Widespread Mismatch Repair Expression in Feline Small Intestinal Lymphomas.

Small intestinal lymphoma is a common feline tumour that most often develops in older cats, but also occurs in younger animals. In man, germline defects in the mismatch repair (MMR) genes most commonly cause hereditary non-polyposis colorectal cancer (HNPPC), or Lynch syndrome, while MMR defects have also been implicated in the development of lymphoid tumours in mice and in people. It was hypothesized that inherited MMR defects predispose a proportion of younger cats to the development of small intestinal lymphoma. MMR expression in 10 small intestinal lymphomas from younger cats (group 1, mean age 4.5 years) was compared with MMR expression in 30 small intestinal lymphomas from older cats (group 2, mean age 12.6 years). The cross-reactivity of the antibodies specific for the human MMR proteins MLH1, MSH2 and MSH6 with the corresponding proteins in feline tissues was first confirmed by western blotting. MMR expression was then investigated immunohistochemically in feline lymphomas. MLH1, MSH2 and MSH6 were detected immunohistochemically within neoplastic lymphocytes from all tumours examined. There were no significant differences between the two groups in either the intensity of immunolabelling or the percentage of neoplastic cells within which MMR proteins were detected. These results confirm the cross-reactivity of the human MMR antibodies with the corresponding proteins in feline tissues, but do not support the hypothesis that inherited germline MMR defects are a significant cause of feline small intestinal lymphomas.

T-regulatory cells infected with feline immunodeficiency virus up-regulate programmed death-1 (PD-1).

CD4(+)CD25(+) regulatory T (Treg) cells play a crucial role in the regulation of peripheral tolerance and immune response. Treg cells influence the nature and magnitude of immune responses, in particular to chronic infections with viruses such as HIV in humans and feline immunodeficiency virus (FIV) in cats. The co-stimulatory molecule programmed (cell) death-1 (PD-1) is expressed on T cells and antigen presenting cells. Interaction with its ligand, PD-L1, reduces CD4(+) and CD8(+) T-cell function, and may lead to dysfunction or exhaustion of T cells. In this study, lymphocytes from blood or lymph nodes of healthy cats were mock or FIV infected, and sorted into CD4(-), CD4(+)CD25(+) and CD4(+)CD25(-) subsets. Expression of FoxP3, PD-1 and PD-L1 mRNA relative to the housekeeping genes beta actin and tyrosine 3-monooxygenase was determined by quantitative reverse transcriptase PCR assays. Results indicated that CD4(+)CD25(+) cells had higher transcript numbers of FoxP3, PD-1 and PD-L1 than CD4(-) and CD4(+)CD25(-) cells (P<0.05). Acute in vitro FIV infection increased expression of FoxP3, PD-1 and PD-L1 in CD4(+)CD25(+) and CD4(+)CD25(-) cells, with highest relative expression in CD4(+)CD25(+) cells. These findings suggest that up-regulation of PD molecules in acutely FIV-infected lymphocytes may contribute to the immunosuppressive function of Treg cells in lentiviral infection.

Pandemic and seasonal human influenza virus infections in domestic cats: prevalence, association
with respiratory disease, and seasonality patterns.

Domestic cats have several features that make them ideal vehicles for interspecies transmission of influenza viruses; however, they have been largely overlooked as potential reservoirs or bridging hosts. In this study, we conducted serological surveillance to assess the prevalence of novel pandemic H1N1 as well as seasonal human influenza virus infections in domestic cats in Ohio. Four hundred serum samples collected from domestic cats (September 2009 to September 2010) were tested using a hemagglutination inhibition (HI) test. The seroprevalences of pandemic H1N1, seasonal H1N1, and H3N2 were 22.5%, 33%, and 43.5%, respectively. In addition, a significant association between clinical feline respiratory disease and influenza virus infection was documented. In this sample of cats, the prevalence of pandemic H1N1 did not follow the seasonality pattern of seasonal H1N1 or H3N2 influenza, similar to observations in humans. Pandemic H1N1 seroprevalence did not vary in relation to ambient temperature changes, while the seroprevalence of seasonal H3N2 and H1N1 influenza viruses increased with the decline of ambient temperature. Our results highlight the high prevalence of influenza virus infection in domestic cats, a seasonality pattern of influenza virus infection comparable to that in humans, and an association of infection with clinical respiratory disease.


Methods for assessing feline immunodeficiency virus infection, infectivity and purification.

Infection of cats with the feline immunodeficiency virus (FIV) recapitulates many aspects of infection of humans with HIV, including highly activated but ineffectual immune responses. Infected hosts remain seropositive for life, and detection of antibodies is the mainstay of diagnosis. However, to quantify virus for research or prognosis, viral proteins, nucleic acids or enzymes, are typically measured by ELISA, PCR or activity, respectively. While such assays are in wide use, they do not distinguish whole, infectious viral particles from defective or disrupted viruses. Titers of infectious viral particles may be estimated from tissue culture infectious doses or by enumerating cell-associated viral proteins, viral transcriptional activity or formation of syncytia. To analyze the viral proteome and the incorporation of host components into viral envelopes, pure lentiviral preparations are required. Methods for purifying lentiviruses include ultracentrifugation to separate particles by size, mass and/or density; chromatography to separate particles by charge, affinity or size; and additional removal of extraviral proteins and exosomes through subtilisin digestion or immunoaffinity. This article reviews advantages and disadvantages of different approaches to purification of lentiviruses with special reference to suitability for FIV, and highlights effects of purification on immune responses and immune assays.


Prevalence of Korean cats with natural feline coronavirus infections.

ABSTRACT: BACKGROUND: Feline coronavirus is comprised of two pathogenic biotypes consisting of feline infectious peritonitis virus (FIPV) and feline enteric coronavirus (FECV), which are both divided into two serotypes. To examine the prevalence of Korean cats infected with feline coronavirus (FCoV) type I and II, fecal samples were obtained from 212 cats (107 pet and 105 feral) in 2009. RESULTS: Fourteen cats were FCoV-positive, including infections with type I FCoV (n = 8), type II FCoV (n = 4), and types I and II co-infection (n = 2). Low seroprevalences (13.7%, 29/212) of
FCoV were identified in chronically ill cats (19.3%, 16/83) and healthy cats (10.1%, 13/129).

CONCLUSIONS: Although the prevalence of FCoV infection was not high in comparison to other countries, there was a higher prevalence of type I FCoV in Korean felines. The prevalence of FCoV antigen and antibody in Korean cats are expected to gradually increase due to the rising numbers of stray and companion cats.


**Nasal hydropulsion: a novel tumor biopsy technique.**

Intranasal tumors of dogs and cats pose a diagnostic and therapeutic challenge for small animal practitioners. Multiple nasal biopsy techniques have been described in the past. This report describes a simplified flushing technique to biopsy and debulk nasal tumors, which often also results in immediate clinical relief for the patient. Based on the results of this retrospective study, the authors recommend high-pressure saline hydropulsion as a minimally invasive diagnostic, and potentially therapeutic, technique for nasal tumors in dogs and cats.


**Vector-Borne Diseases in Client-Owned and Stray Cats from Madrid, Spain.**

Abstract 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. clarridgeiae DNA from another cat (0.15%).


**Effects of dietary protein content on renal parameters in normal cats.**

This study evaluates the effect of dietary protein content on renal parameters in 23 healthy spayed female cats. The objective was to determine if cats eating diets high in protein will have higher serum urea nitrogen (UN) and creatinine values without a detectable change in kidney function, as assessed by urinalysis. A single random cross-over design was used. Cats were fed a standard maintenance diet for at least 1 month prior to the dietary trial. They were fed in two phases. For the first phase, cats were randomly assigned to receive either a high protein [HP=46% metabolizable energy (ME)] or low protein (LP=26% ME) diet. For the second phase, cats were fed whichever diet they were not fed
during the phase I period. Blood and urine samples were collected at 2-week intervals for the duration of the study (10 weeks). UN, albumin, alanine aminotransferase and urine specific gravity were significantly higher, and creatinine and phosphorus were significantly lower (P<0.05) when cats were fed the HP diet as compared to when they were fed the LP diet, although none of the mean values were found to be outside of the corresponding reference interval. Dietary intake can result in clinically significant changes in UN and statistically significantly changes in several other biochemical analytes, although all analytes are likely to remain within normal reference intervals. Therefore, an accurate dietary history is necessary to help determine if renal parameters are being influenced by diet in a particular patient.


Plasma oestrogen changes in adult male cats after orchiectomy, body-weight gain and low-dosage oestradiol administration.

The physiological relevance of oestradiol (E2) on post-orchiectomy (OX) food intake control was evaluated in six adult, male, domestic, short-hair cats. Jugular venous plasma E2 and oestrone (E1) concentrations were determined weekly before OX and immediately after OX in a cross-over trial of two 3-week periods in which E2 (0.5 mug) or vehicle (0.1 ml/kg) was subcutaneously injected daily and blood was sampled 4 h later. Plasma E1 and E2 concentrations before OX were 32 (SE 8.3) and 4.3 (SE 1.0) pg/ml, respectively. Following OX, plasma concentrations of E2 were decreased (P = 0.04) while those of E1 were unchanged. Injections of E2 increased (P = 0.02) plasma E2 towards pre-OX concentrations. In a second cross-over trial, plasma E1 and E2 were determined weekly during the last 3 weeks of two 8-week periods in which food was continuously presented or restricted to 110 % of pre-OX amounts. Continuous food presentation compared with restricted food presentation resulted in greater body weight (6.4 (SE 0.4) v. 5.4 (SE 0.4) kg, P = 0.02) and body fat percentage (29 (SE 3) v. 23 (SE 2) %, P = 0.09) but no significant changes were observed in plasma E1 and E2 concentrations. Hence, circulating E2 appears to be reduced by OX, while it is not significantly changed by body-fat gain. The amount of E2 injected after OX was not supraphysiological; it restored plasma E2 to pre-OX concentrations and reduced food intake in five of the six cats by a mean of 14 (SE 3) %.


An analysis of the demand for and revenue from companion animal veterinary services in Australia between 1996 and 2026 using industry revenue data and household census and pet ownership data and forecasts.

OBJECTIVE To examine the potential impact of household demographic and pet ownership trends on the demand for and revenue from companion animal veterinary services in Australia. DESIGN The size of the market for companion animal veterinary services was estimated by creating a model using assumptions derived from the revenue equation. The model was verified and validated through sensitivity analyses and comparisons between model outputs and available industry data. RESULTS The model provided outputs similar to alternative industry estimates and suggested that revenue growth in recent years has been much stronger than demand growth. Under the assumptions used in this model, forecast changes to household numbers and types are less important than pet ownership trends in determining the potential demand for and revenue from companion animal veterinary services. Forecast trends in household types and relatively stable pet ownership in the future will lead to growth in
demand for companion animal veterinary services in real terms of approximately 1.2% per annum to 2026. CONCLUSION The market for companion animal veterinary services in Australia is mature and growth in demand is expected to remain low over the forecast period. For most veterinary practices within this environment, growth in revenue will be a function of growth in average client fees.


Perspectives on canine and feline hepatozoonosis.

Two species of Hepatozoon are currently known to infect dogs and cause distinct diseases. Hepatozoon canis prevalent in Africa, Asia, southern Europe, South America and recently shown to be present also in the USA causes infection mainly of hemolymphoid organs, whereas Hepatozoon americanum prevalent in the southeastern USA causes myositis and severe lameness. H. americanum is transmitted by ingestion of the Gulf Coast tick Amblyomma maculatum and also by predation on infected prey. H. canis is transmitted by Rhipicephalus sanguineus, in South America also by Amblyomma ovale, and has also been shown to be transmitted transplacentally. Hepatozoonosis of domestic cats has been described mostly in the same areas where canine infection is present and the exact identity of the species which infect cats, their pathogenicity and vectors have not been elucidated. The diagnosis of hepatozoonosis is made by observation of gamonts in blood smears, histopathology, PCR or serology. The main treatment for H. canis is with imidocarb dipropionate whereas H. americanum infection is treated with an initial combination of trimethoprim-sulfadiazine, pyrimethamine and clindamycin followed by maintenance with decoquinate. Treatment for both diseases has not been reported to facilitate complete parasite elimination and new effective drugs are needed for the management of these infections. Prevention of hepatozoonosis should be based on avoidance of oral ingestion of infected tick vectors and infected prey.


Sporothrix schenckii and Sporotrichosis.

Sporotrichosis, which is caused by the dimorphic fungus Sporothrix schenckii, is currently distributed throughout the world, especially in tropical and subtropical zones. Infection generally occurs by traumatic inoculation of soil, plants, and organic matter contaminated with the fungus. Certain leisure and occupational activities, such as floriculture, agriculture, mining, and wood exploitation, are traditionally associated with the mycosis. Zoonotic transmission has been described in isolated cases or in small outbreaks. Since the end of the 1990s there has been an epidemic of sporotrichosis associated with transmission by cats in Rio de Janeiro, Brazil. More than 2,000 human cases and 3,000 animal cases have been reported. In humans, the lesions are usually restricted to the skin, subcutaneous cellular tissue, and adjacent lymphatic vessels. In cats, the disease can evolve with severe clinical manifestations and frequent systemic involvement. The gold standard for sporotrichosis diagnosis is culture. However, serological, histopathological, and molecular approaches have been recently adopted as auxiliary tools for the diagnosis of this mycotic infection. The first-choice treatment for both humans and cats is itraconazole.

Adaptation of healthy adult cats to select dietary fibers in vivo affects gas and short-chain fatty acid production from fiber fermentation in vitro.

Nine young adult (1.73 +/- 0.03 yr) male cats were used to determine the effects of microbial adaptation to select dietary fiber sources on changes in pH in vitro and on total and hydrogen gas, short-chain fatty acid (SCFA), and branched-chain fatty acid (BCFA) production. Cats were adapted to diets containing 4% cellulose, fructooligosaccharides (FOS), or pectin for 30 d before fecal sampling. Each cat was used as a single donor, and fecal inoculum was reacted with each of the aforementioned fiber substrates. Adaptation to dietary FOS resulted in a greater change in pH when exposed to FOS than pectin (adaptation x substrate, P < 0.001). When exposed to the FOS substrate, adaptation to dietary FOS or pectin increased hydrogen gas production (adaptation x substrate, P = 0.021).

Adaptation to dietary FOS increased acetate and total SCFA production when exposed to FOS substrate (adaptation x substrate, P = 0.001). When exposed to the FOS substrate, propionate production tended to increase with adaptation to dietary cellulose (adaptation x substrate, P = 0.060). The BCFA + valerate tended to decrease with adaptation to dietary FOS when exposed to FOS substrate in vitro (adaptation x substrate, P = 0.092). Fructooligosaccharides resulted in the greatest change in pH and production of total gas (P < 0.001), hydrogen gas (P < 0.001), acetate (P < 0.001), propionate (P < 0.001), butyrate (P < 0.001), total SCFA (P < 0.001), and total BCFA + valerate production (P < 0.001). Adaptation to the FOS or pectin diet increased production of hydrogen gas with FOS and pectin substrates. Adaptation to pectin increased (P = 0.033) total gas production with FOS and pectin substrates. Overall, adaptation to either FOS or pectin led to greater SCFA and gas production, but adaptation to FOS resulted in the greatest effect overall.


Radiographic findings in cats with mycobacterial infections.

This study describes radiographic changes associated with mycobacterial infection in 33 domestic cats confirmed by culture or interferon-gamma testing. Infection was seen most frequently in adult (average age 5.7 years; range 1.5-12 years), non-pedigree (87%; 27/31), neutered male cats (69%; 22/32). The most common infections were Mycobacterium microti (60%; 18/30) and Mycobacterium bovis (37%; 11/30); Mycobacterium avium and Mycobacterium malmoense were infrequently cultured (3% of each; 1/30). Radiographs were available for the thorax (24 cats), abdomen (eight), appendicular skeleton (11) and head (three). Radiographic changes affected the thorax most commonly, consisting of bronchial (46%; 11/24), alveolar (38%; 9/24), nodular unstructured interstitial (38%; 9/24) or unstructured interstitial (25%; 6/24) lung patterns, which were often mixed. Perihilar or sternal lymphadenopathy were common (42%; 10/24), particularly perihilar lymphadenopathy (25%; 6/24). Skeletal changes were found in the distal antebrachium (three), pes (two), maxilla, scapula, spine, manus, femur, and tarsus (one each). Changes were typically osteolytic (73%; 8/11), often permissive osteolytic (64%; 7/11). Osteoproliferative changes were seen in three cats and soft tissue swelling in five cats, which were adjacent to the bony abnormality in four cats. Other changes included submandibular soft tissue swelling, marked aortic, aortic root and brachiocephalic trunk calcification, and soft tissue swelling with calcification in the distal antebrachium which was not involving bone. Abdominal changes were uncommon (seen in 2/8 cats) and consisted of hepatomegaly and hepatosplenomegaly. In summary, radiographic changes were varied, no lesion was pathognomonic for mycobacterial infection, and pathology was seen most commonly in the thorax.
Detection of Encephalitozoon cuniculi in the feline cataractous lens.

PURPOSE: Identification of Encephalitozoon cuniculi (E. cuniculi) as a possible causative agent for cataracts and uveitis in cats. METHODS: Within a 12-month study period, cats that were presented with focal anterior cortical or mature cataract and secondary uveitis underwent a complete ophthalmic examination, complete blood count, serum biochemistry, serologic tests for E. cuniculi and tests for feline immunodeficiency virus (FIV), feline infectious peritonitis (FIP), feline leukemia virus (FeLV) and Toxoplasma gondii (T. gondii). PCR for DNA detection of E. cuniculi and T. gondii as well as cytologic examination of aqueous humor after paracentesis and phacoemulsified lens material were also performed. In addition histopathologic examination of the resected anterior lens capsule and attached lens epithelial cells was performed. Serologic testing for antibodies against E. cuniculi was also performed in 100 ophthalmologically healthy cats. RESULTS: Eleven (19 eyes) European shorthair cats with a median age of 3.5 years were included. Nine of 11 cats had bilateral cataracts, with 12/19 eyes having focal anterior cortical cataracts and 7/19 eyes having mature cataracts. In 14/19 eyes anterior uveitis was present. All cats had a positive antibody titer (1:80–1:10,000) for E. cuniculi. Encephalitozoon cuniculi DNA was detected by PCR and sequencing in 18/19 lenses and in 10/19 aqueous samples. Five tentative positive results were detected by cytologic examination. Spores were detected in 15/19 samples of lens material with histopathologic staining. Only 2/100 ophthalmologically healthy cats showed a positive antibody titer for E. cuniculi. CONCLUSION: Encephalitozoon cuniculi is a cause of focal anterior cortical cataract and anterior uveitis in cats.
for 5 weeks. On the fifth week, individual feed intakes and faecal outputs were determined. Fresh faecal samples were collected twice daily, mixed for homogeneity, subsampled and stored at -85 degrees C until analysis. The cats were then switched to a commercially available dry diet (moisture 8.5 %, crude protein 33.0 %, fat 11.0 %, CHO 49.4 % and ash 6.6 % DM) for 5 weeks, and fresh faeces were sampled as described previously. Energy intake tended to be higher in cats fed dry diets (P < 0.10), but body weight was similar between the two feeding periods (P>0.05). Denaturing gradient gel electrophoresis (DGGE) of bacterial 16S rRNA genes amplified from DNA extracted from faeces was performed. The unweighted pair group method with arithmetic mean cluster analysis of bacterial community profiles using Pearson’s correlation revealed diet-specific clustering when the same cats were fed on either a dry or a wet diet (dissimilarity between the groups, 88.6 %; P < 0.001). Subsequent cloning and sequencing of five selected distinct DGGE bands indicated that members of the Pelomonas and Fusobacteriaceae were influenced by a short-term change in diet format. This suggests that 5-week dietary exposure is sufficient to alter gastrointestinal microflora.


