 9-(2-phosphonylmethoxypropyl)-2,6-diaminopurine (PMPDAP) inhibited the replication of feline immunodeficiency virus (FIV). No information about its clinical efficacy is available so far. The aim of this prospective placebo-controlled, double-blinded study was to evaluate the antiviral efficacy of PMPDAP in cats naturally infected with FIV. Twenty cats were randomly assigned to two treatment groups receiving either PMPDAP (25 mg/kg) or placebo twice per week subcutaneously for 6 weeks. The general health status (Karnofsky’s score), clinical signs, laboratory, immunological, and surrogate parameters were evaluated. No significant differences were found between PMPDAP- and placebo-treated cats, although cats treated with PMPDAP showed a tendency for improvement in their Karnofsky’s score and clinical signs. Haematological side effects were noted in the PMPDAP-treated cats. Thus, PMPDAP may be an option in treating cats if it becomes available for veterinarians, but side effects have been monitored.

Calcium channel blocker toxicity in dogs and cats.

Environmental enrichment for indoor cats: implementing enrichment.
In a previous article, we described our approach to implementation of effective environmental enrichment, which begins...

Neutrophil function in small animals.

Neutrophils are highly mobile phagocytes that serve as the initial effectors against pathogens and are actively recruited to sites of inflammation. Chemotactic factors guide them toward the inflammation, and their interaction with endothelial cells directs them through postcapillary venules and into the tissues. Once they have reached their destination, they can efficiently kill many microbes via phagocytosis, extracellular release of granule contents, and the formation of NETs. They also actively produce cytokines and other mediators to promote or suppress inflammation, repair tissues, and modulate the immune response. The importance of neutrophil function in host health is emphasized through discussion of inherited disorders of neutrophil function such as leukocyte adhesion deficiency and cyclic hematopoiesis.


Cross-sectional survey of antimicrobial prescribing patterns in UK small animal veterinary practice.

The increase in the prevalence of antimicrobial resistance has resulted in both human and veterinary antimicrobial use coming under increased scrutiny. The aim of this study was to characterise antimicrobial prescribing patterns in small-animal veterinary practices in the UK. A cross-sectional survey of UK small animal veterinarians was undertaken. A postal questionnaire to evaluate antimicrobial prescribing habits was sent to 900 clinicians. Data were collected on the clinicians, their practices and their sources of information regarding antimicrobials and their use. Respondents were asked if they would prescribe antimicrobials to animals described in four clinical scenarios, and, if so, to provide details of the prescription(s). Questionnaires were completed by 51% of the veterinarians. Only 3.5% of clinicians reported that their practice had an antimicrobial use policy. Penicillins were most commonly prescribed in three clinical scenarios, and 1st generation cephalosporins were most commonly prescribed in a scenario about canine pyoderma. In one scenario, fluoroquinolones and 3rd generation cephalosporins accounted for 10% and 13% of prescriptions respectively. Five percent of all prescriptions were under the recommended dose and 20% were over the recommended dose. Overall, 2.3% of prescriptions were not licensed for use in dogs or cats in the UK. Associations between the use of various antimicrobial drugs and independent variables were analysed using multivariable logistic regression models. Off-license prescriptions and inaccurate dosing of antimicrobials by small-animal clinicians in the UK appears to occur. Antimicrobial use guidelines are rare in small animal practice. The introduction of such guidelines has been shown to lead to more appropriate use of antimicrobials and is therefore recommended.


Lymphocyte Blastogenic Responses to Food Antigens in Cats Showing Clinical Symptoms of Food Hypersensitivity.

Three cats were diagnosed as having food hypersensitivity by food elimination and oral food provocation tests. Twelve allergenic food ingredients were identified by oral food provocation test in the 3 cats. Of the 12 food ingredients, 9 offending food antigens were shown to be positive on lymphocyte stimulation test; however, none of them was positive on antigen-specific IgE testing and only four food antigens were positive on intradermal testing. The stimulation indices in the lymphocyte stimulation tests for the 9 food ingredients were found to be decreased after the cats were fed elimination diets. The present study demonstrates that the lymphocyte stimulation test reflects an immunologic reaction involved in food hypersensitivity and can help identify allergenic food ingredients in feline food hypersensitivity.


Leptin levels in hyperthyroid cats before and after treatment.
Comparison of CD34, CD31, and Factor VIII-Related Antigen Immunohistochemical Expression in Feline Vascular Neoplasms and CD34 Expression in Feline Nonvascular Neoplasms.
The diagnosis of vascular neoplasms is often facilitated by the use of immunohistochemical markers such as factor VIII-related antigen, CD31, and CD34. However, the relative sensitivity and specificity of these markers have not been compared in cat vascular neoplasms. In this study, these 3 immunohistochemical markers were evaluated in 61 endothelial neoplasms (50 hemangiosarcomas and 11 hemangiomas) in 59 cats. All neoplasms were labeled by all 3 markers. CD34 had the highest average immunolabeling intensity in neoplastic endothelial cells. CD31 had the lowest average background labeling, followed by CD34 and factor VIII-related antigen, respectively. CD34 expression was also examined in 130 nonvascular neoplasms of cats; 14 of 62 epithelial neoplasms, 39 of 43 mesenchymal neoplasms, 8 of 23 leukocytic neoplasms, and 2 of 2 melanomas were positive. Given the broad expression of CD34 in mesenchymal neoplasms, this marker has limited diagnostic relevance for vascular neoplasms of cats.

Inflammatory bowel disease in veterinary medicine.
Canine and feline inflammatory bowel disease (IBD) denotes a heterogeneous group of idiopathic, chronic, relapsing inflammatory disorders of the gastrointestinal tract that are immunologically-mediated. While their exact etiologies remain unknown, results from basic science and clinical studies suggest that interplay between genetic factors and enteric bacteria are crucial for disease development, owing to abnormal host responses directed against the commensal microbiota. Key clinical signs include vomiting, diarrhea and weight loss, and histopathologic lesions of inflammation may involve the stomach, small intestine, or colon. Recent advances in molecular tools, disease activity indices, and biomarker development now permit objective assessment of IBD severity at diagnosis and in response to various therapies. Treatment of IBD involves both dietary and pharmacologic interventions as well as therapeutic manipulation of the enteric microbiota through the use of antibiotics and soluble fiber (prebiotic) supplements. Here we provide a comprehensive overview on the etiopathogenesis, clinical features, diagnosis strategies, current treatment recommendations, and outcomes from veterinary studies in dogs and cats with IBD. We also offer scientific comparison between human and canine IBD.

An agent-based model for the transmission dynamics of Toxoplasma gondii.
Toxoplasma gondii (T. gondii) is a unicellular protozoan that infects up to one-third of the world’s human population. Numerous studies revealed that a latent infection of T. gondii can cause life-threatening encephalitis in immunocompromised people and also has significant effects on the behavior of healthy people and animals. However, the overall transmission of T. gondii has not been well understood although many factors affecting this process have been found out by different biologists separately. Here we synthesize what is currently known about the natural history of T. gondii by developing a prototype agent-based model to mimic the transmission process of T. gondii in a farm system. The present model takes into account the complete life cycle of T. gondii, which includes the transitions of the parasite from cats to environment through feces, from contaminated environment to mice through oocysts, from mice to cats through tissue cysts, from environment to cats through oocysts as well as the vertical transmission among mice. Although the current model does not explicitly include humans and other end-receivers, the effect of the transition to end-receivers is estimated by a developed infection risk index. The current model can also be extended to include human activities and thus be used to investigate the influences of human management on disease control. Simulation results reveal that most cats are infected through preying on infected mice while mice are infected through vertical transmission more often than through infection with oocysts, which clearly suggests the important role of mice during the transmission of T. gondii. Furthermore, our simulation results show that decreasing the number of mice on a farm can lead to the eradication of the disease and thus can lower the infection risk of other intermediate hosts on the farm. In addition, with the assumption that the relation between virulence and transmission satisfies a normal function, we show that intermediate virulent lineages (type II) can sustain the disease most efficiently, which can qualitatively agree with the fact that the evolution of the parasite favors intermediate virulence. The effects of other related factors on transmission, including the latent period and imprudent behavior of mice, and prevention strategies are also studied based on the present model.

Comparison of injectable robenacoxib versus meloxicam for peri-operative use in cats: Results of a randomised clinical trial.
The objective of this study was to evaluate the efficacy and tolerability of robenacoxib, a selective cyclooxygenase-2 inhibitor, for the treatment of post-operative pain and inflammation in cats. The study was a prospective, multi-centre, randomised, blinded, non-inferiority design clinical study to compare robenacoxib to meloxicam. Ninety-six cats undergoing surgery at eight centres in Japan were allocated randomly to receive a single SC injection of robenacoxib (2mg/kg, n=67) or meloxicam (0.3mg/kg, n=29) shortly before induction of anaesthesia. Most cats underwent soft tissue surgery (n=87), mainly ovarioectomy (n=68). Post-operative pain and inflammation were assessed at 3, 8 and 22h after recovery from anaesthesia using numerical rating scales. For the primary efficacy endpoint (total clinician score), robenacoxib had significantly better efficacy than meloxicam, the relative efficacy ratio being 1.47 (95% confidence interval 1.19-1.78, P=0.0003). For the secondary efficacy endpoints, robenacoxib was superior to meloxicam when assessed on the basis of posture, behaviour, pain on palpation and overall pain control, while meloxicam was superior with respect to wound heat. No cat in either group required rescue analgesia therapy. In tolerability assessments, pain during injection and pain and inflammation at the injection site 22h after recovery from anaesthesia were rated significantly less with robenacoxib compared to meloxicam. Both treatments were well tolerated on the basis of clinical observations and blood tests, with no significant differences between groups. In conclusion, single pre-operative administration of robenacoxib was well tolerated and had superior efficacy to meloxicam in reducing post-operative pain in cats.


Omentalisation of the head in cats: A cadaver study.
The involvement of the greater omentum in reconstructive, abdominal and thoracic surgery is based on its manifold qualities, which include immunological support, lymphatic drainage, angiogenesis, adhesion, haemostasis and fat storage. The purpose of this study was to determine whether the greater omentum could be extended to the head. In addition, we evaluated the surgical procedures necessary for this extension. Our study reveals that specific surgical lengthening techniques of the greater omentum, such as dorsal extension and inverted L-shape elongation, are necessary to successfully transpose the omentum to the head in cats. As the survival of the omentum after transposition procedures is still unknown, its application in chronic non-healing wounds of the head in cats warrants further investigation.


Interaction of clarithromycin with cyclosporine in cats: pharmacokinetic study and case report.
Clarithromycin (CLM) has been known to increase the cyclosporine (CsA) trough levels in human transplant patients. However, the interaction of CLM with CsA has not been reported in cats. In this study, the effects of oral dosing of CLM on the pharmacokinetics and dosing of CsA in cats were investigated. Co-administration of CLM with CsA resulted in significant increases of oral bioavailability of CsA. In addition, CLM reduced the CsA dosage required to maintain the therapeutic CsA trough levels to almost 35% of the initial CsA therapy and the dose frequency was successfully replaced from a twice a day schedule to once a day in a feline kidney transplant patient. The addition of CLM to the regular CsA-based immunosuppression could be used as an effective alternative to classical ketoconazole treatment in feline kidney transplant patients and may result in substantial cost saving and convenience for the cat owners.


Apparent total tract energy and macronutrient digestibility and fecal fermentative end-product concentrations of domestic cats fed extruded, raw beef-based, and cooked beef-based diets.
The objectives of this study were to determine differences in apparent total tract energy and macronutrient digestibility, fecal and urine characteristics, and serum chemistry of domestic cats fed raw and cooked meat-based diets and extruded diet. Nine adult female domestic shorthair cats were utilized in a replicated 3 x 3 Latin square design. Dietary treatments included a high-protein extruded diet (EX; 57% CP), a raw beef-based diet (RB; 53% CP), and a cooked beef-based diet (CB; 52% CP). Cats were housed individually in metabolic cages and fed to maintain BW. The study consisted of three 21-d periods. Each period included diet adaptation during d 0 to 16; fecal and urine sample collections during d 17 to 20; and blood sample collection at d 21. Food intake was measured daily. Total feces and urine were collected for determination of nutrient digestibility. In addition, a fresh urinary sample was collected from each cat for urinalysis, and a fresh fecal sample was collected from each cat for determination of DM percentage and ammonia, short-chain fatty acid (SCFA), and branched-chain fatty acid (BCFA) concentrations. All feces were scored after collection using a scale ranging from 1 (hard, dry pellets) to 5 (watery, liquid that can be poured). Blood was analyzed for serum metabolites. Apparent total tract DM, OM, CP, fat, and GE digestibilities were greater (P <= 0.05) in cats fed RB and CB than those fed EX. Total fecal SCFA concentrations did not differ among dietary treatments; however, molar ratios of SCFA were modified by diet, with cats fed RB and CB having an increased (P <= 0.05) proportion of fecal propionate and decreased (P <= 0.05) proportion of fecal

butyrate compared with cats fed EX. Fecal concentrations of ammonia, isobutyrate, valerate, isovalerate, and total BCFA were greater (P \leq 0.05) in cats fed EX compared with cats fed RB and CB. Our results indicated that cooking a raw meat diet does not alter apparent total tract energy and macronutrient digestibility and may also minimize risk of microbial contamination. Given the increasing popularity of feeding raw diets and the metabolic differences noted in this experiment, further research focused on the adequacy and safety of raw beef-based diets in domestic cats is justified.

Diagnostic Value of Morphometry in Feline Hypertrophic Cardiomyopathy.
Hypertrophic cardiomyopathy (HCM) is the most common form of feline heart disease. To date, reliable morphometric reference data for anatomical or histological changes are unavailable. The aim of this study was to identify diagnostically relevant morphometric criteria that clearly distinguish feline HCM from normal hearts. Hearts from 15 cats with HCM had increased weights (g per distance between the first and eighth vertebral bodies) when compared with hearts from 15 matched control cats. Several anatomically defined and digitally scanned areas of standardized cross sections were significantly increased in HCM when compared with controls, including the area across the entire heart half-way between the coronary sulcus and apex, the right and left ventricular walls and the ventricular septum. Differences were similar when the papillary muscles were included in the measurements of the right and left ventricular walls and the ventricular septum. Histological morphometric analyses failed to identify any significant differences, including the diameter and cross-sectional area of cardiomyocytes and the length, width or areas of cross-sectioned nuclei. In addition, morphometric analyses failed to identify any differences in the amount of cardiomyocyte fibre branching or myocardial fibrosis. Thus, only the relative weight and macroscopical analyses proved useful in distinguishing feline hearts with HCM from normal hearts. The results do not uphold the hypothesis that increased cardiomyocyte diameter is a principal change in feline HCM.

Orthopedic examination in the cat: clinical tips for ruling in/out common musculoskeletal disease.
PATIENT GROUP: The majority of cats will develop radiographic evidence of degenerative joint disease by the time they are 12 years of age, and many will suffer from a decline in quality of life associated with undiagnosed and untreated orthopedic disease. PRACTICAL RELEVANCE: A focused, efficient orthopedic examination, including gait observation and palpation (awake and under sedation), supplemented with appropriate history, is key in ruling in, or out, clinically important musculoskeletal disease. Identifying problems assists in both developing a diagnostic plan and monitoring response to treatment. CLINICAL CHALLENGES: Many clinicians feel uncomfortable in their ability to reliably perform an orthopedic examination in the cat, and diagnosis and evaluation of response to treatment in cats with orthopedic disease can be challenging. Hands-on training in feline orthopedic examination is limited in many veterinary curricula. Additional constraints may include failure to obtain important information in the history that indicates feline orthopedic disease, lack of appropriate facilities in which to conduct a complete orthopedic examination, and inability to obtain the most important information during the time available to conduct the examination. These problems can create gaps in the practitioner’s ability to provide excellent care for a large proportion of the feline population. GOALS: The above challenges can mostly be overcome with advanced planning and with consideration of the unique behavioral aspects related to feline handling. As discussed in this review, the aim of the initial orthopedic examination is to localize the problem to a specific limb, Ideally to a region or joint of the limb, which can further direct diagnostics such as radiography or arthrocentesis. This should provide a basis for follow-up and assessment of whether treatment strategies are effective.

Acceptability and compliance of atenolol tablet, compounded paste and compounded suspension prescribed to healthy cats*. This study was designed to evaluate the cats’ acceptance and compliance of the owners and cats towards an extemporaneously prepared palatable compounded atenolol (paste and suspension) formulation in comparison to the commercially obtained tablet, in a randomised, cross-over study design. The three formulations were prescribed twice daily for 6 days to 13 healthy privately-owned cats of 13 different owners, with varying levels of experience in medicating cats. Daily compliance was evaluated via an owner-completed diary, completed after each dose administered. Owner’s experience and preference of the formulation was evaluated via questionnaires given prior to, at the end of each treatment protocol, and upon completion of the study. Although compounded suspension was association with fewest missed doses, the majority of cat owners expressed a preference for the divided tablet. Atenolol tablets, compounded paste and suspension acceptance and compliance were comparable. Further work is now required to assess the amount and stability of the active ingredient and the robustness of the paste and suspension formulations prior to any bioavailability comparisons between the formulations.
Khwanjai, V., S. Chuthatep, S. Durongphongtorn, and S. Yibchok-Anun (2012) J Vet Pharmacol Ther 35:13-18. Evaluating the effects of 14-day oral vedaprofen and tolfenamic acid treatment on renal function, hematological and biochemical profiles in healthy cats. The objective of this study was to evaluate the effects of the nonsteroidal anti-inflammatory drugs vedaprofen and tolfenamic acid on renal function after oral administration for 2 weeks in healthy cats. Experiments were performed using nineteen domestic short-haired cats randomly divided into one control (n=6) and two treatment groups. All cats in the first (n=6) and second treatment groups (n=7) received vedaprofen (0.5 mg/kg/day) and tolfenamic acid (4 mg/kg/day), respectively. During the experiment, renal function was evaluated using percent renal uptakes of (99m)Tc-diethylenetriamine-pentaacetic acid ((99m)Tc-DTPA) collected from renal scintigraphy and blood samples used to determine complete blood count and biochemical profiles. Renal scintigraphy and blood collections were performed at days 0, 5, 11, 15, and 45. The percent of renal uptake after the administration of vedaprofen and tolfenamic acid were not significantly different compared to pretreatment (day 0) and control group levels. In addition, significant changes were not observed in hematological and biochemical profiles within or between groups, with the exception of slightly lower numbers in red blood cell counts compared to the normal value on day 45 in the tolfenamic acid-treated group. Taken together, we conclude 14-day administration of vedaprofen and tolfenamic acid might not cause any adverse effects on renal function, hematological and serum biochemical variables.

Konderding, W. S., H. J. Hedrich, E. Bleich, and E. Zimmermann (2012) J Comp Psychol 126:15-22. Paw preference is not affected by postural demand in a nonprimate mammal (Felis silvestris catus). Previously, it has been thought that handedness is unique to humans. Recently, it has been found that hand or paw preferences are common among a variety of vertebrate species. Different models have been put forth to describe the evolution of primate handedness. In this study we aimed to explore whether these models can also be used to predict manual laterality in nonprimate mammalian groups. The cat (Felis silvestris catus) is a good nonprimate model for manual laterality, as cats frequently use paws to catch and hold prey. Cats were exposed to two standardized manual laterality tasks, differing in postural demand. Subjects (N = 28) were forced to use either a stable or unstable body posture (i.e., sitting or standing vs. vertical clinging) to extract food items from a plastic box attached at two different heights. We revealed that cats exhibited paw preferences at an individual level with about 40% left, 30% right, 30% nonlateralized subjects. Postural demand was linked to task difficulty: the unstable body posture was found to be significantly more difficult than the stable body posture. However, these differences in postural demand and task difficulty did not lead to differences in direction or strength of paw preference. Findings suggested that nonprimate mammals differ from primates in their sensitivity to task related factors, such as postural demand. Results coincide with those of some prosimians, providing support for the hypothesis that postural demand and the associated task complexity became influencing factors on manual laterality in the course of primate evolution. (PsycINFO Database Record (c) 2012 APA, all rights reserved).

Konrade, K. A., A. R. Hoffman, K. L. Ramey, R. B. Goldenberg, and T. W. Lehenbauer (2012) Am J Vet Res 73:279-284. Refractive states of eyes and associations between ametropia and age, breed, and axial globe length in domestic cats. OBJECTIVE: To determine the refractive states of eyes in domestic cats and to evaluate correlations between refractive error and age, breed, and axial globe measurements. ANIMALS: 98 healthy ophthalmologically normal domestic cats. PROCEDURES: The refractive state of 196 eyes (2 eyes/cat) was determined by use of streak retinoscopy. Cats were considered ametropic when the mean refractive state was >/= +/− 0.5 diopter (D). Amplitude-mode ultrasonography was used to determine axial globe length, anterior chamber length, and vitreous chamber depth. RESULTS: Mean +/- SD refractive state of all eyes was -0.78 +/- 1.37 D. Mean refractive error of cats changed significantly as a function of age. Mean refractive state of kittens (<4 months old) was -2.45 +/- 1.57 D, and mean refractive state of adult cats (>1 year old) was -0.39 +/- 0.85 D. Mean axial globe length, anterior chamber length, and vitreous chamber depth were 19.75 +/- 1.59 mm, 4.66 +/- 0.86 mm, and 7.92 +/- 0.86 mm, respectively. CONCLUSIONS AND CLINICAL RELEVANCE: Correlations were detected between age and breed and between age and refractive states of feline eyes. Mean refractive error changed significantly as a function of age, and kittens had greater negative refractive error than did adult cats. Domestic shorthair cats were significantly more likely to be myopic than were domestic mediumhair or domestic longhair cats. Domestic cats should be included in the animals in which myopia can be detected at a young age, with a likelihood of progression to emmetropia as cats mature.

Prevalence of spondylosis deformans in the feline spine and correlation with owner-perceived behavioural changes.

Objectives: The primary objective was to determine the prevalence, spinal distribution, and association with the signalment of cats suffering from different grades of feline spondylosis deformans (spondylosis). The secondary objective was to document behavioural changes associated with spondylosis by owner observation. Methods: A cross-sectional study was performed to determine the prevalence of feline spondylosis (group 1). A prospective study was performed to determine the association between radiographic abnormalities of the lumbosacral region (L3-S1) and owner perceived behavioural changes based on a completed questionnaire (group 2). The radiographs were reviewed using a grading system (0-3) for spondylosis. Results: The prevalence of spondylosis in group 1 was 39.4% (158/402). Cats with spondylosis were significantly older than cats without spondylosis (p <0.001). The thoracic (T) vertebrae T4-T10 were most often affected by spondylosis, but spondylosis was most severe in the T10-S1 vertebrae. In group 2, spondylosis of the lumbosacral region was significantly correlated with owner-reported behavioural changes, such as a decreased willingness to greet people and to being petted, increased aggressiveness, and a poor perceived quality of life (p = 0.037). Clinical significance: This study found that feline spondylosis is common and that spondylosis of the lumbosacral region may be accompanied by behavioural changes.


Musculoskeletal oddities in the cat: an overview of some curious causes of lameness.

PRACTICAL RELEVANCE: Cats, both young and old, can suffer a variety of weird and wonderful musculoskeletal conditions that are a cause of lameness. These include developmental, metabolic and nutritional bone diseases, ectopic mineralisation disorders, conditions that cause lameness or exercise intolerance and primarily or secondarily affect muscle, and lastly pad conditions. CLINICAL CHALLENGES: These conditions are mostly rare and can be challenging to diagnose. The aim of this review is to bring these conditions to the attention of practitioners so that, if they are encountered, further research around the topic can be undertaken. Radiographic changes and diagnostic tests that can be used to try to confirm diagnoses are described. EVIDENCE BASE: These unusual causes of lameness are the subject of multiple single case reports or small case series, many of which are relatively old. The evidence presented here is drawn from these articles. However, it is not possible within the scope of this review to discuss all the conditions in as much detail as they may warrant, or to make reference to every article relating to them.


Feline panleukopenia virus, feline herpesvirus-1 and feline calicivirus antibody responses in seronegative specific pathogen-free kittens after parenteral administration of an inactivated FVRCP vaccine or a modified live FVRCP vaccine.

Two groups of feline panleukopenia (FPV), feline calicivirus (FCV) and feline herpesvirus 1 (FHV-1) seronegative kittens (six cats per group) were administered one of two feline viral rhinotracheitis, calcivirus and panleukopenia (FVRCP) vaccines subcutaneously (one inactivated and one modified live) and the serological responses to each agent were followed over 49 days (days 0, 2, 5, 7, 10, 14, 21, 28, 35, 42, 49). While the kittens administered the modified live FPV vaccine were more likely to seroconvert on day 7 after the first inoculation than kittens administered the inactivated vaccine, all kittens had seroconverted by day 14. In contrast, FHV-1 serological responses were more rapid following administration of the inactivated FVRCP vaccine when compared with the modified live FVRCP vaccine. There were no statistical differences between the serological response rates between the two FVRCP vaccines in regard to FCV.


Relationship of orthopedic examination, goniometric measurements, and radiographic signs of degenerative joint disease in cats.

ABSTRACT: BACKGROUND: Available information suggests a mismatch between radiographic and orthopedic examination findings in cats with DJD. However, the extent of the discrepancy between clinical and radiographic signs of OA in companion animals has not been described in detail. This study aimed to evaluate the relationship between orthopedic examination findings, joint goniometry, and radiographic signs of DJD in 100 cats, in a prospective observational design. Cat temperament, pain response to palpation, joint crepitus, effusion and thickening were graded. Radiographs of appendicular joints and the axial skeleton were made under sedation. Joint motion was measured by use of a plastic goniometer before and after sedation. Associations between radiographic degenerative joint disease (DJD) and examination findings were assessed to determine sensitivity, specificity and likelihood estimations. RESULTS: Pain response to palpation was elicited in 0-67% of the joints with DJD, with a specificity ranging from 62-99%; crepitus was detected in 0-56% of the joints and its specificity varied between 87 and 99%; for effusion, values ranged between 6 and 38% (specificity, 82-100%), and thickening, 0-59% (specificity, 74-99%). Joints with DJD tended to have a decreased range
Pancreatic trauma and rupture are rare after feline high-rise syndrome; however, should it happen, pancreatic enzymes will leak into the abdominal cavity and may cause pancreatic autodigestion and fatty tissue saponification. If not diagnosed and treated, it can ultimately lead to multiorgan failure and death. In this case series, 700 records of high-rise syndrome cats that presented between April 2001 and May 2006 were analysed, and four cats with pancreatic rupture were identified. Clinical signs, diagnosis using ultrasonography and lipase activity in blood and abdominal effusion, and treatment modalities are reported. Three cats underwent surgical abdominal exploration, one cat was euthanased. Rupture of the left pancreatic limb was confirmed in all cases. Two of the operated cats survived to date. High-rise syndrome can lead to abdominal trauma, including pancreatic rupture. A prompt diagnosis and surgical treatment should be considered.