**Immunological differences in the global release of the major cat allergen Fel d 1 are influenced by sex and behaviour.**

The biological function of Fel d 1, the major cat allergen released in the environment, is still unclear despite studies suggesting a putative role in chemical communication. Structural and immunological polymorphisms of Fel d 1 have been described. This study examined how Fel d 1 immunological polymorphism may have a physiological origin by estimating a potential relationship with the sex of cats and cat-human interactions. Samples from bath washes of 21 cats were screened to study antibody binding to Fel d 1 using an ELISA. Personality and Tolerance Handling scores were used to assess the behaviour of the cats. In the washes, Fel d 1 concentrations were significantly lower in females than in males (P<0.05). Slopes from the ELISA dose-dependent curves varied among the cats: males secreted Fel d 1 variants with higher antibody recognition than females (P<0.01). Females that were aggressive and difficult to handle displayed a diminished slope value, and therefore a weaker Fel d 1 immunoreactivity in global washes, compared to females that were sociable (P=0.09) and easy to handle (P=0.07). This study shows a variable immunological polymorphism of Fel d 1 within a cat population, particularly between males and females, and this polymorphism appears to be related to cat-human interactions.


**Obesity increases initial rate of fibrin formation during blood coagulation in domestic shorthaired cats.**

Obesity predisposes to a prothrombotic state in humans, but whether a similar state occurs in obese animals is unknown. The objective of the current study was to examine the effect of body fat percentage (BF) on haemostatic parameters including thromboelastography with tissue factor as activator (TF-TEG) in client owned indoor-confined physically inactive cats. Seventy-two cats were included following an initial thorough health examination, and a complete blood count, biochemistry panel, conventional coagulation panel and a TF-TEG analysis were performed with tissue factor (1:50 000) as activator. The cats were anaesthetized, and BF was measured using Dual-energy X-ray absorptiometry. Significant difference between lean (BF < 35%, n = 26), overweight (35% < BF <
45%, n = 28) and obese (BF > 45%, n = 18) cats was identified using anova. The correlation between BF, serum leptin and total adiponectin, respectively, with individual TEG and conventional coagulation parameters was evaluated. Obese cats showed a faster rate of fibrin formation (TF-TEG(R), p < 0.05), and TF-TEG(R) was positively correlated with plasma leptin levels. Increasing BF did not affect other conventional coagulation or TF-TEG parameters. In conclusion, this study indicates a connection between body fat content and altered haemostasis, also in cats. Whether feline obesity causes a hypercoagulable state of clinical relevance should be further investigated.


Rabies surveillance in the United States during 2010.

During 2010, 48 states and Puerto Rico reported 6,154 rabid animals and 2 human rabies cases to the CDC, representing an 8% decrease from the 6,690 rabid animals and 4 human cases reported in 2009. Hawaii and Mississippi did not report any laboratory-confirmed rabid animals during 2010. Approximately 92% of reported rabid animals were wildlife. Relative contributions by the major animal groups were as follows: 2,246 raccoons (36.5%), 1,448 skunks (23.5%), 1,430 bats (23.2%), 429 foxes (6.9%), 303 cats (4.9%), 71 cattle (1.1%), and 69 dogs (1.1%). Compared with 2009, number of reported rabid animals decreased across all animal types with the exception of a 1% increase in the number of reported rabid cats. Two cases of rabies involving humans were reported from Louisiana and Wisconsin in 2010. Louisiana reported an imported human rabies case involving a 19-year-old male migrant farm worker who had a history of a vampire bat (Desmodus rotundus) bite received while in Mexico. This represents the first human rabies case reported in the United States confirmed to have been caused by a vampire bat rabies virus variant. Wisconsin reported a human rabies case involving a 70-year-old male that was confirmed to have been caused by a rabies virus variant associated with tri-colored bats (Perimyotis subflavus).


Pattern of seroreactivity against feline foamy virus proteins in domestic cats from Germany.

The prevalence of feline foamy virus (FFV, spumaretrovirinae) in naturally infected domestic cats ranges between 30 and 80% FFV positive animals depending on age, sex and geographical region analyzed. Two serotypes have been reported for FFV designated FUV7-like and F17/951-like. Serotype-specific neutralization has been shown to correlate with sequence divergence in the surface (SU) domain of the envelope protein (Env). We analyzed a serum collection of 262 domestic cat sera from Germany using a GST-capture ELISA setup screening for Gag and Bet specific antibodies and identified 39% FFV positive animals. Due to the heterogeneity of the serological samples, cut-offs for Gag and Bet reactivity had to be experimentally determined since application of calculated cut-off values yielded some false-positive results; the new cut-off values turned out to be also fully applicable to a previous study. Using the already established FUV7 ElpSU antigen and the newly cloned and produced F17/951 ElpSU antigen, both consisting of the corresponding ectodomains of the envelope leader protein (Elp) and SU protein, we aimed at the detection of Env-specific antibodies and discrimination between the two known FFV serotypes within the diagnostic FFV ELISA. We validated the ElpSU antigens using cat reference sera of known serotype and screened with this assay domestic cat sera from Germany. Use of the FUV7- and F17/951 ElpSU antigens in ELISA resulted in the
detection of Env-specific antibodies in both cat reference sera and sera from domestic cats in Germany, but failed to allow serotyping at the same time.


The surface glycoprotein of a natural feline leukemia virus subgroup A variant, FeLV-945, as a determinant of disease outcome.

Feline leukemia virus (FeLV) is a natural retrovirus of domestic cats associated with degenerative, proliferative and malignant diseases. Studies of FeLV infection in a cohort of naturally infected cats were undertaken to examine FeLV variation, the selective pressures operative in FeLV infection that lead to predominance of natural variants, and the consequences for infection and disease progression. A unique variant, designated FeLV-945, was identified as the predominant isolate in the cohort and was associated with non-T-cell diseases including multicentric lymphoma. FeLV-945 was assigned to the FeLV-A subgroup based on sequence analysis and receptor utilization, but was shown to differ in sequence from a prototype member of FeLV-A, designated FeLV-A/61E, in the long terminal repeat (LTR) and the surface glycoprotein gene (SU). A unique sequence motif in the FeLV-945 LTR was shown to function as a transcriptional enhancer and to confer a replicative advantage. The FeLV-945 SU protein was observed to differ in sequence as compared to FeLV-A/61E within functional domains known to determine receptor selection and binding. Experimental infection of newborn cats was performed using wild type FeLV-A/61E or recombinant FeLV-A/61E in which the LTR (61E/945L) or LTR and SU (61E/945SL) were exchanged for that of FeLV-945. Infection with either FeLV-A/61E or 61E/945L resulted in T-cell lymphoma of the thymus, although 61E/945L caused disease significantly more rapidly. In contrast, infection with 61E/945SL resulted in the rapid induction of a multicentric lymphoma of B-cell origin, thus recapitulating the outcome of natural infection and implicating FeLV-945 SU as a determinant of disease outcome. Recombinant FeLV-B was detected infrequently and at low levels in multicentric lymphomas, and was thereby not implicated in disease induction. Preliminary studies of receptor interaction indicated that virus particles bearing FeLV-945 SU bind to the FeLV-A receptor more efficiently than do particles bearing FeLV-A/61E SU, and that soluble SU proteins expressed from the viruses demonstrate the same differential binding phenotype. Preliminary mutational analysis of FeLV-945 was performed by exchanging regions containing either the primary receptor binding determinant, VRA, the secondary determinant, VRB, or a proline-rich region, PRR, with that of FeLV-A/61E. Results implicated a region containing VRA as a minor contributor, while a region containing VRB largely conferred increased binding efficiency.


Viral determinants of FeLV infection and pathogenesis: lessons learned from analysis of a natural cohort.

Detailed analysis has been performed over many years of a geographic and temporal cohort of cats naturally infected with feline leukemia virus (FeLV). Molecular analysis of FeLV present in the diseased tissues and application of those viruses to experimental systems has revealed unique isolates with distinctive disease potential, previously uncharacterized virus-receptor interactions, information about the role of recombinant viruses in disease induction, and novel viral and cellular oncogenes implicated in pathogenesis, among other findings. The studies have contributed to an understanding of the selective forces that lead to predominance of distinctive FeLV isolates and disease outcomes in a
natural population.


**Feline Histoplasmosis in Brazil: Clinical and Laboratory Aspects and a Comparative Approach of Published Reports.**

The present study described clinical and epidemiological aspects of three cases of feline histoplasmosis and compared them to previously described cases. A detailed mycological identification and antifungal susceptibility profile of each isolate are presented. Secondarily, a serological survey for anti-Histoplasma antibodies was performed with domestic and wild cats. Diseased animals presented nodular to ulcerated skin lesions and respiratory disorders as main clinical signs. *H. capsulatum var. capsulatum* was isolated and the strains showed to be susceptible to antifungal drugs. Considering that feline histoplasmosis is uncommonly observed in veterinary clinics, diagnosis, and clinical management in endemic areas should be improved.


**Use of the PleuralPort Device for Management of Pleural Effusion in Six Dogs and Four Cats.**

OBJECTIVE: To describe the placement technique, complications, and outcomes associated with use of the PleuralPort device for management of pleural effusion in dogs and cats. STUDY DESIGN: Case Series. ANIMALS: Six dogs and 4 cats. METHODS: Medical records of all animals with pleural effusion managed with the PleuralPort device were reviewed. Data regarding signalment, fluid analysis, placement technique, duration of function, duration of implantation, complications, and outcome were collected. Owners and referring veterinarians were contacted for follow-up information. RESULTS: Nine animals had chylous effusion and 1 dog had pleural carcinomatosis. Eleven ports were placed with 1 cat receiving bilateral ports. Four animals developed complications. One cat developed pneumothorax immediately after implantation and was euthanatized. In 2 dogs and 1 cat, the ports obstructed. The 6 remaining animals had functioning ports at time of death or resolution of effusion and no longer required use of the port. No significant port migration, irritation, or infection of the device was reported. Excluding the cat with pneumothorax, median duration of port function was 20 days (range 1-391), and median duration of port implantation was 391 days (range 6-723). CONCLUSIONS: The PleuralPort device is a feasible option for the management of pleural effusion in dogs and cats.


**Dyspnoea and pulmonary consolidation in a cat with T-cell lymphoma.**

A 13-year-old male neutered domestic shorthair cat presented with an acute onset of dyspnoea. Thoracic radiographs revealed marked, bilateral, caudal lung lobe consolidation. A diagnosis of anatomically mixed T-cell lymphoma with pulmonary, renal and alimentary involvement was
confirmed on histopathology. Pulmonary involvement in cases of feline lymphoma is uncommon and the radiographic appearance of pulmonary lymphoma is highly variable. Lung lobe consolidation has been described with primary lung tumours in cats, but not previously in association with pulmonary lymphoma. This unusual presentation serves to alert practitioners to the possibility of lymphoma as a cause of severe bronchopulmonary disease in the cat.


**Genetic determinants of pathogenesis by feline infectious peritonitis virus.**

Feline infectious peritonitis (FIP) is a fatal, immune-augmented, and progressive viral disease of cats associated with feline coronavirus (FCoV). Viral genetic determinants specifically associated with FIPV pathogenesis have not yet been discovered. Viral gene signatures in the spike, non-structural protein 3c, and membrane of the coronavirus genome have been shown to often correlate with disease manifestation. An “in vivo mutation transition hypothesis” is widely accepted and postulates that de novo virus mutation occurs in vivo giving rise to virulence. The existence of “distinct circulating avirulent and virulent strains” is an alternative hypothesis of viral pathogenesis. It may be possible that viral dynamics from both hypotheses are at play in the occurrence of FIP. Epidemiologic data suggests that the genetic background of the cat contributes to the manifestation of FIP. Further studies exploring both viral and host genetic determinants of disease in FIP offer specific opportunities for the management of this disease.


**The impact of home-prepared diets and home oral hygiene on oral health in cats and dogs.**

Many factors influence the oral health status of cats and dogs. The present study aimed to elucidate the influence of feeding home-prepared (HP) food v. commercial pet food on oral health parameters in these animals and to investigate the effect of home oral hygiene on oral health. The study surveyed 17,184 dogs and 6371 cats visiting over 700 Polish veterinary surgeries in 2006-7 during a Pet Smile activity organised by the Polish Small Animal Veterinary Association. All animals underwent conscious examinations to assess dental deposits, size of mandibular lymph nodes and gingival health. An oral health index (OHI) ranging from 0 to 8 was calculated for each animal by combining examination scores, where 0 indicates good oral health and 8 indicates poorest oral health. Information was collected on age, diet and home oral hygiene regimens. There was a significant effect of diet on the OHI (P < 0.001) whereby feeding the HP diet increased the probability of an oral health problem in both cats and dogs. There was a significant beneficial effect of feeding only commercial pet food compared with the HP diet when at least part of the diet was composed of dry pet food. Daily tooth brushing or the offering of daily dental treats were both effective in significantly reducing the OHI in both cats and dogs compared with those receiving sporadic or no home oral hygiene. Feeding only a dry diet was beneficial for oral health in cats and dogs. Tooth brushing and the offering of dental treats were very effective in maintaining oral health, provided they were practised daily.

Effect of dietary water intake on urinary output, specific gravity and relative supersaturation for calcium oxalate and struvite in the cat.

It has been reported that daily fluid intake influences urinary dilution, and consequently the risk of urolithiasis in human subjects and dogs. The aim of the present study was to investigate the role of dietary moisture on urinary parameters in healthy adult cats by comparing nutritionally standardised diets, varying only in moisture content. A total of six cats were fed a complete dry food (6.3 % moisture) hydrated to 25.4, 53.2 and 73.3 % moisture for 3 weeks in a randomised block cross-over design. Urinary specific gravity (SG), urine volume, water drunk and total fluid intake were measured daily; relative supersaturation (RSS) for calcium oxalate (CaOx) and struvite was calculated using the SUPERSAT computer program. Cats fed the 73.3 % moisture diet produced urine with a significantly lower SG (P < 0.001) compared with diets containing 53.2 % moisture or lower. Mean RSS for CaOx was approaching the undersaturated zone (1.14 (sem 0.21); P = 0.001) for cats fed the diet with 73.3 % moisture and significantly lower than the 6.3 % moisture diet (CaOx RSS 2.29 (sem 0.21)). The effect of diet on struvite RSS was less clear, with no significant difference between treatment groups. Total fluid intake was significantly increased (P < 0.001) in the 73.3 % moisture diet (144.7 (SEM 5.2) ml, or 30 ml/kg body weight per d) compared with the 6.3 % (103.4 (SEM 5.3) ml), 25.4 % (98.6 (SEM 5.3) ml) and 53.3 % (104.7 (SEM 5.3) ml) moisture diets, despite voluntary water intake decreasing as dietary moisture intake increased. Cats fed the 73.3 % moisture diet had a higher total daily fluid intake resulting in a more dilute urine with a lower risk of CaOx when compared with the lower-moisture diets.


Pharmacokinetics of levetiracetam after oral and intravenous administration of a single dose to clinically normal cats.

OBJECTIVE: To determine whether therapeutic concentrations of levetiracetam can be achieved in cats and to establish reasonable i.v. and oral dosing intervals that would not be associated with adverse effects in cats. ANIMALS: 10 healthy purpose-bred cats. PROCEDURES: In a randomized crossover study, levetiracetam (20 mg/kg) was administered orally and i.v. to each cat. Blood samples were collected 0, 10, 20, and 40 minutes and 1, 1.5, 2, 3, 4, 6, 9, 12, and 24 hours after administration. Plasma levetiracetam concentrations were determined via high-performance liquid chromatography. RESULTS: Mean +/- SD peak concentration was 25.54 +/- 7.97 mug/mL. The mean y-intercept for i.v. administration was 37.52 +/- 6.79 mug/mL. Half-life (harmonic mean +/- pseudo-SD) was 2.95 +/- 0.95 hours and 2.86 +/- 0.65 hours for oral and i.v. administration, respectively. Mean volume of distribution at steady state was 0.52 +/- 0.09 L/kg, and mean clearance was 2.0 +/- 0.60 mL/kg/min. Mean oral bioavailability was 102 +/- 39%. Plasma drug concentrations were maintained in the therapeutic range reported for humans (5 to 45 mug/mL) for at least 9 hours after administration in 7 of 10 cats. Only mild, transient hypersalivation was evident in some cats after oral administration. CONCLUSIONS AND CLINICAL RELEVANCE: Levetiracetam (20 mg/kg) administered orally or i.v. to cats every 8 hours should achieve and maintain concentrations within the therapeutic range for humans. Levetiracetam administration has favorable pharmacokinetics for clinical use, was apparently tolerated well, and may be a reasonable alternative antiepileptic drug in cats.

Anemia of renal disease: what it is, what to do and what’s new.

PATIENT GROUP: It is estimated that 15-30% of geriatric cats will develop chronic kidney disease (CKD), and that 30-65% of these cats will develop anemia as their renal disease worsens. Anemia of renal disease is multifactorial in its pathogenesis, but the main cause is reduced production of erythropoietin, a renal hormone that controls the bone marrow’s production of red blood cells, as kidney disease progresses. PRACTICAL RELEVANCE: It is important to recognize the presence of anemia of renal disease so that adequate treatment may be instituted to improve quality of life and metabolic function. Erythrocyte-stimulating agents (ESAs), such as epoetin alfa, epoetin beta and darbepoetin alfa, have been developed to counteract the effects of decreased erythropoietin production by the kidneys. These treatments, which are the focus of this review, have 83% similarity in amino acid sequence to the feline hormone. On average, the target packed cell volume (>25%) is reached within 3-4 weeks of ESA therapy. CLINICAL CHALLENGES: The use of ESAs has been associated with a number of complications, such as iron deficiency, hypertension, arthralgia, fever, seizures, polycythemia and pure red cell aplasia (PRCA). Darbepoetin has a prolonged half-life compared with epoetin and thus can be given only once a week, instead of three times a week. The incidence of PRCA appears to be decreased with darbepoetin use when compared with epoetin use in cats. EVIDENCE BASE: There is limited published evidence to date to underpin the use of ESAs in cats. This review draws on the relevant publications that currently exist, and the authors’ personal experience of using these therapies for over 5 years.


Unexpected depletion of plasma arachidonate and total protein in cats fed a low arachidonic acid diet due to peroxidation.