**Activation of AKT in feline mammary carcinoma: a new prognostic factor for feline mammary tumours.**
The PI3K/AKT/PTEN pathway is involved in the pathogenesis of several human cancers. This study investigated the biological and prognostic value of PI3K/AKT/PTEN pathway dysregulation in feline mammary tumours. Expression of p-AKT, HER2, PTEN and steroid receptors was assessed by immunohistochemistry (IHC) in 27 malignant and 12 benign mammary tumours from 39 female cats followed up over a 24-month period. Feline mammary carcinoma (FMC) cell lines were analyzed by Western blot and the feline AKT gene sequence was characterized. p-AKT expression statistically correlated with tumour malignancy, histological dedifferentiation and clinical recurrence. The animals with tumours expressing p-AKT had a shorter disease-free period than those with p-AKT-negative tumours. AKT activation was associated with HER2 expression and PTEN down-regulation, as occurs in human breast cancer, and feline AKT sequencing showed high homology with the human AKT gene. No AKT activation was observed in relation to either oestrogen receptor alpha (ERalpha) or progesterone receptor expression. Taken together, these data offer an explanation for AKT signalling and its role in FMC pathogenesis and prognosis, shedding new light on similarities between feline mammary tumours and hormone-independent breast cancer.


**Prevalence of antibodies anti-bartonella henselae in Western sicily: children, blood donors, and cats.**
To evaluate seroprevalence of B. henselae infection both in Sicilian children and healthy blood donors. Furthermore, circulation of Bartonella in the natural reservoir was also studied. Two hundred forty-three children, living in Sicily (Palermo), affected by various diseases, without clinical features suggesting B. henselae infection, together with 122 healthy blood donors were serologically investigated for IgG and IgM antibodies by indirect fluorescent antibody test (IFAT). One hundred twenty stray and 62 pet cats were also analyzed only for IgG. Among children 25.1% had IgG antibodies to B. henselae; 18.5% showed a titer 1:64, 2.4% 1:128, 2.4% 1:256, 0.8% 1:512, 0.4% 1:1024, and 0.4% 1:5120. Among healthy blood donors 11.4% had IgG class antibodies to B. henselae; 18.5% showed a titer 1:64, 2.4% 1:128, 2.4% 1:256, 0.8% 1:512, 0.4% 1:1024, and 0.4% 1:5120. Among healthy children 25.1% had IgG class antibodies to B. henselae; 9.8% showed a titer 1:64 and 1.6% 1:128. All the human serum samples did not show positive results for B. henselae IgM class antibodies. Stray cats (68.3%) and pet cats (35.4%) also had IgG class antibodies to B. henselae. We demonstrated high frequency of serologic evidence of past B. henselae infection, in young Italian children, affected by various diseases, apparently free of any clinical features suggesting B. henselae infection. This observation is supported by high circulation of Bartonella in cats.


**Ultrasoundographic findings of feline cholangitis.**
Cholangitis is a common inflammatory disorder of the biliary system in cats. There are two major forms based on the predominant type of inflammatory cell infiltrates: lymphocytic or neutrophilic. Ultrasound is a common imaging modality used in these patients. This retrospective study evaluated the ultrasound examinations of 26 cats with a histologic diagnosis of cholangitis. Most cats with cholangitis had sonographically normal liver size, echogenicity, and normal biliary systems. Statistically significant sonographic changes for cats with cholangitis included hyperechoic liver parenchyma, hyperechoic gallbladder contents, and increased pancreatic size. No statistically significant changes were noted to distinguish lymphocytic and neutrophilic forms of cholangitis. Cats with the sonographic features of diffuse liver hyperechogenicity, gallbladder contents and enlarged pancreas may suggest cholangitis.


**Prognostic studies of canine and feline mammary tumours: The need for standardized procedures.**
For several years, veterinary oncologists have been struggling with the prognosis of mammary tumours in dogs and cats. Translation of tumour characteristics into prognostic information is an invaluable tool for the use of the most appropriate therapies, as well as for planning innovative therapeutic trials. Moreover, canine and feline spontaneous mammary gland tumours are good models for the study of human breast cancer. Collecting and interpreting information regarding the prognosis of canine and feline mammary tumours is difficult due to the fact that different methods have been applied to study various components and characteristics. This review identifies some of the challenges of prognostic studies of spontaneous canine and feline mammary tumours and suggests standardized procedures to overcome these challenges and facilitate reproducibility and assessment of results.
Clinical efficacy and safety of dexmedetomidine used as a preanesthetic prior to general anesthesia in cats.

OBJECTIVE: To evaluate the clinical efficacy of dexmedetomidine as a preanesthetic medication administered prior to anesthetic induction with ketamine or propofol and with or without isoflurane for maintenance of anesthesia. DESIGN: Randomized, blinded, controlled clinical trial. ANIMALS: 184 client-owned cats. PROCEDURES: Cats requiring general anesthesia for short or long procedures were assigned to receive 1 of 4 preanesthetic and induction drug combinations (dexmedetomidine and ketamine, placebo [saline [0.9% NaCl] solution] and ketamine, dexmedetomidine, and propofol, or placebo and propofol). Cats undergoing long procedures received isoflurane for maintenance of anesthesia. RESULTS: Administration of dexmedetomidine prior to anesthetic induction with ketamine significantly increased the intubation success rate (57/64 [89%]), compared with the success rate for the placebo (4/37 [11%]); significantly reduced the median induction dose of propofol (≤ 5.1 mg/kg [2.32 mg/lb]), compared with that for the placebo (≤ 10.5 mg/kg [4.77 mg/lb]); and significantly reduced the isoflurane concentration (1.5%) required for anesthesia maintenance, compared with that for the placebo (3.0%). Postoperatively, fewer cats receiving dexmedetomidine required rescue analgesia, and cats had lower pain scores for at least 2 hours after surgery, compared with results for cats receiving the placebo. Heart rate was lower during the procedure and respiratory rate and rectal temperature were lower during and after the procedure for cats receiving dexmedetomidine. More cats that received dexmedetomidine had emesis and pale mucous membranes, compared with the number of cats with those signs that received placebo. CONCLUSIONS AND CLINICAL RELEVANCE: Dexmedetomidine as a preanesthetic was efficacious for clinical use in cats requiring general anesthesia.

Mensching, D. A., M. Slater, J. W. Scott, D. C. Ferguson, and V. R. Beasley (2012) J Toxicol Environ Health A 75:201-212. The Feline Thyroid Gland: A Model for Endocrine Disruption by Polybrominated Diphenyl Ethers (PBDEs)? The role of polybrominated diphenyl ethers (PBDE) was investigated in the occurrence of feline hyperthyroidism (FH) by evaluating 15 PBDE congeners in serum from 62 client-owned (21 euthyroid, 41 hyperthyroid) and 10 feral cats. Total serum PBDE concentrations in euthyroid cats were not significantly different from those of hyperthyroid cats. Total serum PBDE in feral cats were significantly lower than in either of the groups of client-owned cats. Total serum PBDE did not correlate with serum total T4 concentration. Ten samples of commercial canned cat food and 19 dust samples from homes of client-owned cats were analyzed. Total PBDE in canned cat food ranged from 0.42 to 3.1 ng/g, and total PBDE in dust from 510 to 95,000 ng/g. Total PBDE in dust from homes of euthyroid cats ranged from 510 to 4900 ng/g. In dust from homes of hyperthyroid cats, total PBDE concentrations were significantly higher, ranging from 1100 to 95,000 ng/g. Dust PBDE and serum total T4 concentration were also significantly correlated. Estimates of PBDE exposures calculated from canned cat food and dust data suggest that domestic cats are primarily exposed through ingestion of household dust. These findings indicate further study of the role of PBDE is needed in the development of FH, which might identify the cat as a model and sentinel for humans with toxic nodular goiter (TNG).

Mestrinho, L. A., C. A. Ferreira, A. M. Lopes, M. M. Niza, and A. J. Hamaide (2012) J Feline Med Surg 14:151-154. Open surgical correction combined with an external splint for correction of a non-compliant pectus excavatum in a cat. A 4-month-old domestic shorthair female cat weighing 1.3 kg was presented for evaluation of respiratory distress. The animal showed evident dyspnoea with exercise intolerance and a marked concave deformation of the sternum. After measurements of the fronto-sagittal and vertebral indexes, the pectus was classified as moderate and surgery was elected. Surgical correction was performed using an open approach to the sternum with osteotomy of the last sternebra and costochondral junctions of the eighth and ninth ribs bilaterally. A silicone based, U-shape external splint was manufactured and used to stabilise the sternum. Immediate and 5-week postsurgical radiographs revealed a decreased concavity of the sternum and an increase thoracic height at the level of the last sternebra. Postoperative results suggest that this technique could be an effective and economical option for cats with pectus excavatum with a non-compliant sternum.

Meyers-Wallen, V. N. (2012) Sex Dev 6:46-60. Gonadal and sex differentiation abnormalities of dogs and cats. The molecular steps in normal sexual development were largely discovered by studying patients and animal models with disorders of sexual development (DSD). Although several types of DSD have been reported in the cat and dog, which are often strikingly similar to human DSD, these have been infrequently utilized to contribute to our knowledge of mammalian sexual development. Canine and feline cases of DSD with sufficient evidence to be considered as potential models are summarized in this report. The consensus DSD terminology, and reference to previous terminology, is used to foster adoption of a common nomenclature that will facilitate communication and collaboration between veterinarians, physicians, and researchers. To efficiently utilize these unique resources as molecular tools continue to improve, it will be helpful to
deposit samples from valuable cases into repositories where they are available to contribute to our understanding of sexual development, and thus improve human and animal health.

Cats, cations and hypertension.

Spontaneous pneumothorax in 35 cats (2001-2010).
Thirty-five cases of spontaneous pneumothorax were reviewed. In contrast to dogs, cats with an established etiology all had spontaneous pneumothorax associated with lung disease. Underlying diseases identified in affected cats included inflammatory airway disease, neoplasia, heartworm infection, pulmonary abscess and lungworm infection. Many cats were managed successfully with observation alone or needle thoracocentesis and specific therapy for their primary lung disease. Cats who present with spontaneous pneumothorax may be treated successfully with non-surgical therapies and appear to have a better prognosis than previously extrapolated from canine studies.

Potential for Pet Animals to Harbour Methicillin-Resistant Staphylococcus aureus When Residing with Human MRSA Patients.
Colonization by methicillin-resistant Staphylococcus aureus (MRSA) may be persistent in people and is horizontally transmissible. The scientific literature suggests that domestic pets may also participate in cross-transmission of MRSA within households. The objectives of this study were to evaluate the prevalence of and risk factors for MRSA carriage by pets residing in households with an MRSA-infected person. From 66 households in which an MRSA-infected patient resided, we screened 47 dogs and 52 cats using a swab protocol. Isolates from pets and humans were genotyped using two techniques and compared for concordance. Human participants completed a 22-question survey of demographic and epidemiologic data relevant to staphylococcal transmission. Eleven of 99 pets (11.5%) representing 9 (13.6%) of households were MRSA-positive, but in only six of these households were the human and animal-source strains genetically concordant. Human infection by strain USA 100 was significantly associated with pet carriage [OR = 11.4 (95% CI 1.7, 76.9); P = 0.013]. Yet, for each day of delay in sampling the pet after the person’s MRSA diagnosis, the odds of isolating any type of MRSA from the pet decreased by 13.9% [(95% CI 2.6, 23.8); P = 0.017)]. It may be concluded that pets can harbour pandemic strains of MRSA while residing in a household with an infected person. However, the source of MRSA to the pet cannot always be attributed to the human patient. Moreover, the rapid attrition of the odds of obtaining a positive culture from pets over time suggests that MRSA carriage may be fleeting.

Detection of Tritrichomonas foetus and Pentatrichomonas hominis in intestinal tissue specimens of cats by chromogenic in situ hybridization.
In this retrospective study 102 cats were analyzed for the presence of trichomonads in intestinal tissue sections using chromogenic in situ hybridization (CISH). Two intestinal trichomonad species are described in cats: Pentatrichomonas hominis and Tritrichomonas foetus. While P. hominis is considered a mere commensal, T. foetus has been found to be the causative agent of feline large-bowel diarrhea. For the detection of both agents within intestinal tissue CISH assays using three different probes were performed. In the first CISH run a probe specific for all relevant members of the order Trichomonadida (OT probe) was used. In a second CISH run all positive samples were further examined on three consecutive tissue sections using the OT probe, a probe specific for the family of Tritrichomonadidae (Tritri probe) and a newly designed probe specifically detecting P. hominis (Penta hom probe). In total, four of the 102 cats were found to be positive with the OT probe. Thereof, one cat gave a positive reaction with the P. hominis probe and three cats were positive with the T. foetus probe. All Trichomonas-positive cats were pure-bred and between 8 and 32 weeks of age. In one cat positive for T. foetus large amounts of parasites were found in the gut lumen and invading the intestinal mucosa. The species of the detected trichomonads were confirmed by polymerase chain reaction and nucleotide sequencing of a part of the 18S ribosomal RNA gene. In this study, the usefulness of CISH to detect intestinal trichomonads within feline tissue samples was shown. Additionally, the specific detection of P. hominis using CISH was established. Generally, it was shown that CISH is well suited for detection and differentiation of trichomonosis in retrospective studies using tissue samples.

Echocardiographic parameters in healthy young adult Sphynx cats.
The objective of this retrospective study is to determine normal reference values for 2-Dimension (2D) and Motion-mode (M-mode) echocardiographic parameters in nonsedated healthy young adult Sphynx cats and to compare them to those of the domestic shorthair (DSH). 131 Sphynx cats underwent cardiac screening prior to breeding. The control group consisted of 30 healthy adult domestic cats. A complete cardiac ultrasound was performed on all cats using right parasternal long and short axis views. There were few echocardiographic parameters in the Sphynx that differed from those of the healthy DSH. Only the left atrial (LA) dimension in 2D and M-mode, the left atrial/aortic (LA/Ao) ratio and the internal dimension of the left ventricle in systole (LVIDs) measured with M-mode were different. In conclusion, although the heart of Sphynx cat can often have a particular 2-D echocardiographic appearance, the M-mode cardiac dimensions are similar to those of the DSH.