An opportunity to investigate a low-arachidonic acid (AA) feline diet possibly related to elevated peroxide value (PV) during storage on plasma phospholipid (PL) and reproductive tissue fatty acid (FA) profiles presented itself in the present study. Cats (nine animals per group) had been fed one of three dry extruded, complete and balanced diets for 300 d before spaying. The diets contained adequate AA (0.3 g/kg), similar concentration of antioxidants and were stored at ambient temperature, but differed in FA composition. The diets were designated as follows: diet A (high linoleic acid), diet B (high gamma-linolenic acid) and diet C (adequate linoleic acid). Diet samples that were obtained the week before spaying revealed an elevated PV of diet A v. diets B and C (135 v. 5.80 and 2.12 meq/kg fat, respectively). Records revealed decreased food consumption of diet A cats beginning at 240 d but without weight loss; thus an opportunity presented to investigate diet PV effects. Total plasma protein and PL- AA concentrations in group A were significantly decreased at 140 and 300 d. Uterine and ovarian tissues collected at surgery revealed modest decrements of AA. Diet A was below minimum standards at 0.015 % (minimum 0.02 %), probably due to oxidation. The time at which diet A became unacceptable may have occurred between 60 and 140 d because plasma PL-AA was within our normal colony range (approximately 4-7 % relative) after 56 d of feeding. High-linoleic acid-containing diets may be more likely to be oxidised requiring additional antioxidants. The findings suggest that reduced plasma protein in combination with plasma AA concentrations may serve as biomarkers of diet peroxidation in cats before feed refusal, weight loss or tissue depletion.

The impact of oral versus inhaled glucocorticoids on allergen specific IgE testing in experimentally asthmatic cats.

Glucocorticoids (GCs) are palliative for allergic asthma, but allergen-specific immunotherapy (ASIT), which relies on identification of allergens, represents a potentially curative treatment. The purpose of this study was to determine if oral or inhaled GCs would interfere with identification of sensitizing allergens. The hypothesis was that oral but not inhaled GCs would interfere with accurate allergen-specific IgE identification determined by skin and serum testing in experimentally asthmatic cats. Asthma was induced in 18 cats using Bermuda grass allergen (BGA). Cats (n=6/group) were randomized to receive oral GCs (10mg prednisolone q 24h), inhaled GCs (600mug budesonide q 24h) or placebo (q 24h PO) for one month. Intradermal skin testing (IDST) and serum BGA-specific IgE were measured prior to, during and after treatment. A paired t test was used to compare groups pre- and post-treatment (P<0.05 significant). IDST reactivity was eliminated in 4/6, 3/6, and 1/6 cats receiving oral GCs, inhaled GCs, and placebo respectively. Two weeks after stopping treatment, IDST was again positive in all cats. Serum IgE reactivity to BGA was not significantly diminished by any treatment. In conclusion, a two-week withdrawal from GCs is adequate for IDST, but may not be necessary for serum IgE testing.


Evaluation of glomerular filtration rate by use of dynamic computed tomography and Patlak analysis in clinically normal cats.

OBJECTIVE: To obtain quantitative variables of the abdominal aorta and both kidneys on the basis of time-attenuation curves (TACs) and to measure glomerular filtration rate (GFR) for each kidney and the global GFR in clinically normal cats by use of dynamic computed tomography (CT) and Patlak analysis. ANIMALS: 9 healthy cats. PROCEDURES: All the cats were anesthetized with propofol. Anesthesia was maintained by administration of isoflurane, and CT examination was performed in the anesthetized cats. The TACs and renal volume were measured by use of the baseline precontrast and single-slice dynamic scans. The CT-GFR of each kidney and the global CT-GFRs were calculated via Patlak plot analysis. RESULTS: CT-GFR results from 7 cats were valid. Peak aortic enhancement was detected between 9.0 and 14.0 seconds after iohexol injection, and the initial peak time of renal parenchymal enhancement was 15 to 24 seconds after iohexol injection. Mean +/- SD global GFR was 2.06 +/- 0.62 mL/min/kg. Mean +/- SD CT-GFR of the right and left kidneys was 0.97 +/- 0.32 mL/min/kg and 1.05 +/- 0.31 mL/min/kg, respectively. CONCLUSIONS AND CLINICAL RELEVANCE: The CT-GFR method can be rapidly and conveniently performed in clinically normal cats. This combined structural-functional approach provided physiologic and morphological information on the kidneys of cats.


Homeopathic and integrative treatment for feline hyperthyroidism--four cases (2006-2010).

Hyperthyroidism is a frequent veterinary problem, particularly in elderly cats. Homeopathic treatment and other integrative modalities were provided for four hyperthyroid cats whose owners did not want conventional treatment. Symptomatic homeopathic treatment with Thyroidinum was helpful in one cat.
All cats were prescribed an appropriate individualized homeopathic remedy. All four cats showed resolution of clinical signs; three attained normal thyroid hormone levels. Three cats later received acupuncture and/or herbal medicines; two cats later received symptomatic homeopathic remedies. Two cats are thriving after over 3.5 and 4.25 years of treatment; two were euthanized for unrelated problems after 3 and 4 years of treatment. Homeopathic and complementary therapies avoid the potential side effects of methimazole and surgical thyroidectomy, they are less costly than radioactive iodine treatment, and they provide an option for clients who decline conventional therapies.


**Development and Clinical Evaluation of a Rapid Serodiagnostic Test for Toxoplasmosis of Cats Using Recombinant SAG1 Antigen.**

Rapid serodiagnostic methods for Toxoplasma gondii infection in cats are urgently needed for effective control of transmission routes toward human infections. In this work, 4 recombinant T. gondii antigens (SAG1, SAG2, GRA3, and GRA6) were produced and tested for the development of rapid diagnostic test (RDT). The proteins were expressed in Escherichia coli, affinity-purified, and applied onto the nitrocellulose membrane of the test strip. The recombinant SAG1 (rSAG1) showed the strongest antigenic activity and highest specificity among them. We also performed clinical evaluation of the rSAG1-loaded RDT in 182 cat sera (55 household and 127 stray cats). The kit showed 0.88 of kappa value comparing with a commercialized ELISA kit, which indicated a significant correlation between rSAG1-loaded RDT and the ELISA kit. The overall sensitivity and specificity of the RDT were 100% (23/23) and 99.4% (158/159), respectively. The rSAG1-loaded RDT is rapid, easy to use, and highly accurate. Thus, it would be a suitable diagnostic tool for rapid detection of antibodies in T. gondii-infected cats under field conditions.


**Pharmacodynamic effects of ivabradine, a negative chronotropic agent, in healthy cats.**

OBJECTIVE: To determine the pharmacodynamic effects of oral ivabradine in cats. ANIMALS: Eight healthy, adult domestic short hair cats. METHODS: Each cat underwent four study periods of 24 h, receiving either one dose of placebo or ivabradine (0.1 mg/kg, 0.3 mg/kg, and 0.5 mg/kg) in a single-blind randomized crossover study. Clinical tolerance was assessed hourly for the first 8 h, at 12 h, and at the end of the 24-h study period. Heart rate and blood pressure were monitored continuously for 18-24 h via radiotelemetry after each treatment. Response to stress (acoustic startle) was studied before (t = 0) and after treatment (t = 4 h). Statistical comparisons were made using a linear mixed models and 1-way and 2-way repeated measures ANOVA. RESULTS: Heart rate (min(-1)) decreased significantly (P < 0.05) in a dose-dependent manner with peak negative chronotropic effects observed 3 h after ivabradine (mean +/- SD; placebo, 144 +/- 20; ivabradine 0.1 mg/kg, 133 +/- 22; ivabradine 0.3 mg/kg, 112 +/- 20; and ivabradine 0.5 mg/kg, 104 +/- 11). Heart rate (min(-1)) was still reduced (P < 0.05) 12 h after ivabradine (0.3 mg/kg; 128 +/- 18 and 0.5 mg/kg; 124 +/- 16) compared to placebo (141 +/- 21). The tachycardic response to acoustic startle was significantly (P < 0.01) blunted at all 3 doses of ivabradine. Myocardial oxygen consumption estimated by the rate-pressure product was significantly reduced (P < 0.05) for all doses of ivabradine. No effect of ivabradine on systolic, diastolic, and mean
blood pressure was identified and no clinically discernable side effects were observed. CONCLUSION: These findings indicate that a single oral dose of ivabradine predictably lowers heart rate, blunts the chronotropic response to stress, and is clinically well tolerated in healthy cats. This makes ivabradine potentially interesting in the treatment of feline heart disease where ischemia is of pathophysiologic importance.


Seroepidemiology of Toxoplasma gondii, Neospora caninum, and Leishmania spp. infections and risk factors for cats from Brazil.

The seroprevalence of infection by Toxoplasma gondii, Neospora caninum, and Leishmania spp. was detected through an indirect immunofluorescence in 70 cats from the Andradina Municipality, Sao Paulo State, Brazil. Anti-T. gondii antibodies (titer >64) were detected in 15.7% (11/70) of animals, whereas positivity for N. caninum (titer 16) was not observed in any animal. Of the cats from urban and rural areas, 10.4% (5/48) and 27.2% (6/22) were positive for T. gondii, respectively. Breed, age, food, and contact with animals of other species were significant for considering the positivity for T. gondii (P < 0.0001). Cats having access to streets (17.1%, 11/64), cats cohabiting with rats (19.6%, 10/51), and cats feeding on homemade food and raw milk (27.2%, 6/22) were positive for T. gondii. In addition, 4.2% (3/70) of the cats were positive for Leishmania spp. by ELISA technique and negative by IFAT without coinfection with T. gondii and Leishmania spp. There was no serological positivity against feline immunodeficiency virus or feline leukemia virus. In conclusion, T. gondii infection in part of the feline population from Andradina is not linked to immunosuppressions or coinfections but probably to postnatal infection in association with the type of diet and presence of rats.


Identification of intra- and inter-individual metabolite variation in plasma metabolite profiles of cats and dogs.

The purpose of the present study was first to identify drivers of variance in plasma metabolite profiles of cats and dogs that may affect the interpretation of nutritional metabolomic studies. A total of fourteen cats and fourteen dogs housed in environmentally enriched accommodation were fed a single batch of diet to maintain body weight. Fasting blood samples were taken on days 14, 16 and 18 of the study. Gas chromatography-mass spectrometry (GC-MS), liquid chromatography (LC)-MS/MS and solid-phase extraction-LC-MS/MS analyses were used for metabolite profiling. Principal component (PC) analysis that indicated 31 and 27% of the variance was explained in PC1 and PC2 for cats and dogs, respectively, with most individuals occupying a unique space. As the individual was a major driver of variance in the plasma metabolome, the second objective was to identify metabolites associated with the individual variation observed. The proportion of intra- and inter-individual variance was calculated for 109 cat and 101 dog metabolites with a low intra-individual variance (SD < 0.05). Of these, fifteen cat and six dog metabolites had inter-individual variance accounting for at least 90% of the total variance. There were four metabolites common to both species (campesterol, DHA, a cholestenol and a sphingosine moiety). Many of the metabolites with >75% inter-individual variance were common to both species and to similar areas of metabolism. In summary, the individual is an important driver of variance in the fasted plasma metabolome, and specific metabolites and areas of
metabolism may be differentially regulated by individuals in two companion animal species.


**Magnetic Resonance Imaging of Normal Nasal Cavity and Paranasal Sinuses in Cats.**

With 6 figures SUMMARY: 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.


**Serological evidence of Coxiella burnetii exposure in native marsupials and introduced animals in Queensland, Australia.**

SUMMARY The state of Queensland has the highest incidence of Q fever in Australia. In recent years, there has been an increase in human cases where no contacts with the typical reservoir animals or occupations were reported. The aim of this study was to determine the seroprevalence of Coxiella burnetii in Australian native animals and introduced animals in northern and southeastern Queensland. Australian native marsupials sampled included the brushtail possum (Trichosurus vulpecula) and common northern bandicoot (Isoodon macrourus). Introduced species sampled included dingoes (Canis lupus dingo), cats (Felis catus), foxes (Vulpes vulpes) and pigs (Sus scrofa). Serum samples were tested by ELISA for both phase II and phase I antigens of the organism using an Australian isolate. The serological evidence of C. burnetii infection demonstrated in these species has public health implications due to their increasing movement into residential areas in regional Queensland. This study is the first known investigation of C. burnetii seroprevalence in these species in northern Queensland.


**Effects of two commercially available feline diets on glucose and insulin concentrations, insulin sensitivity and energetic efficiency of weight gain.**

A low-carbohydrate, high-protein (LCHP) diet is often recommended for the prevention and management of diabetes in cats; however, the effect of macronutrient composition on insulin sensitivity and energetic efficiency for weight gain is not known. The present study compared the effect in adult cats (n 32) of feeding a LCHP (23 and 47 % metabolisable energy (ME)) and a high-carbohydrate, low-protein (HCLP) diet (51 and 21 % ME) on fasting and postprandial glucose and insulin concentrations, and on insulin sensitivity. Tests were done in the 4th week of maintenance feeding and after 8 weeks of ad libitum feeding, when weight gain and energetic efficiency of each diet were also measured. When fed at maintenance energy, the HCLP diet resulted in higher postprandial glucose and insulin concentrations. When fed ad libitum, the LCHP diet resulted in greater weight gain (P < 0.01), and was
associated with higher energetic efficiency. Overweight cats eating the LCHP diet had similar postprandial glucose concentrations to lean cats eating the HCLP diet. Insulin sensitivity was not different between the diets when cats were lean or overweight, but glucose effectiveness was higher after weight gain in cats fed the HCLP diet. According to the present results, LCHP diets fed at maintenance requirements might benefit cats with multiple risk factors for developing diabetes. However, ad libitum feeding of LCHP diets is not recommended as they have higher energetic efficiency and result in greater weight gain.


**Brain abscess in seven cats due to a bite wound: MRI findings, surgical management and outcome.**

PRESENTATION AND LESION LOCALISATION: Seven adult domestic shorthair cats were presented with a 1- to 6-day history of progressive neurological signs. A focal skin puncture and subcutaneous swelling over the dorsal part of the head were detected on physical examination. Neurological examination indicated lesion(s) in the right forebrain in four cats, multifocal forebrain in one cat, left forebrain in one cat, and multifocal forebrain and brainstem in the remaining cat. In all cats, magnetic resonance imaging revealed a space-occupying forebrain lesion causing a severe mass effect on adjacent brain parenchyma. CLINICAL APPROACH AND OUTCOME: All cats were managed with a combination of medical and surgical treatment. At surgery a small penetrating calvarial fracture was detected in all cats, and a tooth fragment was found within the content of the abscess in two cats. The combination of surgical intervention, intensive care and intravenous antimicrobials led to a return to normal neurological function in five cats. PRACTICAL RELEVANCE: As this series of cases indicates, successful resolution of a brain abscess due to a bite injury depends on early recognition and combined used of antimicrobials and surgical intervention. A particular aim of surgery is to remove any skull and foreign body (tooth) fragments that may represent a continuing focus of infection.


**Clinical outcome following pneumonectomy for management of chronic pyothorax in four cats.**

Pneumonectomy is the resection of all lung lobes from one side of the thorax. The clinical findings, treatment and outcome of four cases of feline chronic pyothorax managed with exploratory thoracotomy and pneumonectomy are reported. All cases were initially medically managed with thoracic drain placement and antibiosis. However, resolution was not achieved with medical therapy and diagnostic imaging findings consistent with an area of abscessation or marked lung lobe consolidation were identified, supporting a decision for surgical management. Surgical exploration was performed via median sternotomy and, on the basis of gross inspection, non-functional lung was removed. A left-sided pneumonectomy was performed in three cats and a right-sided pneumonectomy in one. All cases survived to discharge and an excellent quality of life was reported on long-term follow-up. Pneumonectomy appears to be well tolerated in the cat.

Morphologic and Molecular Analysis of 39 Spontaneous Feline Pulmonary Carcinomas.

The present study was performed to determine the morphologic change and selected molecular features of spontaneous lung tumors in cats examined at the North Carolina State University Veterinary Teaching Hospital. Thirty-nine primary lung carcinomas represented 0.69% of all feline cases admitted to the hospital. Most lung tumors were observed in aged cats (P <.0001), and no sex predilection was found (P <.4241). Persian cats with pulmonary carcinoma were overrepresented in the data set, at least 4 times more frequently than other breeds. The histologic tumor types included adenocarcinoma (64.1%), bronchioloalveolar carcinoma (20.5%), and adenosquamous carcinoma (15.4%). Metastasis was observed in about 80% of 39 cases, with decreasing order of intrapulmonary metastasis, intrathoracic carcinomatosis, regional lymph nodes, and distant organs, including digits. The size of the largest tumor mass was significantly associated with metastatic potential (P <.001). Based on immunohistochemistry, more than 80% (20 of 24) of feline lung tumors were positively labeled with either surfactant protein A or thyroid transcription factor 1. Epidermal growth factor receptor mutant and p53 proteins were detected in approximately 20% (5 of 24) and 25% (6 of 24) of the feline lung tumor cases, respectively. Limited sequencing analysis of K-ras and p53 genes in 3 selected normal and neoplastic lung tissues did not reveal any alteration. Results indicate that primary lung carcinomas are rare but aggressive tumors in cats, thereby warranting further studies on molecular carcinogenesis.


Agonistic behavior and environmental enrichment of cats communally housed in a shelter.

OBJECTIVE: To evaluate the presence of a dominance rank in a group of cats and the relation between agonistic behavior and the use of resources, including environmental enrichment, in these cats.

DESIGN: Observational analytic study.

ANIMALS: 27 neutered cats in a shelter in Sao Paulo, Brazil.

PROCEDURES: The cats were video recorded for 4 consecutive days to obtain baseline data. Subsequently, a puzzle feeder was added as an enrichment device every other day over 8 days, for a total of 4 days with enrichment. Cats were also video recorded on these days. All pretreatment and posttreatment agonistic behaviors and interactions with the puzzle feeder were recorded by reviewing the videotapes.

RESULTS: 143 agonistic encounters were recorded, of which 44 were related to resources and 99 were not. There were insufficient agonistic interactions to determine a dominance rank. Presence or absence of the puzzle feeder did not affect the rate of aggression. There was no significant effect of weight, sex, or coat color on the rate of aggression, and aggressive behavior did not correlate with time spent with the puzzle feeder. Twenty-three of the 27 cats interacted with the puzzle feeder.

CONCLUSIONS AND CLINICAL RELEVANCE: In a stable group of communally housed cats, environmental enrichment did not cause increased aggression as a result of competition for the source of enrichment. Because environmental enrichment increases the opportunity to perform exploratory behaviors, it may improve the welfare of groups of cats maintained long-term in shelters, sanctuaries, or multiset households.


Tear-film osmolarity in normal cats and cats with conjunctivitis.
OBJECTIVE: To compare the tear-film osmolarity of normal cats and cats with conjunctivitis.
ANIMAL STUDIED: The population consisted of shelter, research, and privately owned cats.
PROCEDURES: Cats were classified as normal or having conjunctivitis. An ophthalmic examination
including Schirmer tear test (STT), fluorescein staining, tear-film break-up time (TFBUT), intraocular
pressure (IOP), and slit-lamp biomicroscopy of the anterior segment was performed. The severity of
conjunctivitis was graded and assigned a numerical score. The Tear Lab(TM) Osmolarity System was
utilized to determine the tear-film osmolarity. Unpaired t-tests were used to compare tear-film
osmolarity, TFBUT, IOP, and STT of the two groups. RESULTS: A total of 93 cats (186 eyes) were
examined. There were 37 normal cats (74 eyes) and 39 conjunctivitis cats (78 eyes). The mean age was
2.34 years. There was no statistical difference (P = 0.2065) between the median tear-film osmolarit
y of normal cats (328.5 +/- 17.94 mOsms/L) and conjunctivitis cats (325.0 +/- 24.84 mOsms/L). Cats with
conjunctivitis had an accelerated TFBUT (P < 0.0001) and lower IOPs (P < 0.0001) as compared to
normal cats. No statistical difference was found between STT values (P = 0.1304). CONCLUSIONS:
The median tear-film osmolarity of normal cats was 328.5 mOsms/L. Despite the accelerated TFBUT,
conjunctivitis did not cause a statistically significant change in tear-film osmolarity. The Tear Lab(TM)
Osmolarity System was easily used and well tolerated by the cats in the study.


Molecular characterization of Hepatozoon sp. in cats from Sao Luis Island, Maranhao,
Northeastern Brazil.

Few molecular studies have been done concerning the molecular characterization of Hepatozoon
species among domestic and wild felids. The present work aimed to characterize molecularly the
presence of Hepatozoon sp. DNA in cat blood samples from Sao Luis Island, Maranhao state,
Northeastern Brazil. EDTA-whole blood samples were collected from 200 domestic cats with outdoor
and wood areas access from Sao Luis, Maranhao, Brazil. Each sample of extracted DNA was used as a
template in PCR reactions aiming to amplify a partial sequence of 18S rRNA of Hepatozoon spp. We
also performed sequence alignment to establish the identity of the parasite species infecting these
animals using DNA sequences based on 18S rRNA. From 200 sampled cats, Hepatozoon DNA was
only found in one animal (0.5%). The found Hepatozoon DNA showed 97% of identity with
Hemobartonella felis isolates 1 and 2 from Spain. When analyzing the phylogenetic tree, the found
Hepatozoon DNA was in the same clade than H. felis isolates. Our findings suggest that more than one
species of Hepatozoon could infect felids in Brazil.

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Digestibility for dogs and cats of meat and bone meal processed at two different temperature and
pressure levels*

This study evaluated the effect of two rendering processes applied to meat and bone meal (MBM)
production, associated or not with extrusion, by measuring diet apparent total tract digestibility of dogs
and cats, and true digestibility of amino acids (AA) by cecctomized roosters. Four diets were
evaluated, with the main protein source as follows: conventional and extruded MBM; high temperature
and pressure (HPT; 135 degrees C, 3 bar, 20 min) and extruded MBM; conventional non-extruded
MBM; HPT non-extruded MBM. Nutrient digestibility and food metabolizable energy content were
evaluated with dogs and cats by the method of total collection of faeces. True AA digestibility was evaluated by a precision-fed assay with cecectomyed roosters. The evaluated MBM had high-ash content. The HPT process of MBM increased the digestibility of crude protein of the diets by cats, and the true digestibility of several AA by cecectomized roosters. The extrusion process did not modify the apparent total tract nutrient digestibility of MBM by dogs and their amino acid digestibility by roosters, but increased the digestibility of the dietary protein by cats. Dogs fed HPT MBM presented a higher urea post-prandial response, suggesting reductions in bioavailability and protein synthesis from absorbed AA.


Feline urate urolithiasis: a retrospective study of 159 cases.

The objective of the study was to characterize the signalment, clinicopathologic data, and diagnostic imaging of cats with urate urolithiasis, as well as the salts of uric acid present in the uroliths. A retrospective analysis of feline urate uroliths submitted to the GV Ling Urinary Stone Analysis Laboratory between 2000 and 2008 was included. From these data, records were assimilated from referring veterinarians (143); furthermore, all recorded cases from within the William R Pritchard Veterinary Medical Teaching Hospital (16) were included. Median values for the complete blood count and chemistry panels available were within the reference intervals, when provided, with only a few outliers present. Of all cases evaluated, seven had a portosystemic shunt (PSS). Cats with urate uroliths and a PSS were younger than cats without a PSS (2 years vs 7 years). The pathogenesis of urate uroliths in cats is poorly understood. Most cats were not completely evaluated for a PSS, however, clinicopathologic parameters indicating hepatic dysfunction were seldom noted; more sensitive diagnostics such as serum bile acids were rarely performed to confirm or negate the presence of a shunt. Studies are warranted to evaluate pathogenesis of urate uroliths to tailor proper management and breeding strategies.


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.
Physical activity level of adult cats with varied feeding frequency.

The prevalence of feline obesity is influenced by numerous factors, including inactivity and overconsumption of food. The objective of the present study was to evaluate the effect of feeding frequency on physical activity in adult cats. A total of twelve healthy adult cats were used in a cross-over study consisting of 32 d. In each of the two periods, six cats were fed either two meals or four meals daily. Throughout the study, cats were fed the same diet at amounts to maintain body weight and body condition score. Cats were individually housed 4 h/d at each scheduled feeding time, while for the other 20 h, cats were group-housed to allow for voluntary physical activity in the room with a 16 h light-8 h dark cycle. Voluntary activity levels were evaluated using Actical activity collars for seven consecutive days in each period. Daily average activity level for two-meal-fed cats (20.04 (SEM 2.19), activity counts/epoch (15 s)) was not different from four-meal-fed cats (20.14 (SEM 2.15), activity counts/epoch (15 s); P>0.05). In conclusion, when group-housed cats are fed to maintain their body weight and body condition score, varied feeding frequency between twice and four times daily may not affect activity levels.

Contrast-enhanced ultrasonography of the small bowel in healthy cats.

We characterized the pattern of ultrasonographic contrast enhancement of the small intestinal wall using a commercial contrast medium (Sonovue(R)) in 10 healthy awake cats. Subjectively, a rapid intense enhancement of the serosal and submucosal layers was followed by gradual enhancement of the entire wall section during the early phase. At peak enhancement, there was a subjective loss of demarcation between intestinal wall layers. In the late phase, there was a gradual wash out of signal from the intestinal wall. Submucosal wash out occurred last. Time-intensity curves were generated for selected regions in the intestinal wall and multiple perfusion parameters were calculated for each cat. Perfusion parameters included arrival time (7.64 +/- 2.23 s), baseline intensity (1.04 +/- 0.04 a.u.), time to peak from injection (10.74 +/- 2.08 s), time to peak from initial rise (3.1 +/- 1.15), peak intensity (8.92 +/- 3.72 a.u.), wash-in rate (2.06 +/- 0.70 a.u./s) and wash-out rate (-1.07 +/- 0.91 a.u./s). The perfusion pattern of normal feline small bowel may be useful for characterizing feline gastrointestinal disorders that involve the intestinal wall.

Comparison of a continuous glucose monitoring system with a portable blood glucose meter to determine insulin dose in cats with diabetes mellitus.

BACKGROUND: The continuous glucose monitoring system (CGMS) Guardian REAL-Time((R)) allows the generation of very detailed glucose profiles in cats. The performance of CGMS to generate short-term glucose profiles to evaluate treatment response has not been yet evaluated in diabetic cats. HYPOTHESIS: Analysis of glucose profiles generated using the CGMS produces insulin dose
recommendations that differ from those of profiles generated using the portable blood glucose meter (PBGM) in diabetic cats. ANIMALS: Thirteen client-owned diabetic cats. METHODS: Prospective, observational study. Simultaneous glucose profiles were generated over an 8-10 hour period using the CGMS, blood glucose concentration was measured every 2 hours with the PBGM. Profiles were submitted to three internal medicine specialists who used them to determine the insulin dose. Differences between insulin doses deduced from paired profiles were compared. Percentages of nadirs recorded with the CGMS that were lower, higher, or equal to those derived with the PBGM were calculated. RESULTS: Twenty-one paired glucose profiles were obtained. There was no difference of insulin doses based on CGMS and PBGM profiles (median 0 U; range: -1 to +0.5). Treatment decisions did not differ among investigators. Compared with the observed PBGM nadir, the CGMS nadir was lower, higher, or equal in 17, 2, and 2 of 21 cases, respectively. CONCLUSIONS AND CLINICAL IMPORTANCE: Adjustments in insulin dose based on glucose profiles generated with the CGMS are similar to those based on the PBGM. The common occurrence of lower nadirs recorded with the CGMS suggests that this device detects hypoglycemic periods that are not identified with the PBGM.


Primary hyperaldosteronism: expanding the diagnostic net.

PRACTICAL RELEVANCE: Primary hyperaldosteronism is probably the most common adrenocortical disorder in cats. As in humans, it is often unrecognised, which excludes a potentially large number of cats from appropriate treatment. PATIENT GROUP: Affected cats present at a median age of 13 years (range 5-20 years). A breed or sex predilection has not been documented. The excessive secretion of mineralocorticoids usually leads to hypokalaemia and/or systemic arterial hypertension. Most affected cats present with muscular weakness and/or ocular signs of arterial hypertension. DIAGNOSTICS: In any cat presenting with hypokalaemia and/or arterial hypertension, other potential causes should be excluded. The ratio of plasma aldosterone concentration to plasma renin activity (aldosterone:renin ratio) is currently the best screening test for feline primary hyperaldosteronism. Diagnostic imaging is required to differentiate between adrenocortical neoplasia and bilateral hyperplasia, and to detect any distant metastases. CLINICAL CHALLENGES: The differentiation between adrenocortical neoplasia and bilateral hyperplasia is imperative for planning optimal therapy, but the limited sensitivity of diagnostic imaging may occasionally pose a problem. For confirmed unilateral primary hyperaldosteronism, unilateral adrenalectomy is the treatment of choice, and offers an excellent prognosis, but potentially fatal intra- and postoperative haemorrhage is a reported complication and risk factors have yet to be identified. EVIDENCE BASE: Only a few case reports are available on which to base the optimal diagnostic and therapeutic approach to feline primary hyperaldosteronism. This article reviews the physiology of aldosterone production and the pathophysiology of primary hyperaldosteronism, and summarises the currently available literature on the feline disease. Practical suggestions are given for the diagnostic investigation of cats with suspected primary hyperaldosteronism.


Use of recombinant interferon omega in feline retrovirosis: from theory to practice.

Type-I interferons (IFNs) are cytokines that have non-specific antiviral activity, participating mostly in
innate defense mechanisms. Their administration has been proposed to treat several viral and
immunomediated diseases as an immunomodulatory therapy. Due to its availability, recombinant
human interferon-alpha (rHuIFN-alpha) has been studied in relation to feline retrovirosis, both in vitro
and in vivo. However, IFNs are species-specific and antibodies have been shown to develop in
response to the high rHuIFN-alpha doses necessary for an effective therapy. A recombinant feline IFN
has been developed, which has been characterized as interferon-omega (rFeIFN-omega), designed to
overcome these problems. Nonetheless, very few studies have been undertaken to evaluate its efficacy
in cats naturally infected with FIV or FeLV. In an initial study, we here demonstrated that rFeIFN-
omega can dramatically improve the clinical condition of infected cats, and induce improvement of
hematologic parameters. Minor changes or no change was observed for hypergammaglobulinemia,
CD4/CD8 ratio, proviral load, viremia and RT activity, suggesting that the overall effect of IFN was on
innate immunity. More studies are needed in order to better understand its in vivo mechanisms.


Efficacy of imidacloprid + moxidectin and selamectin topical solutions against the KS1
Ctenocephalides felis flea strain infesting cats.

BACKGROUND: Two studies were conducted to evaluate and compare the efficacy of imidacloprid +
moxidectin and selamectin topical solutions against the KS1 flea strain infesting cats. In both studies
the treatment groups were comprised of non-treated controls, 6% w/v selamectin (Revolution(R);
Pfizer Animal Health) topical solution and 10% w/v imidacloprid + 1% w/v moxidectin (Advantage
Multi(R) for Cats, Bayer Animal Health) topical solution. All cats were infested with 100 fleas on Days
-2, 7, 14, 21, and 28. The difference in the studies was that in study #1 efficacy evaluations were
conducted at 24 and 48 hours post-treatment or post-infestation, and in study #2 evaluations were
conducted at 12 and 24 hours. RESULTS: In study #1 imidacloprid + moxidectin and the selamectin
formulation provided 99.8% and 99.0% efficacy at 24 hours post-treatment. On day 28, the 24 hour
efficacy of the selamectin formulation dropped to 87.1%, whereas the imidacloprid + moxidectin
formulation provided 98.9% efficacy. At the 48 hour assessments following the 28 day infestations,
efficacy of the imidacloprid + moxidectin and selamectin formulations was 96.8% and 98.3%
respectively. In study #2 the efficacy of the imidacloprid + moxidectin and selamectin formulations 12
hours after treatment was 100% and 69.4%, respectively. On day 28, efficacy of the imidacloprid +
moxidectin and selamectin formulations 12 hours after infestation was 90.2% and 57.3%, respectively.
In study #2 both formulations provided high levels of efficacy at the 24 hour post-infestation
assessments, with selamectin and imidacloprid + moxidectin providing 95.3% and 97.5% efficacy,
following infestations on day 28. CONCLUSIONS: At the 24 and 48 hour residual efficacy
assessments, the imidacloprid + moxidectin and selamectin formulations were similarly highly
efficacious. However, the imidacloprid + moxidectin formulation provided a significantly higher rate
of flea kill against the KS1 flea strain infesting cats at every 12 hour post-infestation residual efficacy
assessment. Both formulations should provide excellent flea control for an entire month on cats.


Sporulation and survival of Toxoplasma gondii oocysts in different types of commercial cat litter.

Toxoplasma gondii oocysts are environmentally resistant and can survive outdoors for many months in
dry and cold climates. In the present study, sporulation and survival of T. gondii oocysts was studied in
different types of cat litters commercially available in the United States. Oocysts sporulated within 2-3 days in all types of cat litters and occasionally remained viable for 14 days. Results indicate that cat litter should be changed daily to prevent sporulation and infectivity to people.


**Occurrence of occult bacteriuria in healthy cats.**

Knowledge of the occurrence of bacteriuria in adult, healthy cats is scarce in the scientific literature. A study was designed to investigate the occurrence of bacteriuria in healthy cats without current or previous signs of lower urinary tract disease. The study included 108 cats, 53 males (49.5%) and 55 females (50.5%). The cats ranged in age between 7 months and 18 years, with a mean age of 4.4 years and a median age of 4.0 years. Urine was obtained by cystocentesis from all the cats, and was submitted for bacteriological analyses. Urine and urine sediment was cultured on separate blood agar plates for quantification and species identification by standard procedures. Detection of $\geq10^3$ colony forming units (cfu) per ml urine was defined as significant bacteriuria. Significant bacteriuria exceeding $10^5$ cfu/ml was detected in one sample with a combination of Enterococcus species and Staphylococcus species. There was no bacterial growth in the urine samples from 107 cats (99.1%). Results from our study indicate that the prevalence of bacteriuria in clinically healthy, adult cats is low. Also, that contamination of samples is rare when urine is collected by cystocentesis.


**Treatment and outcome of four cats with apocrine gland carcinoma of the anal sac and review of the literature.**

Anal sac adenocarcinoma is uncommon in cats. We report the outcome of multi-modality therapy in two cats (surgery, definitive radiotherapy and systemic chemotherapy) and surgery alone in two cats. All received surgical excision of the primary tumour followed by radiotherapy and carboplatin chemotherapy in two cases. Both cats that underwent multimodal therapy developed distant metastatic disease and one developed recurrence of the primary tumour. One cat that underwent surgery alone with incomplete margins also developed rapid recurrence. Overall survival times were 89, 161 and 169 days. One cat that had complete surgical excision is still alive without recurrence 425 days postoperatively. Whilst the role of radiation in the local control of this disease is yet to be defined, clearly a more effective systemic therapy is required before such aggressive local treatment can be routinely recommended.


**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 miliary 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.

Faya, M., A. Carranza, M. Priotto, M. Abeya, J. D. Diaz, and C. Gobello (2011) Anim Reprod Sci

**Domestic queens under natural temperate photoperiod do not manifest seasonal anestrus.**

Domestic cat seasonality between the tropics and the arctic zones is scarcely described and results are inconsistent. The aim of this study was to describe domestic feline seasonal patterns under a natural temperate photoperiod. A total of 372 estrous cycles were studied in 34 post pubertal cats during 900 days. The queens were housed in a cat colony (31 degrees 25’ South Latitude, 64 degrees 11’ West Longitude), acclimated under natural photoperiod and daily observed for reproductive behavior. Vaginal cytology was conducted three times a week. For each cat the number of estrous cycles and days in estrus per month for each year were recorded. The months of the year were grouped in four periods of 3 months each according to day length and photoperiod. Comparisons of estrous days among periods were performed by ANOVA for repeated measures. All the cats had estrous cycles throughout the year without intervals of anestrus. Mean number of estrous days differed among the periods (P<0.01), those of long day length and ascending photoperiod being greater (12.5+/-.6) to those of descending photoperiod either with long (8.9+/-.7) or short (9.3+/-.7) days. When the two periods with ascending day lengths were merged and compared to the two periods with descending day lengths merged, the number of estrous days were greater when day length ascended (P<0.01). Nearly 60% of the estrous cycles occurred during the periods of ascending day length. It is concluded, that domestic cats under natural temperate photoperiod have estrous cycles throughout the year showing peak activity the months with increasing photoperiod.


**Human-related factors regulate the spatial ecology of domestic cats in sensitive areas for conservation.**

BACKGROUND: Domestic cats ranging freely in natural areas are a conservation concern due to competition, predation, disease transmission or hybridization with wildcats. In order to improve our ability to design effective control policies, we investigate the factors affecting their numbers and space use in natural areas of continental Europe. METHODOLOGY/PRINCIPAL FINDINGS: We describe the patterns of cat presence, abundance and space use and analyse the associated environmental and human constraints in a well-preserved Mediterranean natural area with small scattered local farms. We failed in detecting cats in areas away from human settlements (trapping effort above 4000 trap-nights),
while we captured 30 individuals near inhabited farms. We identified 130 cats, all of them in farms still in use by people (30% of 128 farms). All cats were free-ranging and very wary of people. The main factor explaining the presence of cats was the presence of people, while the number of cats per farm was mostly affected by the occasional food provisioning with human refuse and the presence of people. The home ranges of eight radio tagged cats were centred at inhabited farms. Males went furthest away from the farms during the mating season (3.8 km on average, maximum 6.3 km), using inhabited farms as stepping-stones in their mating displacements (2.2 km of maximum inter-farm distance moved). In their daily movements, cats notably avoided entering in areas with high fox density. CONCLUSIONS: The presence, abundance and space use of cats were heavily dependent on human settlements. Any strategy aiming at reducing their impact in areas of conservation concern should aim at the presence of settlements and their spatial spread and avoid any access to human refuse. The movements of domestic cats would be limited in areas with large patches of natural vegetation providing good conditions for other carnivore mammals such as red foxes.


**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 times was six minutes and 10 seconds +/- 53 seconds and mean total time of fluoroscopic screening for each procedure was 44 seconds +/- six 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.