FIV establishes a latent infection in feline peripheral blood CD4+ T lymphocytes in vivo during the asymptomatic phase of infection.
ABSTRACT: BACKGROUND: Feline immunodeficiency virus (FIV) is a lentivirus of cats that establishes a lifelong persistent infection with immunologic impairment. RESULTS: In an approximately 2 year-long experimental infection study, cats infected with a biological isolate of FIV clade C demonstrated undetectable plasma viral loads from 10 months post-infection onward. Viral DNA was detected in CD4+CD25+ and CD4+CD25- T cells isolated from infected cats whereas viral RNA was not detected at multiple time points during the early chronic phase of infection. Viral transcription could be reactivated in latently infected CD4+ T cells ex vivo as demonstrated by detectable FIV gag RNA and 2-long terminal repeat (LTR) circle junctions. Viral LTR and gag sequences amplified from peripheral blood mononuclear cells during early and chronic stages of infection demonstrated minimal to no viral sequence variation. CONCLUSIONS: Collectively, these findings are consistent with FIV latency in peripheral blood CD4+ T cells isolated from chronically infected cats. The ability to isolate latently FIV-infected CD4+ T lymphocytes from FIV-infected cats provides a platform for the study of in vivo mechanisms of lentiviral latency.


Feline intestinal parasites in Finland: prevalence, risk factors and anthelmintic treatment practices.
The aim of this study was to estimate the prevalence of feline intestinal parasites in Finland and to determine the possible risk factors for infection. Altogether 411 feline fecal samples were analyzed with a flotation method to reveal helminth eggs and protozoan oocysts. Of the samples, 402 were also screened for Giardia species antigens with a commercial enzyme-linked immunosorbent assay kit. The cat owners completed a questionnaire. Toxocara cati prevalence was 5.4% and Toxascaris leonina 0.2%. Taenia species eggs were found in 1.5% of the samples and Isospora felis in 0.7%, whilst 3.2% of the samples tested positive for Giardia species antigen. Risk factors for Toxocara/Toxascaris species infection included being a non-pedigree cat, having access to the outdoors, living outside of the cities and receiving home-made food. Pedigree cats were at greater risk of contracting Giardia duodenalis. The majority of the cat owners (62.4%) treated their cat with anthelmintics 2-4 times per year.

Epidemiological and genetic data supporting the transmission of Ancylostoma ceylanicum among human and domestic animals.
BACKGROUND: Currently, information on species-specific hookworm infection is unavailable in Malaysia and is restricted worldwide due to limited application of molecular diagnostic tools. Given the importance of accurate identification of hookworms, this study was conducted as part of an ongoing molecular epidemiological investigation aimed at providing the first documented data on species-specific hookworm infection, associated risk factors and the role of domestic animals as reservoirs for hookworm infections in endemic communities of Malaysia. METHODS/FINDINGS: A total of 634 human and 105 domestic canine and feline fecal samples were randomly collected. The overall prevalence of hookworm in humans and animals determined via microscopy was 9.1% (95% CI = 7.0-11.7%) and 61.9% (95% CI = 51.2-71.2%), respectively. Multivariate analysis indicated that participants without the provision of proper latrine systems (OR = 3.5; 95% CI = 1.53-8.00; p = 0.003), walking barefooted (OR = 5.6; 95% CI = 2.91-10.73; p<0.001) and in close contact with pets or livestock (OR = 2.9; 95% CI = 1.19-7.15; p = 0.009) were more likely to be infected with hookworms.
Molecular analysis revealed that while most hookworm-positive individuals were infected with Necator americanus, Ancylostoma ceylanicum constituted 12.8% of single infections and 10.6% mixed infections with N. americanus. As for cats and dogs, 52.0% were positive for A. ceylanicum, 46.0% for Ancylostoma caninum and 2.0% for Ancylostoma braziliense and all were single infections. CONCLUSION: This present study provided evidence based on the combination...
of epidemiological, conventional diagnostic and molecular tools that *A. ceylanicum* infection is common and that its transmission dynamic in endemic areas in Malaysia is heightened by the close contact of human and domestic animal (i.e., dogs and cats) populations.

Nicholson, I., S. Langley-Hobbs, M. Sutcliffe, N. Jeffery, and H. Radke (2012) Vet Comp Orthop Traumatol 25:116-125. **Feline talocrural luxation: A cadaveric study of repair using ligament prostheses.** Currently recommended surgical techniques to treat severe biaxial feline talocrural soft-tissue injuries commonly lead to unsatisfactory outcome. Data relating to canine talocrural stabilisation may not be useful in cats due to major differences in tarsal anatomy between the species. This experimental biomechanical cadaveric study used specimens (*n = 10*) prepared from the distal pelvic limbs of five adult cats. The aim was to design a technique for treating talocrural luxation using suture prostheses and bone tunnels, and to investigate its suitability for use in clinical cases. Four prosthetic ligaments were placed through a series of five 1.5 mm bone tunnels. Two prostheses, the caudoproximal pair, were taut in talocrural flexion and two prostheses, the craniodistal pair, were taut in extension. The intact specimens had their range-of-motion (ROM) and stability tested, after which they were transected at the talocrural joint (simulated luxation) and repaired using the technique described. The ROM and stability of the repaired specimens were tested and compared to the intact specimens. The repaired specimens had comparable stability to the intact specimens, although the ROM was different (*p <0.05*) in six of 16 positions (*p <0.003125*). These corresponded to the positions where the lateral prostheses were taut. The repair technique described may be useful in the treatment of talocrural luxation, as it is low-profile in an area of limited soft-tissue cover, allows anatomic reduction, restores normal talocrural joint stability and near-normal tarsal ROM.

Norrgran, J., B. Jones, N. G. Lindquist, and A. Bergman (2012) Arch Environ Contam Toxicol **Decabromobiphenyl, Polychlorinated Diphenyl Ethers, and Brominated Phenolic Compounds in Serum of Cats Diagnosed With the Endocrine Disease Feline Hyperthyroidism.** The incidence of cats being diagnosed with feline hyperthyroidism (FH) has increased greatly since it was first described in 1979. The cause of FH has not been established. Hypothetically, there is a link between increasing FH and exposure to brominated flame retardants. Much greater polychlorinated diphenyl ethers (PBDE) concentrations have been reported in cat serum compared with human serum, likely due to cat licking behaviour. This study aimed to extend the present identification of brominated compounds in cat serum, with a focus on hydroxylated metabolites of PBDE, to improve the understanding of feline metabolism of PBDEs. A pooled serum sample from 30 Swedish pet cats with FH was analysed, and brominated species were identified. The results showed exposure to the discontinued flame retardant decabromobiphenyl (BB-209) and technical penta- and octa-BDEs. Altogether 12 PBDE congeners were identified along with 2′'-MeO-BDE68. Furthermore, 2,4-dibromophenol, 2,4,6-, 2,4,5- and 2,3,4-tribromophenol plus 2′'-OH-BDE68, 6-OH-BDE47, 5-OH-BDE47, 4′'-OH-BDE49 were identified. 2,4,6-tribromophenol and 6-OH-BDE47 were the most prominent species in cat serum. Considering that these are natural products, it can be concluded that metabolism of PBDEs to OH-PBDEs is not a major route of PBDE elimination in cats. It is notable that BB-209, 6-OH-BDE47, and 2,4,6-tribromophenol all suggested that endocrine-disrupting chemicals were present in high concentrations in cat serum.

Novacco, M., G. Wolf-Jackel, B. Riond, and R. Hofmann-Lehmann (2012) Vet Microbiol **Humoral immune response to a recombinant hemoplasma antigen in experimental ‘Candidatus Mycoplasma turicensis’ infection.** ‘Candidatus Mycoplasma turicensis’ is a feline hemoplasma species that was isolated in a cat with hemolytic anemia. PCR has been widely used to investigate and diagnose ‘Candidatus Mycoplasma turicensis’ infection, but so far, little is known about the humoral immune response in infected cats. Recently, enzyme-linked immunosorbent assays (ELISA) were developed to monitor anti-feline hemoplasma antibodies. The aim of the present study was to investigate the humoral immune response in cats experimentally infected with ‘Candidatus Mycoplasma turicensis’ and to monitor the influence of the pre-administration of methylprednisolone and subsequent antibiotic treatment. Serum and plasma samples from 15 specified pathogen-free cats infected with ‘Candidatus Mycoplasma turicensis’ were analyzed by ELISA. Seroconversion was demonstrated in all cats, and the antibodies remained detectable until the end of the study (up to 100 weeks post-exposure). In some cats, the ELISA seemed more sensitive and better able to demonstrate exposure to ‘Candidatus Mycoplasma turicensis’ than PCR. The peak antibody level occurred after the peak of the bacterial blood loads. The methylprednisolone administrations were associated with increased antibody levels, while antibiotic treatment, particularly with doxycycline, resulted in a decrease in antibody levels. Additionally, preliminary data indicated that three of four seropositive cats were protected from bacteremia after a subsequent challenge. In conclusion, the ELISA was found to be a useful tool to investigate the humoral immune response in hemoplasma-infected cats and a desirable addition to PCR to study the pathogenesis of hemoplasma infections.

**Seroprevalence and risk factors for Toxoplasma gondii infection in domestic cats in The Netherlands.**
Cats, as definitive hosts, play an important role in the transmission of Toxoplasma gondii. To determine the seroprevalence and risk factors for T. gondii infection in Dutch domestic cats, serum samples of 450 cats were tested for T. gondii antibodies by indirect ELISA. Binary mixture analysis was used to estimate the seroprevalence, the optimal cut-off value and the probability of being positive for each cat. The seroprevalence was estimated at 18.2% (95% CI: 16.6-20.0%) and showed a decrease with age in very young cats, an increase up to about 4 years old and ranged between 20 and 30% thereafter. Hunting (OR 4.1), presence of a dog in the household (OR 2.1), former stray cat (OR 3.3) and feeding of raw meat (OR 2.7) were identified as risk factors by multivariable logistic regression analysis. Prevalence differences were estimated by linear regression on the probabilities of being positive and used to calculate the population attributable fractions for each risk factor. Hunting contributed most to the T. gondii seroprevalence in the sampled population (35%).


**Hemolytic anemia in dogs and cats due to erythrocyte enzyme deficiencies.**
Erythrocyte enzyme deficiencies do not usually shorten life expectancy except for PK deficiency in dogs and the potential for PFK-deficient dogs to die during hemolytic crises. In addition, erythrocyte enzyme deficiencies are uncommon or rare, so they are generally not seriously considered in the differential diagnosis of anemia until common causes of anemia have been excluded. However, unique clinical and/or laboratory findings like sporadic hemoglobinuria in English Springer spaniels (PFK deficiency) may quickly point to the possibility of an inherited erythrocyte enzyme defect. The ability to diagnose deficient or carrier animals allows for the possibility of eliminating these undesirable traits in future breeding. Continued research is needed to document additional enzyme deficiencies that likely occur and to develop additional DNA-based assays that are especially important in the recognition of heterozygous or carrier animals that have no clinical signs.


**Successful treatment of hepatic failure secondary to diazepam administration in a cat.**
A 2-year-old castrated male domestic shorthair cat developed acute hepatic failure following oral diazepam administration for behavioral problems. The patient survived with intensive supportive care and was discharged after 5 days in hospital. Successful treatment of diazepam-associated fulminant hepatic failure in cats has rarely been described in the veterinary literature.

Feline infectious peritonitis virus (FIPV) was presumed to arise from mutations in the 3c of a ubiquitous and largely nonpathogenic feline enteric coronavirus (FECV). However, a recent study found that one-third of FIPV isolates have an intact 3c and suggested that it is not solely involved in FIP but is essential for intestinal replication. In order to confirm these assumptions, 27 fecal and 32 FIP coronavirus isolates were obtained from resident or adopted cats from a large metropolitan shelter during 2008-2009 and their 3a-c, E, and M genes sequenced. Forty percent of coronavirus isolates from FECV tissues had an intact 3c gene, while 60% had mutations that truncated the gene product. The 3c genes of fecal isolates from healthy cats were always intact. Coronavirus from FIP diseased tissues consistently induced FIP when given either oronasally or intraperitoneally (i.p.), regardless of the functional status of their 3c genes, thus confirming them to be FIPVs. In contrast, fecal isolates from healthy cats were infectious following oronasal infection and shed at high levels in feces without causing disease, as expected for FECVs. Only one in three cats shed FECV in the feces following i.p. infection, indicating that FECVs can replicate systemically, but with difficulty. FIPVs having a mutated 3c were not shed in the feces following either oronasal or i.p. inoculation, while FIPVs with intact 3c genes were shed in the feces following oronasal but not i.p. inoculation. Therefore, an intact 3c appears to be essential for intestinal replication. Although FIPVs with an intact 3c were shed in the feces following oronasal inoculation, fecal virus from these cats was not infectious for other cats. Attempts to identify potential FIP mutations in the 3a, 3b, E, and M were negative. However, the 3c gene of FIPVs, even though appearing intact, contained many more non-synonymous amino acid changes in the 3’ one-third of the 3c protein than FECVs. An attempt to trace FIPVs isolates back to enteric strains existing in the shelter was only partially successful due to the large region over which shelter cats and kittens originated, housing conditions prior to acquisition, and rapid movement through the shelter. No evidence could be found to support a recent theory that FIPVs and FECVs are genetically distinct.
were not found in feces of the 23 cats. Tissues of 57.8% (37/64) of these stray cats had titers of 1:20 or higher and were considered positive with infection. T. gondii oocysts and mouse virulence of T. gondii from stray cats in Beijing, China. A total of 64 serum samples, 23 feces and tissue samples were investigated in 13 cats by studying PTH concentration (15.1 +/- 1.6 pg/mL) greater (P < 0.001) than I-PTH concentration (9.1 +/- 0.7 pg/mL). The dynamics of PTH secretion in response to changes in extracellular calcium (Ca(2+)) were investigated in 13 cats by studying PTH-Ca(2+) curves. PTH-Ca(2+) curves were obtained by intravenous infusion of disodium ethylenediaminetetraacetic acid and CaCl(2). PTH was measured using both I-PTH and W-PTH assays. During hypocalcemia a sigmoidal curve that was similar when measured with I-PTH or W-PTH was obtained. The maximal PTH concentration in response to hypocalcemia was greater with W-PTH (179.6 +/- 41.9 pg/mL) than with I-PTH (67.6 +/- 10.5 pg/mL; P = 0.01). However, hypercalcemia resulted in an equivalent PTH inhibition, with both assays yielding PTH concentrations as follows: W-PTH = 4.0 +/- 0.4 pg/mL and I-PTH = 4.9 +/- 0.3 pg/mL (NS). Parameters of the feline PTH-Ca(2+) curve are similar to what has been previously reported in dogs.