**Randomized, placebo controlled study of the effect of propentofylline on survival time and quality of life of cats with feline infectious peritonitis.**

BACKGROUND: Currently there is no drug proven to effectively treat cats with feline infectious peritonitis (FIP). HYPOTHESIS: Propentofylline (PPF) can decrease vasculitis, and therefore prolong survival time in cats with FIP, and increase their quality of life. ANIMALS: Twenty-three privately owned cats with FIP. METHODS: Placebo-controlled double-blind trial. FIP was confirmed by histology or immunostaining of feline coronavirus (FCoV) antigen in effusion or tissue macrophages or
both. The cats were randomly selected for treatment with either PPF or placebo. All cats received additional treatment with glucocorticoids, antibiotics, and low molecular weight heparin according to methods. RESULTS: There was no statistically significant difference in the survival time of cats treated with PPF (8 days, 95% CI 5.4-10.6) versus placebo (7.5 days, 95% CI 4.4-9.6). The median survival time of all cats was 8 days (4-36 days). There was neither a difference in quality of life (day 7, \( P = .892 \)), in the amount of effusion (day 7, \( P = .710 \)), the tumor necrosis factor-alpha (TNF-alpha) concentration (day 7, \( P = .355 \)), nor in any other variable investigated in this study, including a complete blood count, and a small animal biochemistry profile. CONCLUSIONS AND CLINICAL IMPORTANCE: This study did not detect an effect of PPF on the survival time, the quality of life, or any clinical or laboratory parameter in cats with FIP. Therefore, PPF does not appear to be an effective treatment option in cats with a late stage of the disease FIP.


**Combined Intramedullary and External Skeletal Fixation of Metatarsal and Metacarpal Fractures in 12 Dogs and 19 Cats.**

OBJECTIVE: To report surgical technique, clinical experiences, and long-term outcomes of combined intramedullary/external skeletal fixation of metatarsal (MT) and metacarpal (MC) fractures in dogs and cats. STUDY DESIGN: Case series. ANIMALS: Dogs (n = 12); 19 cats. METHODS: Clinical and radiographic records of animals managed by combined intramedullary/external fixation of MT/MC fractures were reviewed. Signalment, fracture configuration, complications, and subjective clinical findings were recorded. Surgical technique involved retrograde intramedullary pin placement into fractured MT/MC bones, and transverse pin placement in the base of the MT/MCs or tarsal/carpal bones. Contoured pin ends were enshrouded dorsally in epoxy resin and implants maintained until fracture union. Postoperative clinical and radiographic reassessment was performed where possible. RESULTS: Small breed dogs (n = 12) and 19 cats were operated. Fixator removal occurred in < 10 weeks in all cases. Complications included synostosis (n = 2), pin tract discharge (7), excessive postoperative swelling (8), skin abrasions from the frame (2), and paw distortion associated with frame impingement (2). Long-term radiography documented degenerative changes associated with MT-phalangeal or MC-phalangeal joints in 2 dogs; 7 cats, but changes were typically graded mild or moderate and affected only 1 or 2 joints. CONCLUSIONS: Combined intramedullary/external fixation of MT/MC fractures is viable, particularly juxta-articular fractures. Pin penetration of MT-phalangeal or MC-phalangeal joints may cause morbidity and requires further study.


**Cutaneous epitheliotropic T-cell lymphoma in the cat: a review of the literature and five new cases.**

Cutaneous epitheliotropic T-cell lymphoma (CETL) is characterized by cutaneous infiltration of neoplastic T lymphocytes with a specific tropism for the epidermis and adnexal epithelium. This disease is reported very rarely in the cat. Clinical data were collected from an informal discussion with veterinary dermatologists through the Vetdermlist (vetderm@lists.ncsu.edu). In parallel, case archives of two European diagnostic histopathology laboratories (Institut de Pathologie et Genetique/Bio.be Gosselies, Belgium and the School of Veterinary Sciences, University of Bristol, UK) were reviewed. Fifteen cases with a good clinical description were selected, and five sets of skin biopsies were
available for review. Cutaneous epitheliotropic T-cell lymphoma generally affects older cats with no apparent sex or breed predisposition. Solitary or multiple lesions were reported without predilection for any particular location. The lesions consisted of erythematous plaques or patches, scaly alopecic patches and nonhealing ulcers or nodules, which sometimes mimicked an eosinophilic plaque. Pruritus was rarely reported. No lesions affecting the oral mucosa were observed. Clinical diagnosis of CETL is more challenging in cats than in dogs. Final diagnosis must be based on histopathological examination of skin biopsy samples. The characteristic lesions of feline CETL are similar to those reported in the dog, but involvement of the adnexal glands was not observed in this series (n=5). The neoplastic T cells were generally small to medium in size. The survival time of cats with CETL seems to be more variable than that of affected dogs. Too few cases have been evaluated to permit clear recommendations to be made with respect to treatment.


**Rickettsia, Ehrlichia, Anaplasma, and Bartonella in ticks and fleas from dogs and cats in Bangkok.**

Flea and tick specimens (5-10 fleas or ticks) on dogs and cats from various sites in Bangkok were tested by polymerase chain reaction and DNA sequencing to detect DNA of bacteria Rickettsia (gltA and 17 kDa genes), Anaplasmataceae (16S rRNA gene), and Bartonella (pap31 and its genes). We confirmed that Rickettsia sp. related to Rickettsia felis was detected in 66 of 98 (67.4%) flea specimens from dogs, whereas 8 Bartonella henselae and 2 Bartonella claridgeiae were detected in 10 of 54 (18.5%) flea specimens from cats. Further, this work provides the first evidence of 10 Ehrlichia canis (3.3%), 7 Anaplasma platys (2.3%), and 2 Wolbachia spp. (0.66%) in 304 Rhipicephalus sanguineus tick specimens in Thailand.


**Multicenter evaluation of plasma N-terminal probrain natriuretic peptide (NT-pro BNP) as a biochemical screening test for asymptomatic (occult) cardiomyopathy in cats.**

BACKGROUND: B-type natriuretic peptide concentrations reliably distinguish between cardiac and respiratory causes of dyspnea, but its utility to detect asymptomatic cats with occult cardiomyopathy (OCM) is unresolved. HYPOTHESIS/OBJECTIVES: Determine whether plasma N terminal probrain natriuretic peptide (NT-proBNP) concentration can discriminate asymptomatic cats with OCM from normal cats, and whether NT-proBNP concentration correlates with clinical, biochemical, and echocardiographic parameters. ANIMALS: One hundred and fourteen normal, healthy cats; 113 OCM cats. METHODS: Prospective, multicenter, case-controlled study. NT-proBNP was prospectively measured and cardiac status was determined from history, physical examination, and M-mode/2D/Doppler echocardiography. Optimal cut-off values were derived using receiver operating characteristic (ROC) curve analysis. RESULTS: NT-proBNP was higher (median, interquartile range [25th and 75th percentiles]) in (1) OCM (186 pmol/L; 79, 478 pmol/L) versus normal (24 pmol/L; 24, 32 pmol/L) (P <.001); and (2) hypertrophic obstructive cardiomyopathy (396 pmol/L; 205, 685
pmol/L) versus hypertrophic cardiomyopathy (112 pmol/L; 48, 318 pmol/L) (P < .001). In OCM, NT-proBNP correlated (1) positively with LVPWd (rho = 0.23; P = .01), LA/Ao ratio (rho = 0.31; P < .001), LVs (rho = 0.33; P < .001), and troponin-I (rho = 0.64; P < .001), and (2) negatively with %FS (rho = -0.27; P = .004). Area under ROC curve was 0.92; >46 pmol/L cut-off distinguished normal from OCM (91.2% specificity, 85.8% sensitivity); >99 pmol/L cut-off was 100% specific, 70.8% sensitive.

CONCLUSIONS AND CLINICAL IMPORTANCE: Plasma NT-proBNP concentration reliably discriminated normal from OCM cats, and was associated with several echocardiographic markers of disease severity. Further studies are needed to assess test performance in unselected, general feline populations, and evaluate relationships between NT-proBNP concentrations and disease progression.


Uncontrolled study assessing the impact of a psyllium-enriched extruded dry diet on faecal consistency in cats with constipation.

Two field trials, involving 66 cats (15 trial 1; 51 trial 2) were conducted to assess the efficacy of a psyllium-enriched diet for management of constipation in cats. After investigations and faecal evacuation (by enema if required), all cats were fed on a moderate fibre, psyllium-enriched, dry extruded diet. Additional therapy was either not used (trial 1), or initially allowed but was subsequently withdrawn if possible (trial 2). The diet was well tolerated, and palatability was excellent. Most cases improved after initial therapy (at 2 months; trial 1: 14/15 [93%]; trial 2: 42/51 [82%]), and faecal consistency improved significantly in both trials (P < 0.001). Use of cisapride and lactulose decreased significantly in trial 2 (P < 0.001 for both). The diets used in these pilot studies were efficient in the management of recurrent feline constipation. Randomised control trials are now recommended to examine whether a clinical benefit can be proven.


Characterization of parvoviruses from domestic cats in Brazil.

To characterize Feline parvovirus (FPV) circulating in domestic cats in Brazil, 51 fecal samples from unvaccinated domestic cats were collected during 2004-2005. Six parvoviruses were characterized by hemagglutination (HA) assay at different pH values and temperatures and by polymerase chain reaction (PCR) using different pairs of primers. However, data obtained from HA and PCR did not allow the discrimination between FPV and Canine parvovirus (CPV). Two regions of the VP2 capsid gene (1,171-bp fragment) involved in controlling canine and feline host range were sequenced; 9 synonymous and 10 non-synonymous nucleotide substitutions were detected. All samples were confirmed as FPV by nucleotide sequencing, but 3 feline samples had amino acid changes at residues 93, 375, and 426, which are present in canine strains. The phylogenetic tree built based on nucleotide sequences showed that Brazilian feline samples form a cluster distinct from other parvoviruses deposited in GenBank. Taken together, the findings reinforce the importance of monitoring the continuous evolution of CPV and FPV in the feline population in Brazil.

Ultrasonography of small intestinal obstructions: a contemporary approach.

OBJECTIVES: To assess the accuracy of intestinal ultrasound for diagnosis of intestinal obstruction in dogs and cats. METHODS: A prospective clinical study was performed. Inclusion criteria were dogs and cats with clinical signs suggestive of gastrointestinal obstruction. Animals with no obstruction detected on ultrasound were excluded if they could not be monitored for 48 hours to confirm absence of obstruction. Sonographic diagnosis of small intestinal obstruction was based on identification of at least two findings suggestive of intestinal obstruction. RESULTS: Ninety-two patients suspected of having intestinal obstruction were included. Correct diagnosis of intestinal obstruction was made in 21 cases (23%), and in 68 (74%) this diagnosis was excluded. Interpretation of the images on prospective analysis had sensitivity, positive predictive, specificity and negative predictive values of 100%, 87.5%, 95.8% and 100%, respectively. CLINICAL SIGNIFICANCE: Ultrasonography is an excellent method for investigation of animals with gastrointestinal disorders, and is particularly useful for excluding obstructive processes.


Effect of a multi-species synbiotic formulation on fecal bacterial microbiota of healthy cats and dogs as evaluated by pyrosequencing.

The effect of a multi-species synbiotic on the fecal microbiota of healthy cats (n = 12) and dogs (n = 12) was evaluated. The synbiotic (containing 5 x 10^9 CFU of a mixture of seven probiotic strains, and a blend of fructooligosaccharides and arabinogalactans) was administered daily for 21 days. Fecal and serum samples were collected before, during, and up to 3 weeks after administration. Changes in the fecal microbiota were analyzed using denaturing gradient gel electrophoresis, 16S rRNA gene libraries, quantitative real-time PCR, and 16S rRNA gene 454-pyrosequencing. Probiotic species were detectable in 10/12 dogs and 11/12 cats during product administration. Abundances of Enterococcus and Streptococcus spp. were significantly increased in at least one time point during administration, and returned to baseline abundance after treatment was discontinued. No changes in the major bacterial phyla were identified on 454-pyrosequencing. No adverse gastrointestinal effects were recorded and no significant changes in gastrointestinal function or immune markers were observed during the study period. This study shows that while the ingestion of probiotics and prebiotics does not appear to alter the predominant bacterial phyla present in feces, supplementation with the investigated synbiotic leads to an increased abundance of probiotic bacteria in the feces of healthy cats and dogs.


Post-mortem findings in 54 cases of anesthetic associated death in cats from two spay-neuter programs in New York State.

Anesthetic-associated death (AAD) in cats is infrequent, but occurs far more frequently than in people. Post-mortem investigations of AAD in cats are uncommon, and results only sporadically published. Here we report the findings in 54 cases of AAD in cats. Significant gross and/or microscopic pre-
existing disease, including pulmonary, cardiac, and systemic disease, was detected in 33% of cases. Pulmonary disease was most frequently diagnosed (24% of cases), and included cases of Aelurostrongylus abstrusus infection (9% of cases). Heart disease, including two cases of hypertrophic cardiomyopathy, was less frequent (11% of cases). Four percent died from surgical complications. No significant gross or microscopic disease was detected in 63% of cases. Additional studies are needed to determine if these findings are representative of AAD in cats in other geographic areas or with access to veterinary care. This study demonstrates that post-mortem investigation of AADs is an important and worthwhile endeavor.


Feline calicivirus: a neglected cause of feline ocular surface infections?

Objective To investigate the prevalence of feline calicivirus (FCV) infection in relation to ocular surface lesions in cats with upper respiratory tract diseases (URTD). Animals studied Ninety-nine cats with ocular surface infection and symptoms or recent history of URTD were examined at various rescue shelters and hospitals. Procedure A complete general and ophthalmic examination was performed including Schirmer tear test, slit-lamp biomicroscopy, fluorescein and lissamine green staining. Clinical and ocular symptoms were scored and recorded. Conjunctival samples were collected using a cytobrush, and nucleic acid extraction using RT-PCR was carried out to analyze for the presence of various infectious agents. Results RT-PCR detected either FCV, feline herpes virus type 1 (FHV-1), Chlamydophila felis or Mycoplasma spp. in 63/99 samples. 30/63 samples were positive for FCV, 23/63 for C. felis, 21/63 for Mycoplasma spp., and 16/63 for FHV-1. Out of the 30 FCV-positive samples, 11 were positive only for FCV and in 19 samples FCV was seen in combination with other agents. FCV infection was highest in animals examined at the rescue centers and in the age group of 0-2 months. Erosive conjunctivitis was an important ocular finding. Oral ulcers were detected in all FCV-infected cats. Conclusion Results indicate that FCV is highly prevalent in cats with URTD either as a sole infectious agent or in combination with other pathogens and therefore is a potential cause for ocular surface lesions during the URTD.


Prevalence of methicillin-resistant staphylococci in northern Colorado shelter animals.

Methicillin-resistant Staphylococcus aureus (MRSA) and Staphylococcus pseudintermedius (MRSP) have been recognized as significant pathogens in veterinary medicine. There have been documented cases of MRSA infection and colonization in veterinary critical care units, in veterinary personnel, and in equine and feline patients. To date, there have been no studies examining the prevalence of MRSA or MRSP colonization of cats and dogs in animal shelters in the United States. The purpose of the current study was to determine the prevalence of MRSA and MRSP in cats and dogs in a northern Colorado animal shelter. Samples were collected from 200 cats and 200 dogs in an open admission shelter. Each species was divided into 2 smaller groups: 100 dogs or cats housed in the stray ward and 100 dogs or cats housed in the adoption area. Samples were evaluated for the prevalence of MRSA or MRSP, which was verified through aerobic culture and Kirby-Bauer agar disc diffusion to confirm antimicrobial sensitivity. Results revealed MRSA in 0.5% of cat samples, MRSA in 0.5% of dog samples, and MRSP in 3% of dog samples. These results are consistent with previously published
prevalence rates for these 2 organisms in non-shelter populations of dogs and cats, indicating that cats and dogs from this Colorado shelter do not appear to pose any greater risk to the public than do cats and dogs in the general pet population.


**Effects of unilateral topical administration of 0.5% tropicamide on anterior segment morphology and intraocular pressure in normal cats and cats with primary congenital glaucoma.**

OBJECTIVE: To determine the effects of topical 0.5% tropicamide on anterior segment morphology (ASM) and intraocular pressure (IOP) in normal and glaucomatous cats. ANIMALS USED: Normal cats and cats with inherited primary congenital glaucoma (PCG). PROCEDURES: Control IOP curves were performed in untreated normal and PCG cats. In the first experiment, tropicamide was applied OD in eight normal and nine PCG cats. IOP and pupillary diameter (PD) were measured at 0, 30, and 60 min, then hourly until 8 h post-treatment. In a second experiment, six normal and seven PCG cats received tropicamide OD. High-resolution ultrasound images were obtained at 0, 1, 5, and 10 h post-treatment to measure ASM changes. IOP and PD were measured OD at 0, 1, 2, 3, 5, 7, and 9 h.

RESULTS: In untreated normal cats IOP OU decreased throughout the day. In PCG cats IOP OU had wide fluctuations over time. In normal cats IOP response varied in the treated eye but did not change significantly in untreated eyes. IOP significantly increased from baseline in both eyes of all treated PCG cats. Increases in IOP were associated with some ASM changes. Cats with PCG had a significantly smaller angle recess areas, diminished ciliary clefts and decreased iris-lens contact. ASM changes were not strongly correlated with IOP in all cats. CONCLUSIONS: The ASM of PCG cats is markedly different from normal cats, and clinically significant increases in IOP OU occur in cats with PCG after tropicamide treatment. The mechanism for this increase remains unclear.


**Immune-endocrine interactions in treated and untreated cats naturally infected with FIV.**

Feline immunodeficiency virus (FIV) is a lentivirus that causes a progressive disruption of immune function in cats. The neuroendocrine and immune systems communicate bidirectionally, mediated by cytokines such as tumour necrosis factor-alpha (TNF), several interleukins (IL-1, IL-6, IL-10), and through signals induced by the ratio of IL-10 to IL-12. FIV can affect both pituitary adrenal and thyroid axis function. Twenty FIV-infected cats in similar stages of the disease were evaluated for six months. A cross-sectional study in which the twenty cats were divided into two groups was performed. Ten were treated with Zidovudine (ZDV: 5mg/kg/d, PO, q12h, for six months) and 10 were untreated. Plasma concentrations of adrenocorticotropic hormone (ACTH), cortisol, T4, FT4, T3, IL-10, IL-12 and viral load (VL) were evaluated after six months. ACTH was found in significantly lower concentrations (p<0.0001) in the treated group whereas cortisol did not show significant differences between the two groups. Both T4 and FT4 had high values in untreated individuals (p<0.001) compared with Zidovudine treated cats. T3 did not show significant differences between the two groups. Both IL-10 and IL-12 were found in significantly higher concentrations in ZDV treated cats (p<0.001). By contrast, the IL10/IL12 ratio values were significantly lower in untreated cats. Viral load was significantly lower in the treated cats after six months of therapy, compared with values detected pre-treatment (p<0.002). Untreated cats showed a significant increase of VL (p<0.04)
compared with the values at the beginning of the study. In treated cats, VL showed lower numbers of viral copies than in untreated cats (p<0.01). In summary, Zidovudine treatment appeared to contribute to the normalization of both the adrenal and thyroid axes. This effect could be attributed to the decrease observed in VL, resulting in a change in cytokine patterns.


Retrospective case-control study of the effects of long-term dosing with meloxicam on renal function in aged cats with degenerative joint disease.

Medical records (2005-2009) of a feline-only practice were searched for cats with degenerative joint disease (DJD) treated using meloxicam. DJD was diagnosed by the presence of at least two of the following: (i) altered mobility (observed by the owner), (ii) abnormal physical findings, (iii) characteristic radiographic changes. The primary study cohort consisted of cats older than 7 years that had received meloxicam for variable intervals in excess of 6 months, and for which complete records were available. These cats were subdivided according to whether detectable chronic kidney disease (CKD) was present (‘renal group’), or not (‘non-renal group’), and, for the ‘renal group’, according to the cat’s IRIS category. Serum biochemistry, urinalysis (including urine specific gravity [USG]), body mass and condition score were monitored regularly. Progression of CKD in the ‘renal group’ and ‘non-renal group’ of cats was compared to two groups of age- and IRIS-matched control cats not receiving meloxicam (from the same clinic, over the same time period). The study was thus a case-control design, with two study groups. Thirty-eight cats with DJD receiving long-term meloxicam therapy met the inclusion criteria. Of these, 22 cats had stable CKD at the start of treatment (stage 1, eight cats; stage 2, 13 cats; stage 3, one cat). No cats initially had an elevated urinary protein to creatinine ratio. The remaining 16 cats initially had normal renal analytes and adequately concentrated urine. The median age of the ‘renal’ and ‘non-renal’ meloxicam groups was 15.5 and 13.4 years, respectively. The median treatment duration was 467 days in the ‘renal group’ and 327 days in the ‘non-renal group’. After titration (to the lowest effective dose), the median maintenance dose was 0.02 mg/kg/day in both groups (range 0.015-0.033 mg/kg/day). There was no difference in sequential serum creatinine concentration or USG measurements between the ‘non-renal group’ treated with meloxicam compared to control cats not treated with meloxicam. There was less progression of renal disease in the ‘renal group’ treated with meloxicam compared to the age- and IRIS-matched cats with CKD not given meloxicam. These results suggest that a long-term maintenance dose of 0.02 mg/kg of meloxicam can be safely administered to cats older than 7 years even if they have CKD, provided their overall clinical status is stable. Long-term meloxicam therapy may slow the progression of renal disease in some cats suffering from both CKD and DJD. Prospective studies are required to confirm these findings.


Recent advances in leishmaniosis in pet animals: epidemiology, diagnostics and anti-vectorial prophylaxis.

The leishmanioses are diseases caused by protozoa of the genus Leishmania, parasites infecting numerous mammal species, including humans, and transmitted by the bite of phlebotomine sand flies. They are a large group of diseases ranging over inter-tropical zones of America and Africa, and extend into temperate regions of Latin America, Europe and Asia. Pet animals are found infected with
different Leishmania species but Leishmania infantum is the most widespread being dogs the main reservoir of zoonotic visceral leishmaniosis (ZVL). Dogs are very susceptible to this parasite and may suffer from a complex syndrome, canine leishmaniosis (CanL), one of the major zoonoses globally causing severe fatal disease in this animal. Infections in cats and horses have also been reported in areas where CanL is diagnosed. In Europe dogs and cats are common companion animals and their health is of great concern, therefore management of leishmaniosis in pets generally follows that of human ZVL. The recent spread of Leishmania infections in non-endemic territories has been monitored by means of canine surveys, which represent a suitable approach because of the dog’s role as a sentinel host. New tools have been developed for the surveillance and control of ZVL. A number of insecticide-based preparations have been specifically registered for dog protection against sand fly bites, with elevated efficacy for both individual and mass protection.


Treatment of refractory feline sporotrichosis with a combination of intralesional amphotericin B and oral itraconazole.

OBJECTIVE To describe the use of intralesional amphotericin B in localised lesions for the treatment of 26 cats from Rio de Janeiro, Brazil, with sporotrichosis refractory to oral itraconazole. DESIGN Uncontrolled intervention study. METHOD The 26 cats in this study were diagnosed with sporotrichosis, confirmed by isolation of Sporothrix schenckii, and presented residual localised skin lesions refractory to treatment with oral itraconazole for a minimum period of 8 weeks. The animals received weekly applications of intralesional amphotericin B in conjunction with oral itraconazole. In cases of owner unavailability, a maximum of 2 weeks between the infiltrations was accepted. RESULTS Twenty-two (84.6%) of the 26 treated cats achieved clinical remission, 16 (72.7%) of which were cured, and in the remaining six (27.3%) the lesions recurred at the same site. Lack of clinical response was observed in one animal and three owners abandoned treatment. CONCLUSION The proposed therapeutic regimen is an adjunctive treatment option for cats with sporotrichosis presenting as residual skin lesions refractory to itraconazole.


Segregation analysis of overweight body condition in an experimental cat population.

The goal of this study was to analyze the mode of inheritance of an overweight body condition in an experimental cat population. The cat population consisted of 95 cats of which 81 cats could be clearly classified into lean or overweight using the body condition scoring system according to Laflamme. The lean or overweight classification was then used for segregation analyses. Complex segregation analyses were employed to test for the significance of one environmental and 4 genetic models (general, mixed inheritance, major gene, and polygene). The general genetic model fit the data significantly better than the environmental model (P <= 0.0013). Among all other models employed, the major gene model explained the segregation of the overweight phenotype best. This is the first study in which a genetic component could be shown to be responsible for the development of overweight in cats.

Clinical aspects of feline immunodeficiency and feline leukemia virus infection.

Feline leukemia virus (FeLV) and feline immunodeficiency virus (FIV) are retroviruses with a global impact on the health of domestic cats. The two viruses differ in their potential to cause disease. FIV can cause an acquired immunodeficiency syndrome that increases the risk of developing opportunistic infections, neurological diseases, and tumors. In most naturally infected cats, however, FIV itself does not cause severe clinical signs, and FIV-infected cats may live many years without any health problems. FeLV is more pathogenic, and was long considered to be responsible for more clinical syndromes than any other agent in cats. FeLV can cause tumors (mainly lymphoma), bone marrow suppression syndromes (mainly anemia) and lead to secondary infectious diseases caused by suppressive effects of the virus on bone marrow and the immune system. Today, FeLV is less important as a deadly infectious agent as in the last 20 years prevalence has been decreasing in most countries.


When cats’ ways of life interact with their viruses: a study in 15 natural populations of owned and unowned cats (Felis silvestris catus).

In natural populations, virus circulation is influenced by host behavior and physiological characteristics. Cat populations exhibit a great variability in social and spatial structure, the existence of different ways of life within a same population may also result in different epidemiological patterns. To test this hypothesis, we used a logistic regression to analyze the risk factors of Feline immunodeficiency virus (FIV), feline herpes virus (FHV), feline calicivirus (FCV), and feline parvovirus (FPV) infection in owned (fed and sheltered) and unowned (neither fed nor sheltered, unsocialized) cats living in a rural environment in the North Eastern part of France. A serological survey was carried out in 492 non-vaccinated and non-sterilized individuals from 15 populations living in the same area. The prevalence of feline leukemia virus (FeLV) was also studied, but too few were infected to analyze the risk factors of this virus. For each virus, the epidemiological pattern was different in owned and unowned cats. Unowned cats were more frequently infected by directly transmitted viruses like FIV, FHV and FCV (21.22%, 67.66%, 86.52% in unowned cats vs 9.55%, 53.88%, 77.18% in owned cats, respectively), a difference that may be explained by a more solitary and more aggressive behavior in unowned adults, and/or possibly by a higher sensitivity related to a more stressful life. On the contrary, owned cats were more frequently infected with FPV (36.41% in owned cats vs 15.61% in unowned cats), possibly as a result of their concentration around human settlements. The present study showed that owned and unowned cats living in a same area have behavioral and physiological characteristics sufficiently different to influence virus circulation. Pooling different types of cats in a single sample without taking it into account could give a wrong picture of the epidemiology of their viruses. The conclusion of this work can be extended to any epidemiological studies led in wildlife species with flexible behavior as any variations in social or spatial structure, between or within populations, could result in different virus circulation.


Multidetector-row computed tomography of thoracic aortic anomalies in dogs and cats: patent
ductus arteriosus and vascular rings.

BACKGROUND: Diagnosis of extracardiac intrathoracic vascular anomalies is of clinical importance, but remains challenging. Traditional imaging modalities, such as radiography, echocardiography, and angiography, are inherently limited by the difficulties of a 2-dimensional approach to a 3-dimensional object. We postulated that accurate characterization of malformations of the aorta would benefit from 3-dimensional assessment. Therefore, multidetector-row computed tomography (MDCT) was chosen as a 3-dimensional, new, and noninvasive imaging technique. The purpose of this study was to evaluate patients with 2 common diseases of the intrathoracic aorta, either patent ductus arteriosus or vascular ring anomaly, by contrast-enhanced 64-row computed tomography. RESULTS: Electrocardiography (ECG)-gated and thoracic nongated MDCT images were reviewed in identified cases of either a patent ductus arteriosus or vascular ring anomaly. Ductal size and morphology were determined in 6 dogs that underwent ECG-gated MDCT. Vascular ring anomalies were characterized in 7 dogs and 3 cats by ECG-gated MDCT or by a nongated thoracic standard protocol. Cardiac ECG-gated MDCT clearly displayed the morphology, length, and caliber of the patent ductus arteriosus in 6 affected dogs. Persistent right aortic arch was identified in 10 animals, 8 of which showed a coexisting aberrant left subclavian artery. A mild dilation of the proximal portion of the aberrant subclavian artery near its origin of the aorta was present in 4 dogs, and a diverticulum analogous to the human Kommerell’s diverticulum was present in 2 cats. CONCLUSIONS: Contrast-enhanced MDCT imaging of thoracic anomalies gives valuable information about the exact aortic arch configuration. Furthermore, MDCT was able to characterize the vascular branching patterns in dogs and cats with a persistent right aortic arch and the morphology and size of the patent ductus arteriosus in affected dogs. This additional information can be of help with regard to improved diagnoses of thoracic anomalies and the planning of surgical interventions.


Characteristics of ageing pets and their owners: dogs v. cats.

The purpose of the present cross-sectional, convenience sampled study was to ascertain differences in diet and lifestyle between cat (n 155) and dog (n 318) owners and their pets. Average cat ownership was 6.1 (SD 5) years and average cat’s age was 6.9 (SD 5) years. Cats were reported to be overweight (14 %), fed ad libitum (87 %), given medication (11 %) and had health conditions (24 %). Cat’s age was significantly and positively related to cat’s weight, duration of illness, owner’s BMI and some owners’ dietary characteristics. Overweight in cats was significantly associated with overweight in older owners (> /= 60 years). Younger cat owners (< 60 years) showed non-statistically significant trends between the owner’s BMI and cat’s overweight. Cat’s age was inversely correlated with cat’s and owner’s activity levels. Dogs were owned for 5.5 (SD 4) years and mean dog’s age was 5.9 (SD 4) years. Dogs were reported to be overweight (18 %), fed ad libitum (49 %), given medication (31 %) and had health conditions (34 %). Dog’s age was positively associated with duration of illness. Dog’s age was inversely correlated with amount of food fed, dog’s activity and owner’s exercise and intake of fruit, vegetables and whole grains. Dog’s age was positively correlated with the owner’s BMI and frequency of added fat consumption. Overweight in dogs was associated with overweight in older owners (> /= 60 years) and was correlated with poorer health in both the dog and the owner. Younger dog owners were more likely to have an overweight dog if they themselves were obese. Similarities were found in owner’s and pet’s diet and lifestyle issues with ageing. Overweight was associated with ageing, dietary, lifestyle and health issues in this sample. Older owners who were overweight had overweight pets. Strategies should be targeted towards decreasing both owner’s and pet’s overweight.
The use of exercise and dietary interventions should be encouraged.


The effect of dietary starch level on postprandial glucose and insulin concentrations in cats and dogs.

A charge made against feeding dry foods to cats is that the high carbohydrate (i.e. starch) content results in high blood glucose levels which over time may have detrimental health effects. The present study determined the post-meal concentrations of plasma glucose and insulin in adult cats (seven males and four females) and dogs (Labrador retrievers; four males and five females) fed dry diets with low-starch (LS), moderate-starch (MS) or high-starch (HS) levels. In a cross-over design with at least 7 d between the test meals, plasma glucose and insulin concentrations were measured following a single meal of a LS, MS and HS diet (209 kJ/kg bodyweight). Only the HS diet resulted in significant post-meal increases in plasma glucose concentration in cats and dogs although the time-course profiles were different between the species. In cats, plasma glucose concentration was significantly increased above the pre-meal concentration from 11 h until 19 h after the meal, while in dogs, a significant increase above baseline was seen only at the 7 h time point. Plasma insulin was significantly elevated in dogs 4-8 h following the MS diet and 2-8 h after the HS diet. In cats, plasma insulin was significantly greater than baseline from 3-7 and 11-17 h after the HS diet. The time lag (approximately 11 h) between eating the HS diet and the subsequent prolonged elevation of plasma glucose concentration seen in cats may reflect metabolic adaptations that result in a slower digestive and absorptive capacity for complex carbohydrate.


Postprandial glucose and insulin profiles following a glucose-loaded meal in cats and dogs.

Data from intravenous (i.v.) glucose tolerance tests suggest that glucose clearance from the blood is slower in cats than in dogs. Since different physiological pathways are activated following oral administration compared with i.v. administration, we investigated the profiles of plasma glucose and insulin in cats and dogs following ingestion of a test meal with or without glucose. Adult male and female cats and dogs were fed either a high-protein (HP) test meal (15 g/kg body weight; ten cats and eleven dogs) or a HP + glucose test meal (13 g/kg body-weight HP diet + 2 g/kg body-weight D-glucose; seven cats and thirteen dogs) following a 24 h fast. Marked differences in plasma glucose and insulin profiles were observed in cats and dogs following ingestion of the glucose-loaded meal. In cats, mean plasma glucose concentration reached a peak at 120 min (10.2, 95 % CI 9.7, 10.8 mmol/l) and returned to baseline by 240 min, but no statistically significant change in plasma insulin concentration was observed. In dogs, mean plasma glucose concentration reached a peak at 60 min (6.3, 95 % CI 5.9, 6.7 mmol/l) and returned to baseline by 90 min, while plasma insulin concentration was significantly higher than pre-meal values from 30 to 120 min following the glucose-loaded meal. These results indicate that cats are not as efficient as dogs at rapidly decreasing high blood glucose levels and are consistent with a known metabolic adaptation of cats, namely a lack of glucokinase, which is important for both insulin secretion and glucose uptake from the blood.
The efficacy and safety of a novel lipophilic formulation of methimazole for the once daily transdermal treatment of cats with hyperthyroidism.

BACKGROUND: Previous studies on transdermal methimazole have used pluronic lecithin organogel as the vehicle. This might not be the most suitable vehicle for a lipophilic drug, such as methimazole.

HYPOTHESIS/OBJECTIVES: Once daily transdermal administration of a novel lipophilic formulation of methimazole is as safe and effective as oral carbimazole in treating hyperthyroidism in cats.

ANIMALS: Forty-five client-owned cats diagnosed with hyperthyroidism.

METHODS: Prospective study. Cats with newly diagnosed, untreated hyperthyroidism were treated with carbimazole (5 mg PO, q12h) or methimazole (10 mg) applied to the inner pinnae q24h. Cats were examined after 0, 1, 4, 8, and 12 weeks of treatment. Clinical signs, body weight, systolic blood pressure, hematologic, serum biochemical and urine parameters, total serum thyroxine concentrations (TT4), and serum methimazole concentrations were recorded.

RESULTS: No significant differences between groups were detected at day 0. Both formulations were effective in treating hyperthyroidism. No significant differences were detected in thyroxine concentrations, body weight, blood pressure, heart rate, alkaline phosphatase, alanine aminotransferase, creatinine, urea, and urine specific gravity (USG) between groups. The serum methimazole concentrations correlated poorly with TT4-concentrations in both groups.

CONCLUSIONS AND CLINICAL IMPORTANCE: In this 12-week trial, once daily application of a novel formulation of transdermal methimazole applied to the pinnae was as effective and safe as twice daily oral carbimazole in the treatment of cats with hyperthyroidism. This novel formulation and transdermal application could have practical advantages to some pet owners.
Effect of macronutrients, age, and obesity on 6 and 24-hour post-prandial glucose metabolism in cats.

Obesity and age are risk factors for feline diabetes. This study aimed to test the hypothesis that age, long-term obesity, and dietary composition would lead to peripheral and hepatorenal insulin resistance, indicated by higher endogenous glucose production (EGP) in the fasted and post-prandial state, higher blood glucose and insulin, and higher leptin, free thyroxine, and lower adiponectin concentrations. Using triple tracer ((2)H(2)O, [U-(13)C(3)] propionate, and [3,4-(13)C(2)] glucose) infusion, and indirect calorimetry, we investigated carbohydrate and fat metabolic pathways in overnight-fasted neutered cats (13 young lean; 12 old lean and 12 old obese), each fed 3 different diets (high protein with and without polyunsaturated fatty acids, and high carbohydrate) in a cross-over design. EGP was lowest in fasted and post-prandial obese cats despite peripheral insulin resistance, indicated by hyperinsulinemia. Gluconeogenesis was the most important pathway for EGP in all groups but glycogen contributed significantly. Insulin and leptin concentrations were higher in old than young lean cats; adiponectin was lowest in obese cats but surprisingly highest in lean old cats. Diet had little effect on metabolic parameters. We conclude that hepatorenal insulin resistance does not develop in the fasted or post-prandial state even in long-term obese cats, allowing the maintenance of euglycemia through lowering EGP. Glycogen plays a major role in EGP, especially in lean fasted cats, and in the post-prandial state. Aging may predispose to insulin resistance, which is a risk factor for diabetes in cats. Mechanisms underlying the high adiponectin of healthy old lean cats need to be further explored.

Feline Immunodeficiency Virus (FIV) Neutralization: A Review.

One of the major obstacles that must be overcome in the design of effective lentiviral vaccines is the ability of lentiviruses to evolve in order to escape from neutralizing antibodies. The primary target for neutralizing antibodies is the highly variable viral envelope glycoprotein (Env), a glycoprotein that is essential for viral entry and comprises both variable and conserved regions. As a result of the complex trimeric nature of Env, there is steric hindrance of conserved epitopes required for receptor binding so that these are not accessible to antibodies. Instead, the humoral response is targeted towards decoy immunodominant epitopes on variable domains such as the third hypervariable loop (V3) of Env. For feline immunodeficiency virus (FIV), as well as the related human immunodeficiency virus-1 (HIV-1), little is known about the factors that lead to the development of broadly neutralizing antibodies. In cats infected with FIV and patients infected with HIV-1, only rarely are plasma samples found that contain antibodies capable of neutralizing isolates from other clades. In this review we examine the neutralizing response to FIV, comparing and contrasting with the response to HIV. We ask whether broadly neutralizing antibodies are induced by FIV infection and discuss the comparative value of studies of neutralizing antibodies in FIV infection for the development of more effective vaccine strategies against lentiviral infections in general, including HIV-1.