Validated assays for quantification of intact parathyroid hormone (I-PTH) are no longer available. Moreover, the third-generation PTH assay that only detects the whole PTH molecule (W-PTH) has never been tested in cats. The work presented here is aimed to validate a commercially available assay for measurement of I-PTH and W-PTH in cats and to study the dynamics of PTH secretion in healthy cats. Our results show that both assays are reliable for the measurement of feline PTH. In healthy adult cats W-PTH concentration (15.1 +/- 1.6 pg/mL) was greater (P < 0.001) than I-PTH concentration (9.1 +/- 0.7 pg/mL). The dynamics of PTH secretion in response to changes in extracellular calcium (Ca(2+)) were investigated in 13 cats by studying PTH-Ca(2+) curves. PTH-Ca(2+) curves were obtained by intravenous infusion of disodium ethylenediaminetetraacetic acid and CaCl(2). PTH was measured using both I-PTH and W-PTH assays. During hypocalcemia a sigmoidal curve that was similar when measured with I-PTH or W-PTH was obtained. The maximal PTH concentration in response to hypocalcemia was greater with W-PTH (179.6 +/- 41.9 pg/mL) than with I-PTH (67.6 +/- 10.5 pg/mL; P = 0.01). However, hypercalcemia resulted in an equivalent PTH inhibition, with both assays yielding PTH concentrations as follows: W-PTH = 4.0 +/- 0.4 pg/mL and I-PTH = 4.9 +/- 0.3 pg/mL (NS). Parameters of the feline PTH-Ca(2+) curve are similar to what has been previously reported in dogs.

Norovirus (NoV) RNA was detected in the stools of 6 out 14 (42.8%) 8-12-week-old cats with enteritis from a feline shelter, in New York State. Upon sequence analysis of the complete capsid, the six NoVs were found to be identical, suggesting the spread of a unique NoV strain in the shelter. The full-length genomic sequence (7839 nt) of one feline NoV, CU081210/2010/US, was determined. In the capsid protein VP1 region, the virus displayed the highest amino acid identity to animal genogroup IV genotype 2 (GIV.2) NoVs: lion/Pistoia-387/06/IT (97.9%) and dog/Bari-170/07/IT (90.4%). These findings document the discovery of a novel feline calicivirus, different from vesiviruses, and extend the spectrum of NoV host range. Epidemiological studies using feline NoV-specific diagnostic tools and experimental infection of cats are required to understand whether NoVs have a pathogenic role in this species.

Isolation and characterization of Toxoplasma gondii strains from stray cats revealed a single genotype in Beijing, China.

Cats are essential in the epidemiology of Toxoplasma gondii because they are the only hosts that can excrete the environmentally resistant oocysts in nature. This study was aimed to determine the seropositivity, distribution of genotypes and mouse virulence of T. gondii from stray cats in Beijing, China. A total of 64 serum samples, 23 feces and tissue samples were collected from stray cats in Beijing. Antibodies to T. gondii were assayed by the modified agglutination test (MAT). 57.8% (37/64) of these stray cats had titers of 1:20 or higher and were considered positive with infection. T. gondii oocysts were not found in feces of the 23 cats. Tissues of 23 cats were bioassayed in mice and 11 T. gondii isolates were obtained.
The genotype of these isolates were identified by 11 PCR-RFLP markers, including SAG1, (3'+5')SAG2, alt.SAG2, SAG3, BTUB, GRA6, c22-8, c29-2, L358, PK1, and an apicoplast marker, Apico. Only one genotype was identified. This genotype, designated as ToxoDB genotype #9, was previously reported in cats, pigs and human from Guangdong and Gansu provinces in China and animals from a few other countries. To determine mouse virulence of this lineage of parasites, one isolate was randomly selected and inoculated into BABL/c mice, the result showed that it is intermediately virulent to mice. These results indicated that an atypical, intermediately virulent T. gondii lineage is widespread in China. The high seropositivity of T. gondii in stray cats posts potential risk of transmission of the parasite to human population in the region.


Prevalence of selected bacterial and parasitic agents in feces from diarrheic and healthy control cats from Northern California.

BACKGROUND: Bacterial and parasitic agents are commonly implicated as causes of diarrhea in cats, but there is a paucity of information evaluating epidemiological and prevalence factors associated with most of these organisms in cats.

OBJECTIVES: Determine the prevalence of selected enteropathogens in diarrheic and nondiarrheic cats. ANIMALS: A total of 219 diarrheic and 54 nondiarrheic cats. METHODS: Prospective study. Fresh fecal specimens were submitted for centrifugation flotation, culture, ELISA (Giardia, Cryptosporidium, Clostridium perfringens enterotoxin [CPE], and C. difficile toxin A [TcdA]) and polymerase chain reaction (PCR) testing (Trichomonas foetus and Campylobacter spp.). An epidemiologic questionnaire was completed for each cat. RESULTS: Campylobacter was isolated from significantly fewer diarrheic (21/219 or 9.6%) versus nondiarrheic cats (15/54 or 27.8%, P =.001), and was detected in 74 of 131 cats (56.5%) via PCR. Campylobacter jejuni, C. helveticus, and C. upsaliensis were detected in 6.8, 100, and 44.6% of the 74 cats. Multiple Campylobacter spp. were identified in 47.3% of these cats. All cats were negative on fecal culture for Salmonella and for C. difficile TcdA via ELISA. CPE was detected in 9/219 diarrheic (4.1%) and in 1/54 nondiarrheic cats (1.9%, P =.69). Cats < 2 years were significantly more likely to be infected with intestinal parasites (P <.001). CONCLUSIONS AND CLINICAL IMPORTANCE: Routine fecal cultures and toxin immunoassays for detection of bacteria are of limited diagnostic value in diarrheic cats. Molecular-based testing is superior to fecal cultures for detection and identification of Campylobacter spp., but positive test results do not correlate to the presence of disease.


Adrenal function in cats with hyperthyroidism.

Adrenal function may be altered in animals with hyperthyroidism. The aim of the study was to assess adrenal function of hyperthyroid cats (n = 17) compared to healthy cats (n = 18) and cats with chronic diseases (n = 18). Adrenal function was evaluated by adrenocorticotropic hormone (ACTH) stimulation test and the urinary cortisol to creatinine ratio (UCCR) was determined. Length and width of both adrenal glands were measured via ultrasound. Hyperthyroid cats had significantly higher cortisol levels before and after stimulation with ACTH than the other groups. However, the UCCR was not elevated in hyperthyroid cats. The size of the adrenal glands of hyperthyroid cats was not significantly different from the size of those of healthy cats. The results indicate that cats with hyperthyroidism have a higher cortisol secretory capacity in a hospital setting. The normal size of the adrenal glands suggests that cortisol levels may not be increased permanently.


Retrospective study of the prevalence of postanaesthetic hypothermia in cats.

A retrospective study of 275 anaesthetic records of cats was undertaken to examine the prevalence of postanaesthetic hypothermia, its clinical predictors and consequences. Temperature was recorded throughout anaesthesia. The temperature reached at the end was classified as hypothermia (>39.50 degrees C), normothermia (38.50 to 39.50 degrees C), slight hypothermia (38.49 to 36.50 degrees C), moderate hypothermia (36.49 to 34.00 degrees C) or severe hypothermia (<34.00 degrees C). Statistical analysis consisted of multiple regression to identify the factors that affect the temperature at the end of the procedure. Before premedication, the mean (sd) temperature was 38.2 (1.0) degrees C. At 60, 120 and 180 minutes from induction, the temperature was 35.4 (1.4) degrees C, 35.0 (1.5) degrees C and 34.6 (1.5) degrees C, respectively. The prevalence of hypothermia was slight 26.5 per cent (95 per cent CI 21.7 to 32.0 per cent), moderate 60.4 per cent (95 per cent CI 54.5 to 66.0 per cent) and severe 10.5 per cent (95 per cent CI 7.4 to 14.7 per cent). The variables associated with a decrease in the temperature recorded at the end of anaesthesia were the duration of anaesthesia, the reason for anaesthesia (abdominal and orthopaedic surgeries significantly reduced the temperature when compared with minor procedures) and the anaesthetic risk (high-risk cats showed lower temperatures than low-risk cats). The temperature before premedication was associated with an increase in the final temperature.
Effects of intravenous, low-dose ketamine-diazepam sedation on the results of hematologic, plasma biochemical, and coagulation analyses in cats.

OBJECTIVE: To evaluate the effects of an IV, low-dose ketamine-diazepam combination used for short-duration chemical restraint on the results of clinicopathologic testing in cats and to assess its practicality and tolerance. DESIGN: Prospective case series. ANIMALS: 42 client-owned cats of various breeds, ages, and health status. PROCEDURES: Blood samples were obtained just prior to and just after IV injection of ketamine chlorhydrate (10 mg) and diazepam (0.5 mg). A CBC, plasma biochemistry panel, and coagulation profile were performed on each sample (ie, before and after chemical restraint). Practicality of the procedure was assessed, and cats were monitored for immediate and delayed effects. RESULTS: Significant changes were observed for most of the analytes tested. However, the magnitude of the observed changes was notably low and likely not of clinical relevance. The chemical-restraint procedure appeared effective, safe, and well tolerated. CONCLUSIONS AND CLINICAL RELEVANCE: The IV, low-dose ketamine-diazepam combination used for short-duration chemical restraint in the present study may be suitable to assist physical restraint for blood sampling for assessment of hematologic, serum biochemical, and coagulation parameters in cats.


Effects of ivabradine on heart rate and left ventricular function in healthy cats and cats with hypertrophic cardiomyopathy.

OBJECTIVE: To evaluate the effects of the pacemaker funny current (I(f)) inhibitor ivabradine on heart rate (HR), left ventricular (LV) systolic and diastolic function, and left atrial performance in healthy cats and cats with hypertrophic cardiomyopathy (HCM). ANIMALS: 6 healthy cats and 6 cats with subclinical HCM. PROCEDURES: Anesthetized cats underwent cardiac catheterization and were studied over a range of hemodynamic states induced by treatment with esmolol (200 to 400 mug/kg/min, IV), esmolol and dobutamine (5 mug/kg/min, IV), ivabradine (0.3 mg/kg, IV), and ivabradine and dobutamine. Left ventricular systolic and diastolic function, cardiac output, and left atrial function were studied via catheter-based methods and echocardiography. RESULTS: Treatment with ivabradine resulted in a significant reduction of HR, rate-pressure product, and LV contractile function and a significant increase in LV end-diastolic wall stress, and LV relaxation time constant (tau) in cats with HCM. Concurrent administration of ivabradine and dobutamine resulted in a significant increase of LV contractility and lusitropy, with blunted chronotropic effects of the catecholamine. Left atrial performance was not significantly altered by ivabradine in cats with HCM. Regression analysis revealed an association between maximum rate of LV pressure rise and tau in cats with HCM. CONCLUSIONS AND CLINICAL RELEVANCE: Ivabradine had significant effects on several cardiovascular variables in anesthetized cats with HCM. Studies in awake cats with HCM are needed to clinically validate these findings.


The aim of this study was to assess the efficacy and safety of deslorelin acetate implants on domestic queen puberty postponement. Thirty, 114.4 +/- 12.7 days old, 1.5 +/- 0.1 kg prepubertal crossbred female cats were included in this study. The animals were kept under a positive photoperiod and randomly assigned to deslorelin acetate 4.7 mg SC implants (n = 15) or to a non-treated control group (n = 15). The queens were followed up daily and weighed weekly until puberty. Vaginal cytology was also carried out three times a week. Puberty was diagnosed by the presence of the typical oestrous behaviour and vaginal cytology findings. At puberty, ovariectomy was performed and the gonads grossly described. Age (281.2 +/- 21.6 vs 177.8 +/- 10.8; p < 0.01) but not weight (2.6 +/- 0.1 vs 2.5 +/- 0.1; p > 0.1) at puberty differed between the deslorelin and control groups, respectively. One deslorelin-treated female showed an oestrous response and another showed clinical signs of pyometra after the implants. Deslorelin-treated ovaries appeared small, while control gonads were normal. It was concluded that long-term-release deslorelin, administered at approximately 50% adult body weight, postponed feline puberty without altering growing rate.