A diet with a struvite relative supersaturation less than 1 is effective in dissolving struvite stones in vivo.

Magnesium ammonium phosphate (struvite) is one of the most common minerals found in feline uroliths. Previous studies have shown the efficacy of acidifying calculolytic diets (inducing urine pH < 6.5), in dissolving struvite stones in cats. Recent work in our laboratory found that wet and dry test diets induce a struvite urinary relative supersaturation (RSS) < 1 and that the urine of healthy cats fed the dry test diet dissolved feline struvite stones in vitro. The objective of the present study was to demonstrate the efficacy of those test diets on naturally occurring struvite urocystoliths in cats. A total of twenty-one cats were used, of which seventeen completed the study. Of the seventeen cats, eight were fed the wet test diet and nine the dry test diet. Uroliths dissolved in a median of 18 (10-55) d. In the remaining four cats, uroliths failed to dissolve and were removed surgically. Quantitative analysis showed that these uroliths contained either calcium oxalate or calcium phosphate. The present study demonstrates that diets that induce a struvite RSS < 1 result in struvite stone dissolution in vivo.


Identification of Rickettsia felis in fleas but not ticks on stray cats and dogs and the evidence of Rickettsia rhipicephali only in adult stage of Rhipicephalus sanguineus and Rhipicephalus haemaphysaloides.

Rickettsia spp. are zoonotic pathogens and mainly transmitted by various arthropod vectors, such as fleas, ticks, and lice. Previous epidemiological studies indicated that ectoparasites infested on dogs or cats may be infected by Rickettsia spp., and transmit them to human beings accidentally. In this study, the prevalence of Rickettsia infection was evaluated using fleas and ticks from stray dogs and cats in Taiwan. A total of 158 pools made by 451 cat fleas (Ctenocephalides felis) from 37 dogs and 4 cats were used for analysis. Besides, 386 Rhipicephalus ticks collected from the other 62 stray dogs were included in this study. Nymphal and adult ticks were individually analyzed but larvae were separated into 21 pools for molecular detection. Partial sequencing analysis of the gltA gene was applied for Rickettsia identification. The results showed that 44.3% (70/158) of the cat flea pools were harboring Rickettsia DNA. Although 6.9% (13/187) of adult ticks were infected with Rickettsia, neither larval pools nor nymphal ticks were found to contain Rickettsia DNA. According to the results of sequencing analyses, all Rickettsia PCR-positive cat flea pools were infected with R. felis, and all Rickettsia PCR-positive adult ticks were infected with R. rhipicephali. The results of this study demonstrated that C. felis but not Rhipicephalus sanguineus (the brown dog tick) and Rh. haemaphysaloides collected from stray animals in Taiwan could be infected the zoonotic pathogen R. felis. Moreover, R. rhipicephali was only identified in adult stage of Rhipicephalus sanguineus and Rh. haemaphysaloides.


The effect of siblings on early development: a potential contributor to personality differences in mammals.
Although most mammals grow up in the company of same or different age sibs (or half sibs), surprisingly little attention has been given to how relations among them might influence the development of individual differences in morphology, physiology, and behavior. Here we review evidence from our work on domestic and wild European rabbits, and more recently on laboratory rats, mice, and domestic cats, supporting the proposition that in mammals early sibling relations contribute to the development of individual differences in these three domains and thereby to long-term behavioral differences of the kind we might consider part of an animal’s behavioral style or personality. First we report a consistent and marked negative relation between litter size and individuals’ body mass at birth and weaning, as well as marked within-litter differences in prenatal body mass and placental efficiency. We then report individual differences in preweaning behaviors associated with these morphological variables such as position occupied in the litter huddle and development of motor ability, as well as physiological differences in thermoregulation, immune parameters, and endocrine indicators of stress. Finally, we report first evidence from wild rabbits that early relations among littermates may have long-term consequences for individual differences in behavioral style. We conclude that in mammals, individual differences in early growth, physiology and behavior potentially important for the development of animal personality, are shaped to an appreciable extent by early sibling relations and that this little-researched field deserves closer attention.


Anaphylactic events observed within 4 h of ocular application of an antibiotic-containing ophthalmic preparation: 61 cats (1993-2010).

This study describes signalment, history, antibiotic administered, clinical signs observed, therapy, and outcome of anaphylactic events within 4 h following ophthalmic administration of an antibiotic to cats. Data came from survey responses (45 cats) or Federal Drug Administration reports (16 cats). Cat age (7 weeks-19 years), breed, and gender ranged widely. Most were healthy (87%) prior to anaphylaxis. Ophthalmic antibiotics commonly were administered for conjunctival (65%) or corneal (11%) disease, or ocular lubrication (7%) and contained bacitracin, neomycin, and polymyxin B (44%), or oxytetracycline and polymyxin B (21%). Polymyxin B was present in all cases. Vaccines or other drugs were also administered to 51% of cats. In 56% cases, anaphylaxis occurred within 10 min of drug application. Most (82%) cats survived. Although a causal association was not proved, ophthalmic antibiotic administration preceded anaphylaxis in all cats. Like other drugs, ophthalmic antibiotics should be used only when indicated.


Pathological correlations between podocyte injuries and renal functions in canine and feline chronic kidney diseases.

Podocytes cover the glomerulus and their adjacent foot processes form a principal barrier called the slit diaphragm. Podocyte dysfunctions, including podocyte loss and slit diaphragm disruptions, induce chronic kidney diseases (CKD). In this study, we analyzed the correlations between podocyte injuries and renal dysfunctions in domestic carnivores. Dogs and cats were divided into normal and CKD groups according to renal histopathology and plasma creatinine values. Immunostaining results showed
that linear reactions of slit diaphragm molecules, e.g., nephrin, podocin, and ACTN4, were parallel to glomerular capillaries in all animals. However, in dogs, reactions of nephrin and ACTN4 were changed to a granular pattern in the CKD group, and their intensities significantly decreased with the number of podocytes in the glomerulus. Moreover, the expression of nephrin and ACTN4 negatively correlated with creatinine. Real-time PCR analysis showed that nephrin mRNA expression in the kidneys of CKD dogs was significantly lower than that in normal animals, and negatively correlated with creatinine. Although no significant correlation between renal dysfunction and podocyte injury was detected in cats, histoplanimetric scores of tubulointerstitial lesions in CKD cats were higher than those in both normal cats and diseased dogs. Furthermore, mRNAs of WT1 and SD molecules were detected in urine from CKD animals. In conclusion, podocyte injuries such as podocytopenia and decreased expression of nephrin and ACTN4 in the glomerulus were more strongly correlated with renal dysfunction in dogs than in cats. These findings suggest that the CKD pathogenesis, especially susceptibilities to podocyte injuries, differed between dogs and cats.


**Microsporidia in household dogs and cats in Iran: a zoonotic concern.**

Microsporidia in dogs and cats is primarily caused by the obligate, intracellular parasite Encephalitozoon cuniculi, which is a member of the phylum Microsporidia. The aim of the current study is the detection of this parasite in stool samples of small animals of Iran, by polymerase chain reaction. Microsporidia spp. was found in 31% (31/100) of dogs (E. cuniculi (18/100), Encephalitozoon bieneusi (8/100) and Encephalitozoon intestinalis (5/100)), and 7.5% (3/40) of the specimens obtained from cats were infected with E. bieneusi. Sequencing of PCR products confirmed these results. In conclusion, Microsporidia infection seems to be fairly common in pet animals of Iran, especially in dogs. This finding could indicate the importance of pet animals as zoonotic reservoirs of microsporidial human infections.


**Investigation of the faecal microbiota of geriatric cats.**

AIMS: Aim of the study was to investigate the faecal microbiota of geriatric cats, as aging affects the nutrient digestibility and metabolic function of the feline intestine. METHODS AND RESULTS: Twenty geriatric cats were randomly assigned to two groups that were fed different foods. Coriobacteriaceae, Clostridium cluster XIV, bifidobacteria and lactic acid bacteria were the dominant faecal bacterial groups, accounting for c. 40% of total bacteria. Clostridium cluster IX was less predominant (0.5% of total bacteria), while the remaining bacterial populations enumerated only accounted for 0.2% of total bacteria. Highly diverse microbial profiles were demonstrated for geriatric cats with denaturing gradient gel electrophoresis, although a few common bands were evident. Some differences were seen in the feline faecal microbiota between animal groups at the same time or over time for individual animals. However, no obvious clustering based on animal group or sample time was indicated. CONCLUSIONS: Geriatric cats harboured a complex faecal microbiota and c. 41% of total bacteria have been detected with the probes employed. SIGNIFICANCE AND IMPACT OF THE STUDY: First molecular-based study examining faecal microbiota of geriatric felines. Knowledge of the microbiota associated with ageing in cats may allow improved development of foods specific for
the needs of senior cats.


Managing feral cats on a university’s campuses: how many are there and is sterilization having an effect?

Worldwide domestic and feral cat (Felis catus) numbers have increased. Concerns regarding high populations of feral cats in urban areas include wildlife predation, public nuisance, and disease. This study aimed to estimate the size of the feral cat population on 5 campuses of the University of KwaZulu-Natal, South Africa, to determine whether sterilization has an effect and to make management recommendations. The study used both the total count and mark-recapture methods to estimate the feral cat population on each campus. The study chose a noninvasive method of taking photographs to “mark” individuals and record those who were sterilized. The study estimated a total of 186 cats on all campuses and density at 161 cats km(-2). There was a negative relationship between sterilization and numbers. Sites with higher sterilization showed a lower proportion of younger cats. At the average sterilization of 55%, the population, according to predictions, would remain stable at fecundity, survival, and immigration rates reported by cat caretakers. However, caretakers underestimated cat abundance by 7 +/- 37 SD%. Caretakers’ feral cat sterilization and feeding programs appear to provide a service to the university community. Key management recommendations were to increase sterilization to 90% to reduce the population over the long term and to raise funds to support the costs incurred by voluntary cat caretakers.


Changes in the femoral head and/or neck in cats.


The effect of atenolol on NT-proBNP and troponin in asymptomatic cats with severe left ventricular hypertrophy because of hypertrophic cardiomyopathy: a pilot study.

BACKGROUND: Atenolol often is used empirically in cats with hypertrophic cardiomyopathy (HCM) before the onset of heart failure, although evidence of efficacy is lacking. Cardiac biomarkers play a critical role in the early detection of subclinical cardiac disease, in the prediction of long-term prognosis, and in monitoring the response to therapy in humans. HYPOTHESIS: Circulating concentrations of the biomarkers N-terminal pro-B type natriuretic peptide (NT-proBNP) and cardiac troponin I (cTnI) will decrease after chronic administration of atenolol PO to cats with severe HCM but no signs of heart failure. ANIMALS: Six Maine Coon or Maine Coon cross cats with severe HCM. METHODS: Cats were treated with atenolol (12.5 mg PO q12 h) for 30 days. No cat had left ventricular dynamic outflow tract obstruction caused by systolic anterior motion of the mitral valve. The concentrations of NT-proBNP and cTnI were assayed before and on the last day of drug administration. RESULTS: There was no statistically significant change in NT-proBNP (median before, 394 pmol/L; range, 71-1,500 pmol/L; median after, 439 pmol/L; range, 24-1,500 pmol/L; P = .63) or in cTnI (median before, 0.24 ng/mL; range, 0.10-0.97 ng/mL; median after, 0.28 ng/mL; range, 0.09-1.0 ng/mL; P = .69) after administration of atenolol. CONCLUSIONS: Atenolol
administration did not decrease NT-proBNP or cTnI concentrations in cats with severe left ventricular hypertrophy caused by hypertrophic cardiomyopathy. These results suggest that atenolol did not decrease myocardial ischemia and myocyte death in these cats. A larger clinical trial is warranted to verify these findings.


**Cutaneous lymphoplasmacytic lymphoma with systemic metastasis in a cat.**

A lymphoplasmacytic lymphoma was diagnosed in a 12-year-old domestic cat that had a primary cutaneous mass involving the stomach, liver, kidneys, heart, abdominal wall, diaphragm, bone marrow and several lymph nodes. Histopathologically, the most characteristic feature of this tumor was the heterogeneity of cell components, such as small lymphocytes, well-differentiated plasma cells and plasmacytoid transformed lymphocytes. Amyloid was deposited in the skin, stomach, and several lymph nodes. Immunohistochemically, neoplastic small lymphocytes were positive for CD20, and well-differentiated plasma cells and plasmacytoid transformed lymphocytes were positive for lambda-Ig light chains and MUM1/IRF-4. These results emphasize the importance of lymphoplasmacytic lymphoma as a differential diagnosis of extramedullary cutaneous plasmacytoma in cats.


**Comparison of Behavioral Effects of Morphine and Fentanyl in Dogs and Cats.**

Behavioral effects induced by intravenous administration of morphine at 0.3, 0.6, 1.2, and 2.4 mg/kg and fentanyl at 5, 10, 20, and 40 mug/kg were evaluated in dogs and cats. In dogs, fentanyl and morphine depressed activity and level of consciousness in a dose dependant manner. In cats, higher doses of fentanyl stimulated activity temporarily, but excitement, so-called “opioid mania”, was not observed. Morphine induced distinctive behavioral changes characterized by sitting with fixed staring and “opioid mania” was not observed in cats.


**Nitrogen metabolism of four raw meat diets in domestic cats.**

Little nutritional information has been collected from domestic cats fed raw meat diets. The objective of the present study was to evaluate differences in N metabolism of domestic cats fed raw beef-based diet (66 % crude protein (CP) and 20 % fat), bison-based diet (49 % CP and 39 % fat), elk-based diet (79 % CP and 6 % fat) and horse-based diet (60 % CP and 26 % fat). A total of eight intact adult female cats were fed to maintain body weight in a cross-over design. Daily food intake, faecal and urinary outputs, and N metabolism were measured. Dietary N was highly digestible (96.8 (SEM 0.7)) for all treatments. Urinary N accounted for a majority of total N excretion, and differences in total N excretion reflect differences in urinary N. Differences in N intake and N absorption were due to differences in CP levels among diets. N retention was similar to values reported in the literature for domestic cats fed purified and traditional extruded diets. Despite differences in protein concentrations and N intake, all raw meats tested maintained N metabolism.
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 urine 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 as compared to cats fed EX. Fecal concentrations of ammonia, isobutyrate, valerate, isovalerate, and total BCFA were greater (P </= 0.05) in cats fed EX compared to 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.

Comparative pharmacokinetics and pharmacodynamics of tablet, suspension and paste formulations of atenolol in cats.


Khor, K. H., Campbell, F. E., Charles, B. G., Norris, R. L. G., Greer, R. M., Rathbone, M. J., Mills, P. C. Comparative pharmacokinetics and pharmacodynamics of tablet, suspension and paste formulations of atenolol in cats. J. vet. Pharmacol. Therap. doi: 10.1111/j.1365-2885.2011.01342.x. This study compared the pharmacokinetic and pharmacodynamic profiles of an extemporaneously prepared (compounded) atenolol paste and suspension for oral administration, against the commercially available divided tablet in healthy cats. Eleven healthy cats (mean: age 4 +/- 0.4 year, weight 5.0 +/- 0.7 kg) were dosed twice-daily with 12.5 mg atenolol (tablet, paste or suspension) for 7 days in a randomized cross-over design with a 7-day wash-out period. On day 7, an electrocardiogram was performed before and immediately after stress provocation (jugular venipuncture) at prestudy screening, and at 2, 6 and 12 h after morning dosing. Systolic arterial blood pressure (BP) was assessed following the second electrocardiogram. Plasma was collected at prestudy screening, and at 1, 2, 6 and
12 h to measure atenolol plasma concentrations. Mean atenolol dose was 2.5 mg/kg (range: 2.1-3.3 mg/kg). Stress-induced rise in heart rate was attenuated (P < 0.05) at every time point compared to baseline for all formulations. Although the paste significantly attenuated stress-induced elevation in heart rate at all time points, the effect was not consistently equivalent to the tablet. The BP was not altered (P > 0.05) at any time point by any formulation. In conclusion, there were no significant differences (P > 0.05) in any of the pharmacokinetic parameters or pharmacodynamic profiles of the paste and suspension compared to the commercially available tablet.


**A pilot study of the body weight of pure-bred client-owned adult cats.**

A total of 539 pure-bred and seventy-five cats without a pedigree were weighed and scored at cat shows or in veterinary surgeries. Data from normal-weight cats with a body condition score (BCS) of 5 (ideal) were only used. Breeds were grouped into five classes. For female cats, the mean weight for these groups were as follows: very light (2.8 kg); light (3.2 kg); medium (3.5 kg); large (4.0 kg); giant (4.9) kg. For male cats, the corresponding values were 3.6, 4.2, 4.3, 5.1 and 6.1 kg. Siamese/Oriental Shorthair were identified as a very light breed, the Norwegian Forest and the Siberian Cat as a large breed and the Maine Coon as a giant breed. Males and females of the same breed did not always belong to the same class. In some breeds, individuals of the same sex were found in two different classes. The percentage of intact overweight cats (BCS >5) was low (7 % of intact males, 3 % of intact females). Incidence of overweight in neutered cats was 50 % in males and 38 % in females. Among pedigree cats, there were differences in the incidence of overweight in neutered cats: high in Norwegian Forest Cats (males 75 %, females 50 %) and low in Siamese/Oriental Shorthair Cats (males 25 %, females 1 %). Cats with a BCS of 6, 7 and 8 had on average 120, 154 and 214 % of the normal weight of their breed, respectively.


**Onchocerca lupi causing ocular disease in two cats.**

Although canine ocular onchocerciasis has been well described as an emerging pathogen of dogs in Europe and North America over the past 20 years, there are no previous reports of feline ocular onchocerciasis. This report details the clinical, histopathologic, and molecular diagnosis of two domestic short hair cats residing in the United States infected with Onchocerca lupi causing episcleritis and orbital cellulitis. The results of this report suggest that O. lupi is a newly recognized disease of domestic cats.


**Contrast-enhanced ultrasonography in the differentiation of retinal detachment and vitreous membrane in dogs and cats.**

OBJECTIVES: To evaluate contrast-enhanced ultrasonography (CEU) and colour Doppler imaging (CDI) for detection of persistent vascularisation in retinal detachment. METHODS: In 22 eyes, retinal detachment (n=13) and vitreous membranes (n=9) were confirmed by ophthalmological examination,
during cataract surgery, by histopathology or after vitreoretinal surgery. Tentative diagnosis of retinal detachment or vitreous membrane was made using grey-scale B-mode ultrasonography. Assessment of retinal detachment was based on the presence or absence of vascularisation in the membranous structure using CDI and CEU. RESULTS: Sensitivity, specificity, positive-predictive value and negative-predictive value of grey-scale ultrasonography in differentiating retinal detachment from vitreous membrane were 92.3%, 66.6%, 80% and 85.7%. In 91% of eyes, colour Doppler assessment was unsuccessful due to the movement of the eye. Persistent vascularisation was demonstrated in all cases of retinal detachments with CEU. CEU was 100% accurate for detection and differentiation between retinal detachment and vitreous membrane. CLINICAL SIGNIFICANCE: CEU is a useful clinical tool for the diagnosis of retinal detachment and vitreous membrane in dogs and cats.