This retrospective study documents deep gluteal tenodesis (DGT) used to stabilize coxo-femoral luxation (CFL) in dogs and cats, and to report relaxation rate and clinical outcome after DGT. Medical records (1995-2008) of 65 dogs and cats with traumatic CFL treated by capsulorrhaphy and DGT were reviewed. Animals with radiographic evidence of pre-existing hip dysplasia or articular fractures had been excluded. Relaxation rate and outcome were assessed by clinical examination,
performed two and ten weeks postoperatively. Surgical treatment was performed between one and 20 days after the initiating event. No perioperative complications occurred. All hip joints were correctly reduced and stabilized immediately after DGT completion. Except for five patients, placement of the screw was considered correct. In two of these patients, the screws were too long and were protruding into the pelvic canal. In two dogs, the screws were not tightened adequately, and in one dog the screw was too short. Twenty-six dogs and eight cats were re-examined between eight and 13 weeks postoperatively. Re-luxation did not occur in any of them. Outcomes were good in two cases and excellent in 32 cases; all but two had a normal range-of-motion of the reconstructed hip, and were free of lameness and did not show any signs of pain. Traumatic CFL can be stabilized safely and effectively by DGT in dogs and cats. This technique should be considered among other capsular reinforcement techniques in the presence of an intact deep gluteal muscle.

A New Rickettsia Species Found in Fleas Collected from Human Dwellings and from Domestic Cats and Dogs in Senegal.

Abstract: The insects of the order Siphonaptera, commonly named fleas, are vectors of pathogens around the world. Our previous studies showed that 4.4% of acute febrile diseases in the Sine-Saloum region of Senegal were due to Rickettsia felis. The aim of this study was to explain the high prevalence of R. felis infections in two rural Senegalese populations by an entomological, systematic monitoring protocol. A total of 232 fleas from three species (Ctenocephalides felis, Echidnophaga gallinacea, and Synosternus pallidus) were collected by candle trapping and manually from pets in the villages of Dielmo and Ndiop during the year 2010. The fleas were then tested for the presence of Bartonella and Rickettsia species. No fleas were found to be positive for any Bartonella species or R. felis. Surprisingly, we found that 91.4% of S. pallidus were infected by a new Rickettsia species, which, based on sequence analysis of gltA, ompB, and two fragments of rpoB, was found to be closely related to R. felis. The results from this study did not explain the high incidence of R. felis infections in these Senegalese populations.

Herpesvirus dermatitis in two cats without facial lesions.
Background - Cats with feline herpesvirus (FeHV-1)-associated dermatitis typically present with ulcerative lesions on the rostral muzzle and nasal planum. This report describes FeHV-1 dermatitis in the flank region, in the absence of facial lesions. Hypothesis/Objectives - Clinicians should be aware of this unusual manifestation of FeHV-1 dermatitis to prevent potential misdiagnosis. Animals - A 12-year-old male castrated Bengal cat and a 3-year-old male castrated Siamese cat with plaques and ulcers in the flank region are described. Methods - Formalin-fixed biopsy samples were obtained from lesional skin. Histopathology and FeHV-1 immunohistochemistry were performed. Results - Each sample had epidermal and follicular necrosis with a dense dermal infiltrate of eosinophils. Few to moderate numbers of intranuclear inclusion bodies were present in keratinocytes. The presence of FeHV-1 in the lesions was confirmed with immunohistochemistry. Conclusions and clinical importance - Feline herpesvirus-associated dermatitis should not be ruled out based on the location of the lesion, because a correct diagnosis is imperative for proper treatment. Future studies to assess the cause of lesions at this unusual site are warranted.

Tolerability and efficacy of the intestinal phosphate binder Lantharenol(R) in cats.
ABSTRACT: BACKGROUND: Tolerability and efficacy of the intestinal phosphate binder Lantharenol(R) (lanthanum carbonate octahydrate) were tested in two prospective, randomized and negative controlled laboratory studies with healthy adult cats fed commercial maintenance diet non-restricted in phosphorus. In the first study, the maximal tolerated dose was determined. Starting from a dose of 0.125 g/kg body weight mixed with the daily feed ration, the dose of Lantharenol(R) was doubled every other week until signs of intolerability were observed (N = 10 cats compared to 5 untreated controls). In the second study, the effects of feed supplementation for two weeks with approximately 2, 6, and 20% of the maximal tolerated dose on phosphorus excretion patterns and balance were assessed (N = 8 cats per group). RESULTS: Lantharenol(R) was found to be safe and well tolerated up to the dose of 1 g/kg bodyweight, corresponding to a concentration of 84 g Lantharenol(R)/kg complete feed, defined as dry matter with a standard moisture content of 12%. Feed supplementation for two weeks with approximately 2-20% of this dosage (i.e., 1.6, 4.8, and 16 g/kg complete feed) resulted in a shift from urinary to faecal phosphorus excretion. Apparent phosphorus digestibility was dose-dependently reduced compared to the control group fed with diet only (N = 8). CONCLUSIONS: The feed additive was well accepted and tolerated by all cats. Therefore, Lantharenol(R) presents a well tolerated and efficacious option to individually tailor restriction of dietary phosphorus as indicated, for instance, in feline chronic kidney disease.
ISFM Feline Abstracts • Jan-Feb 2012


**Efficacy of a 0.0584% hydrocortisone aceponate spray in presumed feline allergic dermatitis: an open label pilot study.**

This study evaluated the efficacy of a 0.0584% hydrocortisone aceponate (HCA) spray (Cortavance(R); Virbac SA) in 10 cats with presumed allergic dermatitis. The cats initially received two sprays/100 cm(2) of skin once daily. Clinical lesions (a Feline Dermatitis Extent and Severity Index; FeDESI), pruritus (10 cm visual analog scale with grade descriptors) and owner assessments of efficacy, tolerance and ease of use (from 1=very poor to 5=excellent) were assessed every 14 days. The frequency of treatment was reduced after day 28 in cats with a >50% reduction in FeDESI and pruritus scores. One cat was lost to follow up at day 28 and two at day 42. Intention-to-treat data were analysed. The FeDESI [mean (SD): day 0, 42.2 (15.7) and day 56, 9.9 (11.7); P<0.0001] and pruritus scores [day 0, 61.2 mm (20.1) and day 56, 14.6 mm (16.1); P<0.0001] significantly decreased throughout the trial. The owner scores for tolerance [median (range): day 14, 4 (1-5) and day 56, 4 (3-5); P=0.003] and ease of administration [day 14, 3 (2-5) and day 56, 4 (2-5); P=0.02] significantly increased during the trial, but there was no significant change in efficacy scores [day 14, 4 (3-5) and day 56, 4 (2-5); P=0.5]. There were no adverse effects attributable to the HCA spray, no significant changes in weight [mean (SD): day 0, 5.0 kg (1.4) and day 56, 5.0 kg (1.6); P=0.51] and no significant changes in haematology, biochemistry or urinalysis (n=4). Six cats required every-other-day treatment and four required daily treatment. In conclusion, HCA spray appeared to be effective and safe in these cats, although it is not licensed for use in this species.


**Neutropenia in dogs and cats: causes and consequences.**

Neutropenia is a serious hematopathologic change that should not be ignored. In almost all patients, it is an important primary or secondary indicator of significant underlying disease. While in some neutropenic patients the diagnostic work up will be simple, in others it is challenging. The value of examining a blood smear for toxic changes in neutrophils cannot be overemphasized; it may indicate the presence of systemic inflammation, as well as providing clues about prognosis and the extent of treatment the patient may require.


**Rickettsia felis and Bartonella spp. in fleas from cats in Albania.**

Fleas can serve as vectors for bacterial pathogens like Bartonella and Rickettsia species, which have been isolated worldwide. However, the knowledge of the epidemiology of vector-borne diseases in general and thus on flea-borne diseases in Albania is limited. Therefore, from 78 free-roaming cats in Tirana, Albania, fleas (371 Ctenocephalides felis and 5 Ctenocephalides canis) were collected to examine them for the presence of Rickettsia and Bartonella species. Ten of the 371 C. felis (2.7%) were positive for Rickettsia felis, and 24 (6.5%) for Bartonella spp. (B. henselae and B. clarridgeiae). In total, fleas from 15 cats (19.2%) were positive for either one or the other of the pathogens. The results of this study provided evidence for the presence of R. felis (causing flea-borne spotted fever) and Bartonella spp. (causing cat scratch disease) in Albania. Thus, these infectious diseases should be considered as differential diagnoses when febrile symptoms are presented, especially after contact with cats or their fleas.


**Hypertrophic cardiomyopathy in the Sphynx cat: A retrospective evaluation of clinical presentation and heritable etiology.**

Hypertrophic cardiomyopathy is an inherited disease in some feline breeds including the Maine Coon and Ragdoll. In these breeds, distinct causative genetic mutations have been identified. The two breeds appear to have slightly different clinical presentations, including age of diagnosis. The observation that these two breeds may have different clinical presentations, as well as different genetic mutations, suggests that hypertrophic cardiomyopathy is a diverse disease in the cat. Hypertrophic cardiomyopathy is poorly described in the Sphynx. The objective of this study was to phenotypically characterize Sphynx hypertrophic cardiomyopathy and to evaluate for a familial etiology. Records of 18 affected cats (11 female, seven male) were evaluated. Age of affected cats ranged from 0.5 to 7 years (median, 2 years). Four affected cats were from a single family and included an affected cat in each of four generations (three females, one male). Further studies are warranted to evaluate for a causative mutation and better classify the phenotypic expression.

**Helicobacter heilmannii sp. nov., isolated from feline gastric mucosa.**

Three gram-negative, microaerophilic bacteria, strains ASB1(T), ASB2 and ASB3, with a corkscrew-like morphology isolated from the gastric mucosa of cats were studied using a polyphasic taxonomic approach. The isolates grew on biphasic culture plates under microaerobic conditions at 37 degrees C and exhibited urease, oxidation and catalase activities. They were also able to grow in colonies on dry agar plates. Based on 16S rRNA gene sequence analysis, ASB1(T), ASB2 and ASB3 were identified as members of the genus Helicobacter and showed 98 to 99 % sequence similarity to strains of Helicobacter felis, Helicobacter bizzozeronii, ‘Candidatus Helicobacter heilmannii’, Helicobacter cynogastricus, Helicobacter balcaniformis and Helicobacter salomonis, six related Helicobacter species previously detected in feline or canine gastric mucosa. Sequencing of the partial hsp60 gene demonstrated that ASB1(T), ASB2 and ASB3 constitute a separate taxon among the feline and canine Helicobacter species. The urease gene sequences of ASB1(T), ASB2 and ASB3 showed approximately 91 % similarity to those of ‘Candidatus Helicobacter heilmannii’. Protein profiling, the absence of alkaline phosphatase activity and several other biochemical characteristics also allowed strains ASB1(T), ASB2 and ASB3 to be differentiated from other Helicobacter species of feline or canine gastric origin. The results of this polyphasic taxonomic study show that the cultured isolates constitute a new taxon corresponding to ‘Candidatus Helicobacter heilmannii’, which was previously demonstrated in the stomach of humans, wild felidae, cats and dogs. The name Helicobacter heilmannii sp. nov. is proposed for these isolates; the type strain is ASB1(T) (= DSM 23983(T) = LMG 26292(T)).


**Clinical signs and left atrial size in cats with cardiovascular disease in general practice.**

OBJECTIVES: To evaluate population characteristics, clinical signs and simple echocardiographic measurements of a general practice population of cats, in identifying characteristics that reliably distinguish cats with heart disease from others, including those with respiratory disease, using widely available techniques. METHODS: Cats presented with heart disease (n=103), respiratory disease (n=19) and a normal group (n=29) were prospectively recruited. All cats were subject to full clinical examination, echocardiography and additional diagnostic procedures as appropriate to establish definitive diagnosis. Cats were classified as Group 1: no heart disease +/- respiratory disease; Group 2: heart disease with no clinical signs; Group 3: heart disease with clinical signs. Murmur, gallop sound and arrhythmia prevalence and left atrial size were compared between the groups. RESULTS: Low heart rates prevailed in Group 3. Murmurs were prevalent in Group 2, but in Group 3 prevalence was significantly lower. Dyspnoea, gallop sounds, arrhythmias and left atrial diameter were significantly different between groups. CLINICAL SIGNIFICANCE: Heart rate is unreliable for diagnosing heart failure in cats. Absence of murmur is prevalent in cats with clinical signs of heart failure, but arrhythmia and gallop sounds are prevalent. Echocardiographic measurement of left atrial diameter >16.5 mm may distinguish heart failure from respiratory disease in general practice.


**Coinfection of Leishmania chagasi with Toxoplasma gondii, Feline Immunodeficiency Virus (FIV) and Feline Leukemia Virus (FeLV) in cats from an endemic area of zoonotic visceral leishmaniasis.**

The aim of the present study was to determine the coinfection of Leishmania sp. with Toxoplasma gondii, Feline Immunodeficiency Virus (FIV) and Feline Leukemia Virus (FeLV) in a population of cats from an endemic area for zoonotic visceral leishmaniasis. An overall 66/302 (21.85%) cats were found positive for Leishmania sp., with infection determined by direct parasitological examination in 30/302 (9.93%), by serology in 46/302 (15.23%) and by both in 10/302 (3.31%) cats. Real time PCR followed by amplicon sequencing successfully confirmed Leishmania infantum (syn Leishmania chagasi) infection. Out of the Leishmania infected cats, coinfection with FIV was observed in 12/66 (18.18%), with T. gondii in 17/66 (25.75%) and with both agents in 5/66 (7.58%) cats. FeLV was found only in a single adult cat with no Leishmania infection. A positive association was observed in coinfection of Leishmania and FIV (p<0.0001), but not with T. gondii (p>0.05). In conclusion, cats living in endemic areas of visceral leishmaniasis are significantly more likely to be coinfected with FIV, which may present confounding clinical signs and therefore cats in such areas should be always carefully screened for coinfections.


**Seroprevalence of feline immunodeficiency virus, feline leukaemia virus and Toxoplasma gondii in stray cat colonies in northern Italy and correlation with clinical and laboratory data.**

Stray cat colonies in urban and rural areas of Lombardy, northern Italy, were surveyed for seroprevalence of feline
immunodeficiency virus (FIV) antibodies, feline leukaemia virus (FeLV) antigen and Toxoplasma gondii IgG. Of 316 cats tested, 6.6% were positive for FIV and 3.8% were positive for FeLV infection; 203 cats were tested for T gondii IgG antibodies and a prevalence of 30.5% was detected. Statistical analysis tested the influence of provenience, age, gender, health status and laboratory results on seroprevalence and found male gender and adult age were risk factors for FIV infection. FIV-infected cats were more likely to have a decreased red blood cell count than FIV seronegative cats. No predictors were significantly associated with FeLV and T gondii seropositivity. Colony cats in this study posed a limited risk for retrovirus infection to pet cats allowed outdoors, whereas toxoplasmosis exposure was comparable with the worldwide data.


Laboratory diagnosis of disseminated intravascular coagulation in dogs and cats: the past, the present, and the future.


Doppler echocardiographic diagnosis and surgical therapy of constrictive pericarditis in a cat.

A 4-year-old Ragdoll cat presented for dyspnea secondary to chylos pleural effusion to the University of Georgia Veterinary Teaching Hospital. Physical examination, complete blood count, serum chemistries, urinalysis, thoracic radiographs, abdominal radiographs, and thoracic fluid cytology and culture failed to identify an etiology for the chylos effusion. The patient tested negative for feline leukemia virus, feline immunodeficiency virus and heartworm disease. Respiration phasic influences on early diastolic trans-mitral, trans-tricuspid and pulmonary vein blood flow velocities during Doppler echocardiography were consistent with constrictive pericarditis. The cat underwent subtotal pericardectomy. The patient recovered without complication and is overtly healthy without radiographic or echocardiographic abnormalities 6-months post-surgery. Constrictive pericarditis should be considered in cats with idiopathic pleural effusion, with or without ascites, in which standard echocardiographic assessment is not suggestive of structural heart disease. If constrictive pericarditis is present, the Doppler characteristics outlined here may allow for this diagnosis to be made. Pericardectomy may be highly rewarding, although the specific etiology of the constrictive pericarditis may remain unknown.


Pharmacokinetics of famciclovir and penciclovir in tears following oral administration of famciclovir to cats: a pilot study.

Objective To validate a means of collecting tears from cats, develop an assay for quantifying famciclovir and penciclovir in tears, and to assess famciclovir and penciclovir concentrations and pharmacokinetics in the tears of cats being treated orally with famciclovir for suspected herpetic disease. Animals Seven client-owned cats. Procedures Cats were treated orally with a median (range) dose of 40 (39-72) mg of famciclovir/kg three times daily for at least 24 h. At various time points following famciclovir administration, tear samples were collected using Schirmer tear test strips. Tear famciclovir and penciclovir concentrations were measured using liquid chromatography-mass spectrometry, and concentration-time profiles were analyzed noncompartmentally. The relationship between famciclovir dose and tear penciclovir concentration near its maximum was evaluated using least squares linear regression. Results Maximum tear famciclovir concentration of 0.305 mg/mL occurred at 2.64 h; elimination half-life was 2.28 h. Maximum tear penciclovir concentration (0.981 mg/mL) occurred 2.25 h following oral administration of famciclovir; elimination half-life was 2.77 h. A significant positive correlation was noted between famciclovir dose and tear penciclovir concentration at various time points between 0.5 and 3.75 h following drug administration (P = 0.025). Tear penciclovir concentration exceeded the concentration shown to have in vitro efficacy against feline herpesvirus (FHV-1) (0.304 mug/mL) in about half of samples collected. Conclusions Oral administration of 40 mg of famciclovir/kg to cats resulted in a tear penciclovir concentration-time profile that approximated the plasma penciclovir concentration-time profile and frequently achieved a penciclovir concentration at the ocular surface likely to be effective against FHV-1.


Synaptic plasticity in the medial superior olive of hearing, deaf, and cochlear-implanted cats.

The medial superior olive (MSO) is a key auditory brainstem structure that receives binaural inputs and is implicated in processing interaural time disparities used for sound localization. The deaf white cat, a proven model of congenital deafness, was used to examine how deafness and cochlear implantation affected the synaptic organization at this binaural center in the ascending auditory pathway. The patterns of axosomatic and axodendritic organization were determined for principal
neurons from the MSO of hearing, deaf, and deaf cats with cochlear implants. The nature of the synapses was evaluated through electron microscopy, ultrastructure analysis of the synaptic vessels and immunohistochemistry. Results show that the proportion of inhibitory axosomatic terminals was significantly smaller in deaf animals when compared to hearing animals. However, after a period of electrical stimulation via cochlear implants, the proportion of inhibitory inputs resembled that of hearing animals. Additionally, the excitatory axodendritic boutons of hearing cats were found to be significantly larger than those of deaf cats. Boutons of stimulated cats were significantly larger than the boutons in deaf cats, though not as large as in the hearing cats, indicating a partial recovery of excitatory inputs to MSO dendrites after stimulation. These results exemplify dynamic plasticity in the auditory brainstem and reveal that electrical stimulation through cochlear implants has a restorative effect on synaptic organization in the MSO. J. Comp. Neurol., 2012. (c) 2012 Wiley-Liss, Inc.

Todd, S. E., D. G. Thomas, G. Bosch, and W. H. Hendriks (2012) J Anim Sci Selenium status in adult cats and dogs fed high levels of dietary inorganic and organic selenium. Cats maintain higher blood Se concentrations compared to dogs and, unlike dogs, show no signs of chronic Se toxicity (selenosis) when fed dietary organic Se (selenomethionine) concentrations of 10 microg/g DM. This study investigated the response of cats and dogs to high dietary concentrations of sodium selenite and organic Se to determine differences in metabolism between both species. In 2 consecutive studies, 18 adult cats and 18 adult dogs of equal sex were fed a control diet (0.6 microg Se/g DM) or the control diet supplemented to 8 to 10 microg Se/g DM from Na(2)SeO(3) or organic Se for 3 wk. All animals were fed the control diet 1 mo before the start of the study and blood samples were taken on d 0 and 21. The Se balance was assessed during the final week and a liver biopsy was obtained on the final day of the study. Measurements included plasma Se concentrations, plasma glutathione peroxidise (GPx) activities, plasma Se clearance, Se intake, and urinary Se excretion. No clinical signs of selenosis were observed in the cats or dogs, and apart from Se clearance, form of Se had no effect on any of the measurements. Apparent fecal Se absorption was greater in the dogs fed both forms of Se, while greater plasma Se concentrations were observed in the cats on both the control and supplemented diet (P = 0.034). Cats fed the supplemented diets had lower hepatic Se concentrations (P < 0.001) and excreted more Se in urine (P < 0.001) compared to dogs. Furthermore, cats fed the Na2SeO3 supplement had greater Se clearance rates than dogs (P < 0.001). There was no effect of species on plasma GPx activity. We conclude that cats can tolerate higher dietary Se concentrations as they are more efficient at excreting excess Se in the urine and storing less Se in the liver.

Toydemir, T. S., M. R. Kilicarslan, and V. Olgac (2012) Theriogenology 77:662-674. Effects of the GnRH analogue deslorelin implants on reproduction in female domestic cats. The aim of the present study was to investigate the safety and efficacy of deslorelin, a GnRH agonist, implants in suppressing estrus behavior and matings in a controlled ambient environment in feline queens in the presence of a tomcat. Local and utero-ovarian side effects of deslorelin implants were also investigated. The queens were housed in groups and assigned to one of three treatments: group 1 received 9.5 mg deslorelin implants (N = 14), group 2 received 5 mg megestrol acetate tablets and 9.5 mg deslorelin implants (N = 7), and group 3 were given placebo implants (N = 7). All implants were placed subcutaneously cranial to the interscapular region under xylazine hydrochloride sedation. Ovarian activity was monitored by fecal estradiol (E(2)) analyses. The animals were observed daily and checked individually at three-day intervals for behavioral signs of estrus. After 18.5 mo of trial, queens were ovariohysterectomized, and ovaries and uteri were weighed and evaluated histologically. E(2) levels were significantly lower in group 1 and 2 than in group 3 with an average of 128.48 +/- 19.97 ng/g, 90.44 +/- 7.16 ng/g and 283.26 +/- 39.21 ng/g, respectively, excepting the first week of treatment. After inserting implants an initial estrus-like increase in fecal E(2) concentrations occurred in all treated queens except one female in group 2. Ovarian and uterine weights were significantly different among the groups (P < 0.01), and were lowest in groups 1 and 2. Primordial and primary follicle numbers were significantly higher in groups 1 and 2 than in group 3 (P < 0.001). Endometrial gland, antral follicle, and corpus luteum (CL) numbers were highest in group 3 (P < 0.01, 0.001, and 0.001, respectively) compared with groups 1 and 2. Deslorelin implants successfully suppressed estrus behavior and E(2) secretion in queens for 18.5 mo of the study period. Further investigations are needed to demonstrate the effects of GnRH agonists on ovarian interstitial tissue.

Trevizan, L., A. de Mello Kessler, J. T. Brenna, P. Lawrence, M. K. Waldron, and J. E. Bauer (2012) Lipids 47:413-423. Maintenance of Arachidonic Acid and Evidence of Delta5 Desaturation in Cats Fed gamma-Linolenic and Linoleic Acid Enriched Diets. Cats have limited Delta6 desaturase activity. However, gamma-linolenate (GLA) feeding may by-pass the Delta6 desaturase step allowing arachidonate (ARA) accumulation via Delta5-desaturation. Alternatively, high dietary linoleate (LNA) may induce limited Delta6 desaturase also resulting in ARA accumulation. Fatty acid profiles were determined after feeding high
LNA, high GLA, or adequate LNA diets. Adult female cats (n = 29) were assigned to one of three groups and fed for 8 weeks. Plasma samples were collected at weeks 0, 2, 4 and 8 for plasma triacylglycerol (TAG), total cholesterol (TC), lipoprotein (LP), and plasma and red blood cell membrane phospholipid fatty acid determinations. Time, but no diet, effects were observed for TAG, TC, and LP fractions at weeks 2 and 4 with significant increases likely due to increased dietary fatty acid intake. However, all values were within feline normal limits. The GLA diet resulted in increased dihomo-γ-linolenic acid (DGLA) and ARA as early as week 2, supporting a Δ5 desaturase. Further evidence of Δ5 desaturase was found at high dietary LNA with the appearance of a novel fatty acid, 20:3 7, 11, 14, apparently formed via Δ5 desaturation and chain elongation of LNA. However, Δ6 desaturase induction at high dietary LNA concentration was not observed. Cats were able to maintain plasma and red blood cell ARA when fed a practical diet containing GLA using what appears to be an active Δ5 desaturase enzyme.

Tvarijonaviciute, A., A. J. German, S. Martinez-Subiela, F. Tecles, and J. J. Ceron (2012) J Feline Med Surg 14:138-146. Analytical performance of commercially-available assays for feline insulin-like growth factor 1 (IGF-1), adiponectin and ghrelin measurements. The objective of this study was to evaluate three commercially-available human assays for the determination of adiponectin, ghrelin and insulin-like growth factor 1 (IGF-1) concentrations in feline serum samples. Intra- and interassay coefficients of variation were lower than 20%, 15% and 6% for adiponectin, ghrelin and IGF-1 assays, respectively. Dilutions of feline serum pools resulted in linear regression equations in all kits. Mean recovery of adiponectin, ghrelin and IGF-1 assays were 107%, 102% and 105%, respectively. Significant differences were detected in adiponectin and ghrelin concentrations between lean and obese cats (P <0.05 in both cases), but there was no difference in IGF-1 concentrations (P = 0.12).

Verbrugghe, A., M. Hesta, S. Daminet, and G. P. Janssens (2012) Crit Rev Food Sci Nutr 52:172-182. Nutritional modulation of insulin resistance in the true carnivorous cat: a review. Cats are strict carnivores that rely on nutrients in animal tissues to meet their specific and unique nutritional requirements. In their natural habitat, cats consume prey high in protein with moderate amounts of fat and minimal carbohydrates in contrast to commercial diets, which are sometimes moderate to high in carbohydrates. This change in diet has been accompanied by a shift from an outdoor environment to an indoor lifestyle and decreased physical activity, because cats no longer need to hunt to obtain food. This transformation of the lifestyle of cats is thought to be responsible for the recent increase in incidence of obesity, insulin resistance, and diabetes mellitus in domestic cats. At first, an overview of the evolutionary physiological adaptations of carbohydrate digestion in the feline digestive tract and of the hepatic carbohydrate and protein metabolism reflecting the true carnivorous nature of cats is given. Secondly, this literature review deals with nutritional modulation of insulin sensitivity, focusing on dietary macronutrients, carbohydrate sources, and dietary fiber for prevention and treatment of insulin resistance.

Waap, H., R. Cardoso, A. Leitao, T. Nunes, A. Vilares, M. J. Gargate, J. Meireles, H. Cortes, and H. Angelo (2012) Vet Parasitol In vitro isolation and seroprevalence of Toxoplasma gondii in stray cats and pigeons in Lisbon, Portugal. Oral contamination with Toxoplasma gondii oocysts shed by cats into the environment has been linked to severe outbreaks of human toxoplasmosis. Pigeons (Columba livia) are highly susceptible to oral infection with oocysts and indirectly indicate soil contamination, since they feed from the ground. A seroprevalence study was performed on cats and pigeons captured in the city of Lisbon. Serum samples collected from 1507 pigeons captured at 64 feeding sites and 423 stray cats were screened for antibodies anti-T. gondii using a commercial direct agglutination test. Seroprevalence in pigeons was 2.6% (39/1507) (95% CI: 1.9-3.5%) and 37.5% (24/64) of pigeon flocks sampled showed to be infected with T. gondii. The proportion of infected pigeons within seropositive flocks ranged between 4.8% and 21.1%. Among cats, seroprevalence was 44.2% (187/423) (95% CI: 39.5-49.1%). Isolation of T. gondii from animal tissues was attempted by in vitro assay. Inoculation of brain homogenates from 20 pigeons and 56 cats into Vero cell cultures allowed isolation of T. gondii from 13 pigeons (65%) and 15 cats (26.8%). Inoculation of muscle homogenates (heart and limbs) prepared by acid-peptic digestion from a subset of 15 cats resulted in the recovery of T. gondii from 10 cats (66.7%).

Validation of a portable hand
preferred MSC for clinical applications where rapid and efficient generation of MSC is
cultures of AT
present in the surface markers assessed. We conclude that BM
human and veterinary medicine. At present, MSC are most often collected from bone marrow (BM) or adipose tissue (AT)
Mesenchymal stem cells (MSC) are increasingly being proposed as a therapeutic option for a variety of different diseases in
combination with neutralisation tests.
ELISA to the gold standard FAVN test in 701 samples from vaccinated dogs and cats. The rabies ELISA developed recently
can be considered a valuable method for the assessment of rabies an
neutralisation tests (FAVN
test or RFFIT) are time
-consuming, expensive and require highly trained technicians as well as
special laboratory facilities. The rabies ELISA designed by BioPro was developed initially for use for field samples from
boxes to check the efficacy of oral vaccination campaigns in Europe. In this study, the specificity, sensitivity and reliability of
this commercial rabies ELISA was evaluated for testing sera from dogs and cats involved in international trade. The
specificity evaluated in 315 unvaccinated animals was 100%. Concordance of 86.2% was obtained when comparing BioPro
ELISA to the gold standard FAVN test in 701 samples from vaccinated dogs and cats. The rabies ELISA developed recently
can be considered a valuable method for the assessment of rabies antibodies in vaccinated domestic carnivores in
combination with neutralisation tests.

Coombs’ testing and its diagnostic significance in dogs and cats.
The Coombs’ test can detect both immunoglobulin and complement on the surface of RBCs, and as such can be of value as
an aid in the diagnosis of IMHA. Techniques that may improve sensitivity include use of monovalent reagents, increased
dilutions of antiglobulin to avoid a prozone effect, and testing at 4 degrees C. These techniques are not without controversy,
and positive tests should always be interpreted in the presence of other clinical and hematologic evidence for IMHA.
Alternate techniques, such as flow cytometry, can improve detection of RBC-bound immunoglobulin, but require a flow
cytometer and further standardization between laboratories.

Evaluation of ELISA for detection of rabies antibodies in domestic carnivores.
Serological tests of pets have increased as many rabies-free countries have amended their quarantine measures and adopted
a scheme requiring rabies vaccination followed by a serological test. A European directive requires the measurement of
neutralising antibodies as proof of protection to allow the free movement of pets within the European Union and between
three countries non listed in the list C of regulation 998/2003 and European countries. At present, the recommended
neutralisation tests (FAVN test or RFFIT) are time-consuming, expensive and require highly trained technicians as well as
special laboratory facilities. The rabies ELISA designed by BioPro was developed initially for use for field samples from
boxes to check the efficacy of oral vaccination campaigns in Europe. In this study, the specificity, sensitivity and reliability of
this commercial rabies ELISA was evaluated for testing sera from dogs and cats involved in international trade. The
specificity evaluated in 315 unvaccinated animals was 100%. Concordance of 86.2% was obtained when comparing BioPro
ELISA to the gold standard FAVN test in 701 samples from vaccinated dogs and cats. The rabies ELISA developed recently
can be considered a valuable method for the assessment of rabies antibodies in vaccinated domestic carnivores in
combination with neutralisation tests.

In vitro comparison of feline bone marrow-derived and adipose tissue-derived mesenchymal stem cells.
Mesenchymal stem cells (MSC) are increasingly being proposed as a therapeutic option for a variety of different diseases in
human and veterinary medicine. At present, MSC are most often collected from bone marrow (BM) or adipose tissue (AT)
and enriched and expanded in vitro before being transferred into recipients. However, little is known regarding the culture
characteristics of feline BM-derived (BM-MSC) versus AT-derived MSC (AT-MSC). We compared BM-MSC and AT-
MSC from healthy cats with respect to in vitro growth and cell surface phenotype. Mesenchymal stem cells isolated from
AT proliferated significantly faster than BM-MSC. Phenotypic differences between BM-MSC and AT-MSC were not
present in the surface markers assessed. We conclude that BM-MSC and AT-MSC are similar phenotypically but that
cultures of AT-MSC are easier to generate because of their higher intrinsic proliferative rate. Thus, AT-MSC may be the
preferred MSC for clinical applications where rapid and efficient generation of MSC is important.

Validation of a portable hand-held whole-blood ketone meter for use in cats.
BACKGROUND: Urinary dipsticks are the most frequent method used for screening of ketones in animals, but this method has many drawbacks. In human medicine, portable meters that measure ketones in whole blood have largely replaced urinary dipsticks. OBJECTIVE: The aim of this prospective study was to validate a portable whole-blood ketone meter for use in cats. METHODS: Sixty-two cats (11 clinically healthy, 51 with diabetes mellitus) were included in the study. The concentration of beta-hydroxybutyrate (beta-HB) was measured in venous and capillary blood with a hand-held ketone meter (Precision Xceed; assay range 0-8 mmol/L) and compared with a spectrophotometric method. Precision, accuracy, and the effects of hematocrit and anticoagulants were evaluated. RESULTS: Between-run precision using low- and high-concentration control solutions was 8.1% and 2.6%, respectively; within-run coefficient of variation determined using 12 feline blood samples was 2.8%. In the 62 cats, beta-HB concentrations measured with the portable ketone meter ranged from 0-7.4 mmol/L (median 0.9 mmol/L). When beta-HB concentrations measured by the portable meter were < 4.0 mmol/L there was good agreement with the reference method, but concentrations > 4.0 mmol/L were lower than those obtained by the reference method in 20 of 24 cats (83%). There was good correlation between capillary and venous measurements. Results were not affected by hematocrits from 0.17 to 0.50 L/L, but EDTA was not a suitable anticoagulant. CONCLUSION: Measurement of beta-HB concentration in peripheral or capillary blood by an easy-to-use portable ketone meter was suitable for detecting ketonemia in cats. Underestimation of beta-HB concentration was observed at higher values, but results were sufficiently high to aid in diagnosing diabetic ketoacidosis.


The ontogenesis of lateralized behavior in the domestic cat, Felis silvestris catus.

For the first time, the development of paw preferences in the domestic cat, Felis silvestris catus, is explored. Twelve cats were tested at ages 12 weeks, 6 months, and 1 year on a challenge requiring them to use one of their paws to retrieve food. To control for repeated testing of the same cats at different ages, the subjects’ paw preferences were compared with those of cats tested just once, at 6 months (n = 11) or 1 year (n = 14) of age. Analysis revealed a significant effect of age on the distribution of cats’ paw preferences. Cats were significantly more likely to be ambilateral than paw preferent at 12 weeks and at 6 months but more likely to display a lateral bias in paw use at 1 year. There was a significant positive correlation between cats’ paw preferences at 6 months and at 1 year. Lateralized behavior was strongly sex related. Females had a greater preference for using their right paw; males were significantly more inclined to adopt their left. Analysis revealed no significant difference in the direction or strength of paw preferences of cats tested longitudinally or cross-sectionally at 6 months or 1 year of age. Findings indicate that cats develop paw preferences by 1 year and hint at a relative stability in preferred paw use over time. The strong sex effect observed strengthens the case for the influence of a biological mechanism in the emergence of motor asymmetry in cats. (PsycINFO Database Record (c) 2012 APA, all rights reserved).


Principles and applications of flow cytometry and cell sorting in companion animal medicine.

Flow cytometry measures multiple characteristic of single cells using light scatter properties and fluorescence properties of fluorescent probes with specificity to cellular constituents. The use of flow cytometry in the veterinary clinical laboratory has become more routine in veterinary diagnostic laboratories and institutions (http://www.vet.k-state.edu/depts/dmp/service/immunology/index.htm), and reference laboratories. The most common applications in small animal medicine includes quantitation of erythrocytes and leukocytes in automated hematology instruments, detection of antibodies to erythrocytes and platelets in cases of immune-mediated diseases, immunophenotyping of leukocytes and lymphocytes in immunodeficiency syndromes, or leukemias and lymphomas. DNA content analysis to identify aneuploidy or replicating cells in tumor preparations has not gained routine acceptance because of the variability of prognostic results. Other applications including cell sorting and multiplexing using microspheres are potential assays of the future once they become validated and the instrumentation footprint becomes more and more compact, less expensive, and easier to use.


Microsphere immunoassay for the detection of cytokines in domestic cat (Felis catus) plasma: Elevated IL-12/23 in acute feline immunodeficiency virus infections.

We recently described the development and validation of a highly sensitive and specific microsphere immunoassay capable of simultaneously quantifying three domestic cat cytokines in tissue culture supernatant. Here we describe the modification of this assay to measure interferon gamma (IFNgamma), interleukin (IL)-10 and IL-12/IL-23 p40 (IL-12/23) in domestic cat plasma, report values obtained from plasma collected after feline immunodeficiency virus (FIV) exposure, and compare plasma concentrations to blood cell mRNA expression. The validated quantitation limits of this assay are 31-1000pg/ml for IFNgamma, 63-2000pg/ml for IL-10, and 20-625pg/ml for IL-12/23. Plasma cytokine levels from domestic cats infected with pathogenic and/or apathogenic FIV were determined at 3-4 and 7-8weeks post-infection. IL-12/23 was elevated
(p<0.05) during acute infection with both FIV strains in two similar studies, conducted five years apart in different feline cohorts (n=44 total animals). IL-12/23 concentrations ranged from 377 to 1904pg/ml in naive cats and 552 to 3460pg/ml in infected cats. In contrast, the majority of plasma samples had IFN gamma and IL-10 concentrations below the lowest standard tested. The inability to consistently detect levels of IFN gamma and IL-10 in plasma, despite the fact that mRNA changes were detected, suggests that these cytokines may be secreted and/or cleared in a more highly regulated manner than IL-12/23, or perhaps exert local effects under tighter peripheral constraints and/or at a lower effective concentration.

The present study investigated whether renal cyclooxygenase (COX) induction is associated with the severity of chronic kidney disease (CKD) in dogs and cats. The collected kidneys were examined histopathologically and immunohistochemically. The immunoreactivities of COX-1 and COX-2 were evaluated quantitatively, and the correlations to the plasma creatinine concentrations, glomerular size, glomerulosclerosis, interstitial fibrosis, and interstitial cell infiltration were evaluated statistically. Immunoreactivities for COX-1 were heterogeneously observed in the medullary distal tubules and collecting ducts; no correlations with the severity of renal damage were detected. Immunoreactivities for COX-2 were heterogeneously observed in the macula densa (MD) regions. In dogs, the percentage of COX-2-positive MD was significantly correlated with the glomerular size. In cats, glomeruli with COX-2-positive MD had significantly higher sclerosis scores than those with COX-2-negative MD. In conclusion, renal COX-2 is induced in canine and feline CKD, especially in relation to the glomerular changes.

Pharmacokinetics of ketamine and propofol combination administered as ketofol via continuous infusion in cats.
Zonca, A., Ravasio, G., Gallo, M., Montesissa, C., Carli, S., Villa, R., Cagnardi, P. Pharmacokinetics of ketamine and propofol combination administered as ketofol via continuous infusion in cats. J. vet. Pharmacol. Therap. doi: 10.1111/j.1365-2885.2012.01377.x. The pharmacokinetics of the extemporaneous combination of low doses of ketamine and propofol, known as ‘ketofol’, frequently used for emergency procedures in humans to achieve safe sedation and analgesia was studied in cats. The study was performed to assess propofol, ketamine and norketamine kinetics in six female cats that received ketamine and propofol (1:1 ratio) as a loading dose (2 mg/kg each, IV) followed by a continuous infusion (10 mg/kg/h each, IV, 25 min of length). Blood samples were collected during the infusion period and up to 24 h afterwards. Drug quantification was achieved by HPLC analysis using UV-visible detection for ketamine and fluorimetric detection for propofol. The pharmacokinetic parameters were deduced by a two-compartment bolus plus infusion model for propofol and ketamine and a monocompartmental model for norketamine. Additional data were derived by a noncompartmental analysis. Propofol and ketamine were quantifiable in most animals until 24 and 8 h after the end of infusion, respectively. Propofol showed a long elimination half-life (t(1/2lambda2) 7.55 +/- 9.86 h), whereas ketamine was characterized by shorter half-life (t(1/2lambda2) 4 +/- 3.4 h) owing to its rapid biotransformation into norketamine. The clinical significance of propofol’s long elimination half-life and low clearance is negligible when the drug is administered as short-term and low-dosage infusion. The concurrent administration of ketamine and propofol in cats did not produce adverse effects although it was not possible to exclude interference in the metabolism.