**Obesity in dogs and cats: what is wrong with being fat?**

Few diseases in modern pets are diet-induced. One possible exception to this is obesity, which is ultimately caused by consuming more calories than needed by the dog or cat. While fat is the most concentrated and efficiently stored source of calories, and protein least so, an excess of calories from any source will contribute to adiposity. Obesity is an excess of body fat sufficient to result in impairment of health or body function. In people, this is generally recognized as 20 to 25% above ideal bodyweight. This degree of excess is important in dogs as well. A lifelong study in dogs showed that even moderately overweight dogs were at greater risk for earlier morbidity; these dogs required medication for chronic health problems sooner than their lean-fed siblings. The average difference in body weight between groups was approximately 25%. Obese cats also face increased health risks, including an increased risk of arthritis, diabetes mellitus, hepatic lipidosis, and early mortality. The risk for development of diabetes increases about 2 fold in overweight cats and about 8 fold in obese cats. Altered adipokine secretion appears to be an important mechanism for the link between excess body weight and so many diseases. Once considered to be physiologically inert, adipose tissue is an active producer of hormones, such as leptin and resistin, and cytokines, including many inflammatory cytokines such as tumor necrosis factor alpha (TNFalpha), interleukins 1beta and 6, and C-reactive protein. The persistent, low-grade inflammation secondary to obesity is thought to play a causal role in chronic diseases such as osteoarthritis, cardiovascular disease, diabetes mellitus, and others. For example, TNFalpha alters insulin sensitivity by blocking activation of insulin receptors. In addition, obesity is associated with increased oxidative stress, which also may contribute to obesity-related diseases. Management of obesity involves nutritional modification as well as behavioral modification. Increased protein intake combined with reduced calorie intake facilitates loss of body fat while minimizing loss of lean body mass. Limiting treats to 10% of calorie intake, and increasing exercise both aid in successful weight management.


**Domesticated Cats with Active Mycobacteria Infections have Low Serum Vitamin D (25(OH)D) Concentrations.**

Vitamin D insufficiency is regularly observed in human patients with tuberculosis but it is unknown if spontaneous mycobacteria infections in other species are associated with suboptimal vitamin D status.
Serum 25 hydroxyvitamin D (25(OH)D) concentrations were significantly lower in cats with mycobacteriosis than in healthy cats (P < 0.001).


Identification of a novel feline picornavirus from the domestic cat.

While picornaviruses are known to infect various animals, their existence in the domestic cat was unknown. We describe the discovery of a novel feline picornavirus, FePV, from stray cats in Hong Kong. Among 662 cats, FePV was detected in fecal samples of 14 cats and urine samples of two cats by RT-PCR. Analysis of five FePV genomes revealed a distinct phylogenetic position and genomic features, with low sequence homologies to known picornaviruses especially in leader and 2A proteins. Among the closely related bat picornaviruses group 1 to 3 and the genus Sapelovirus, G+C content and sequence analysis of P1, P2 and P3 regions showed that FePV is most closely related to bat picornavirus group 3. However, FePV possessed other distinct features, including a putative type IV IRES instead of type I IRES in bat picornavirus group 3, protein cleavage sites and H-D-C catalytic triad in 3C(pro) different from those in sapeloviruses and bat picornaviruses, and the shortest leader protein among known picornaviruses. These results suggest that FePV may potentially belong to a new genus in Picornaviridae. Western blot analysis using recombinant FePV VP1 polypeptide showed a high seroprevalence of 33.6% among tested plasma samples from 232 cats for IgG. IgM was also detected in three cats positive for FePV in fecal samples, supporting recent infection in these cats. Further studies are important to understand the pathogenicity, epidemiology and genetic evolution of FePV in these common pet animals.


The effect of contrast-enhanced ultrasound on the kidneys in eight cats.

Contrast-enhanced ultrasound (CEUS) of the left kidney was performed on eight non-anesthetized, young, purpose bred, domestic shorthaired cats. Each cat underwent a physical examination before and 4h and 48h after CEUS. Complete blood count (CBC), serum biochemical analysis, urinalysis, including evaluation of the enzymatic activities of urinary N-acetyl-beta-d-glucosaminidase (NAG) and gamma-glutamyl transferase (GGT), were also performed. No changes were observed in CBC or serum biochemical analyses, with the exception of a decrease in blood urea concentration at 48h post-contrast ultrasound. A small elevation in NAG (U/g creatinine) was observed with a mean (SD) increase from 0.53 (0.35) to 1.43 (0.59) U/g creatinine. The magnitude of the rise was less than the circadian variation reported earlier for healthy cats. These results suggest that CEUS can be safely used to assess kidney perfusion in cats. The changes observed in laboratory values after CEUS did not appear to be related to detrimental effects on the kidneys.


Comparison of urine protein profiles in cats without urinary tract disease and cats with
idiopathic cystitis, bacterial urinary tract infection, or urolithiasis.

OBJECTIVE: To characterize and compare the urine protein content in cats without urinary tract disease and cats with idiopathic cystitis (IdC), bacterial urinary tract infection (UTI), or urolithiasis. ANIMALS: Control cats (n = 18) and cats with IdC (18), UTI (12), and urolithiasis (12) from which urine samples were obtained and 2 cats with obstructive IdC and 4 additional control cats from which postmortem urinary bladder biopsy specimens were obtained. PROCEDURES: Protein contents in urine samples obtained via cystocentesis or catheterization were measured via the Bradford method. Urine proteins were separated by means of 1-dimensional gel electrophoresis. Evaluation of fibronectin content was performed via western blotting and immunohistochemical analysis. Urinary bladder biopsy specimens were examined histologically and analyzed immunohistochemically for fibronectin. RESULTS: Urine fibronectin content was significantly greater in cats with IdC, compared with control cat findings. Urine fibronectin contents did not differ significantly among controls and cats with UTI or urolithiasis. Histologic examination of bladder biopsy specimens obtained from 2 cats with obstructive IdC revealed destruction of the urothelial lining of the urinary bladder and severe fibrosis; immunohistochemical analysis revealed few fluorescence signals for fibronectin, unlike findings in control bladder biopsy specimens. CONCLUSIONS AND CLINICAL RELEVANCE: Results indicated that urine fibronectin content in cats with IdC was greater than that in controls, cats with UTI, or cats with urolithiasis. In cats with IdC, increased permeability of damaged urothelium may result in detachment and leakage of fibronectin into urine. Urine fibronectin might serve as a biomarker for diagnosis of IdC in cats.


Effect of citrus polyphenol- and curcumin-supplemented diet on inflammatory state in obese cats.

Among obesity-associated disorders, low-grade inflammation has been described. The putative therapeutic properties of citrus and curcumin polyphenols could be associated with their anti-inflammatory properties. Two diets supplemented either with hesperidin (0.05 %) and naringin (0.1 %) from citrus extract or with highly bioavailable curcumin from Curcuma longa extract (0.09 %) were fed to eight obese cats for two 8-week periods (cross-over study design) while maintaining animals in an obese state. Plasma acute-phase protein (APP; alpha1-acid glycoprotein (AGP), serum amyloid A and haptoglobin) levels were assessed before and at the end of each test period. TNF-alpha, IL-1beta, IL-2, IL-4, IL-5, IL-10, IL-12, IL-18, transforming growth factor-beta, interferon (IFN)-gamma mRNA levels were determined in peripheral blood mononuclear cells (PBMC) by real-time PCR. Compared with pre-study values, supplementation with citrus polyphenols resulted in lower plasma AGP and haptoglobin concentrations, while that with curcumin resulted in lower plasma AGP concentration. There were no differences between the supplementations. TNF-alpha, IL-1beta, IL-4, IL-5, IL-10, IL-12, IL-18, transforming growth factor-beta, mRNA levels remained unaffected by either dietary supplementation. In contrast, IFN-gamma and IL-2 mRNA levels were lower at the end of the citrus and the curcumin supplementation, respectively. There were no differences between the supplementations. The present study results show a slight effect of citrus and curcumin supplementation on inflammatory markers expressed by PBMC, and a decreased concentration of APP, which are mainly expressed by the liver. This would confirm that hesperidin and naringin or highly bioavailable curcumin extract have beneficial effects, targeted in the liver and could improve the obesity-related inflammatory state.
Histological examination of the intestine from dogs and cats with intussusception.

Objectives: To review the histological findings in the intestine from dogs and cats with intussusception. Methods: Medical records and histopathology reports of dogs and cats with intussusception were reviewed retrospectively. Results: Forty-nine animals (31 dogs and 18 cats) were identified for inclusion. Tissues examined comprised the intussusception alone in 29 animals (16 dogs and 13 cats), and the intussusception with additional intestinal biopsies in 20 animals (15 dogs and 5 cats). Twenty-eight of 49 (57.1%) animals, comprising 19 of 31 (61.3%) dogs and 9 of 18 cats (50%) had abnormalities detected on histological examination of tissue. Eleven of 29 (46.9%) cases where only the intussusception was submitted achieved a histological diagnosis, compared to 17 of 20 (85%) where additional biopsies were submitted (P=0.003). Cats (median age 36 months, range 2 to 174) were significantly older than dogs (median age 7.5 months, range 1 to 125 months, P=0.010) and were significantly more likely to have underlying neoplasia (5 of 9; 55.6%) compared to dogs who were more likely to have inflammatory causes (17 of 19; 89.5%, P=0.020). There was no association between histological diagnosis and location of the intussusception (P=1.000). Clinical Significance: Histological abnormalities were detected in more than half of the animals. Diagnosis of intestinal disease in animals with intussusception may be improved by submission of additional biopsy samples. Cats with intussusception are more likely to be older and have underlying neoplasia than dogs which are more likely to have inflammatory disease.

Prevalence of Clonorchis sinensis infection in dogs and cats in subtropical southern China.

BACKGROUND: Clonorchiasis, caused by Clonorchis sinensis, is one of the major parasitic zoonoses in China, particularly in China’s southern Guangdong province where the prevalence of C. sinensis infection in humans is high. However, little is known of the prevalence of C. sinensis infection in its reservoir hosts dogs and cats. Hence, the prevalence of C. sinensis infection in dogs and cats was investigated in Guangdong province, China between October 2006 and March 2008. RESULTS: A total of 503 dogs and 194 cats from 13 administrative regions in Guangdong province were examined by post-mortem examination. The worms were examined, counted, and identified to species according to existing keys and descriptions. The average prevalences of C. sinensis infection in dogs and cats were 20.5% and 41.8%, respectively. The infection intensities in dogs were usually light, but in cats the infection intensities were more serious. The prevalences were higher in some of the cities located in the Pearl River Delta region which is the most important endemic area in Guangdong province, but the prevalences were relatively lower in seaside cities. CONCLUSIONS: The present investigation revealed a high prevalence of C. sinensis infection in its reservoir hosts dogs and cats in China’s subtropical Guangdong province, which provides relevant “base-line” data for conducting control strategies and measures against clonorchiasis in this region.

A review of feline leukemia virus and feline immunodeficiency virus seroprevalence in cats in...
Canada.

Feline leukemia virus (FeLV) and feline immunodeficiency virus (FIV) are common and important infectious diseases of cats in Canada. Prevalence data are necessary to define prophylactic, management, and therapeutic measures for stray, feral and owned cats. Recently, comprehensive data on the seroprevalence of retrovirus infections of cats in Canada have become available and are reviewed. Further investigation into geographic variations in retrovirus seroprevalence within Canada is warranted, and may provide information to improve recommendations for testing and prevention. As well, more information is needed on FIV subtypes in Canada to improve diagnostics and vaccines, as well as to provide information on disease outcomes.


Development of a questionnaire assessing health-related quality-of-life in dogs and cats with cancer.

Health-related quality-of-life (HRQoL) has been studied extensively in human medicine. There is currently no standard HRQoL evaluation for veterinary oncology patients. The aim of this study was to assess the practicality, usefulness and robustness, from a pet owner and clinician perspective, of a questionnaire for the assessment of HRQoL in canine and feline cancer patients. A HRQoL assessment entitled ‘Cancer Treatment Form’ and two questionnaires entitled ‘Owner Minitest’ and ‘Clinician Minitest’ were designed. The first and second were completed by owners of patients presenting to a veterinary oncology referral service and the third by attending clinicians. The ‘Cancer Treatment Form’ was well received by owners and clinicians and provided a valuable assessment of HRQoL with 98% (82/84) of owners reporting an accurate reflection of their pet’s quality-of-life. Following this, minor improvements to the form could be suggested prior to regular use in evaluation of clinical oncology patients.


Use of pimobendan in 170 cats (2006-2010).

HYPOTHESIS/OBJECTIVES: To describe the therapeutic use of pimobendan in cats, describe the patient population to which it was administered, document potential side effects and report the clinical course following administration of pimobendan in conjunction with standard heart failure therapy. It is hypothesized that cats with advanced heart disease including congestive heart failure from a variety of causes will tolerate pimobendan with a minimum of side effects when used in treatment in conjunction with a variety of other medications. ANIMALS, MATERIALS AND METHODS: One hundred and seventy client owned cats with naturally occurring heart disease, one hundred and sixty four of which had congestive heart failure. Medical records were reviewed and owners and referring veterinarians were contacted for follow-up data. Data collected included pimobendan dose, other medications administered concurrently, data collected at physical examination, presence or absence of heart failure, adverse effects, classification of heart disease, echocardiographic data and survival time. The data were analyzed for significance between the initial visit and any follow-up visits. RESULTS: All cats were treated with pimobendan. The median pimobendan dose was 0.24 mg/kg q 12 h. Pimobendan was used in combination with multiple concurrent medications including angiotensin converting enzyme
inhibitors, diuretics and anti-thrombotics. Five cats (3.0%) had potential side effects associated with pimobendan. One cat (0.6%) had presumed side effects severe enough to discontinue pimobendan use. Median survival time for 164 cats with congestive heart failure after initiation of pimobendan was 151 days (range 1-870). CONCLUSION: Pimobendan appears to be well tolerated in cats with advanced heart disease when used with a variety of concurrent medications. Randomized controlled studies need to be performed to accurately assess whether it is efficacious for treatment of congestive heart failure in cats.


FIV associated neoplasms--a mini-review.

Retroviral induced neoplasms have been key to understanding oncogenesis and are important etiologic agents associated with cancer formation. Cats infected with feline immunodeficiency virus (FIV), the feline analogue to human immunodeficiency virus (HIV), are reported to be at increased incidence of neoplasia. This review highlights reported risk factors and tumor cell phenotypes associated with neoplasias arising in FIV-infected animals, differences in oncogenic disease in natural versus experimental FIV infections, and similarities between FIV- and HIV-related malignancies. The most common type of FIV-associated neoplasm reported in the literature is lymphoma, specifically of B-cell origin, with experimentally infected cats developing neoplastic lesions at an earlier age than their naturally infected cohorts. The mechanism of FIV-induced lymphoma has not been completely ascertained, though the majority of published studies addressing this issue suggest oncogenesis arises via indirect mechanisms. HIV-infected individuals have increased risk of neoplasia, specifically B-cell lymphoma, in comparison with uninfected individuals. Additional similarities between FIV- and HIV-associated neoplasms include the presence of extranodal lymphoma, a synergism with other oncogenic viruses, and an apparent indirect mechanism of induced oncogenesis. This literature supports study of FIV-associated neoplasms to further characterize this lentiviral-neoplasia association for the benefit of both human and animal disease, and to advance our general knowledge of mechanisms for viral-induced oncogenesis.


Comparison of two questionnaires to assess gastrointestinal toxicity in dogs and cats treated with chemotherapy*.

Questionnaires completed by pet owners are widely used instruments to monitor adverse gastrointestinal (GI) effects in the owners’ animals undergoing chemotherapy and for reporting toxicoses in clinical trials; however, no questionnaires have been formally evaluated. This study compares two questionnaire-based evaluations of adverse GI events: a basic, open-ended questionnaire and a detailed questionnaire modelled after the grading in the Veterinary Co-operative Oncology Group-Common Terminology Criteria for Adverse Events (VCOG-CTCAE). Owners completed both questionnaires after their dog or cat received moderately emetogenic chemotherapy. Results were used to derive toxicity grades for anorexia, vomiting and diarrhoea. We evaluated 123 pairs of questionnaires. Disagreement in grade of anorexia, vomiting and diarrhoea was found in 24, 7 and 13% of paired questionnaires, respectively (kappa = 0.63, 0.83 and 0.71, respectively). Although ‘good’ to
‘very good’ agreement was found, the potential for only ‘fair’ agreement between questionnaire methods is of concern and suggests a need to adopt a standardized form.


**Antimicrobial usage in dogs and cats in first opinion veterinary practices in the UK.**

OBJECTIVES: To provide baseline data on patterns of antimicrobial usage in dogs and cats through the analysis of data stored in electronic practice management systems. METHODS: Clinical data from 11 first opinion veterinary practices were extracted for the year 2007. Descriptive statistical analysis was performed to assess the usage of antimicrobials. RESULTS: Widespread usage of systemic broad-spectrum antimicrobials was observed. Antimicrobials most frequently used in both species were potentiated amoxicillin (44.4% and 46.1% in cats and dogs, respectively) and amoxicillin (14.3% and 20.7%). Cephalexin (13.4%) and cefovecin (15.0%) were also commonly used in dogs and cats, respectively. Systemic critically important antimicrobials in human medicine were widely used in dogs (60.5%) and cats (82.7%). Topical antimicrobials used in both species included fusidic acid (48.4% and 54.8%), framycetin (20.4% and 13.4%), polymyxin B (12.6% and 9.3%) and neomycin (6.5% and 6.6%). CLINICAL SIGNIFICANCE: Inappropriate usage of broad-spectrum antimicrobials may contribute to the development of antimicrobial resistance and loss of efficacy of antimicrobials in veterinary settings. Data recorded in practice management systems were demonstrated to be a practical source for monitoring antimicrobial usage in pets.


**Effect of omega-3 fatty acids on serum concentrations of adipokines in healthy cats.**

OBJECTIVE: To determine associations between serum concentrations of omega-3 polyunsaturated fatty acids and concentrations of adiponectin, leptin, and insulin in healthy cats. ANIMALS: 56 healthy adult client-owned cats. PROCEDURES: Body condition score (BCS) was determined, and blood samples were collected after food was withheld for 12 hours. Serum was harvested for fatty acid analysis and measurement of serum concentrations of adiponectin, leptin, insulin, glucose, triglyceride, and cholesterol. RESULTS: 1 cat was removed because of hyperglycemia. Significant interaction effects between BCS and serum concentrations of eicosapentaenoic acid (EPA) were detected for the analyses of associations between EPA and serum concentrations of adiponectin, insulin, and triglyceride. Cats were categorized into nonobese (BCS, 4 to 6 [n = 34 cats]) and obese (BCS, 7 to 8 [21]) groups; serum concentrations of EPA were directly associated with concentrations of adiponectin and inversely associated with concentrations of insulin and triglyceride in obese cats and were directly associated with concentrations of leptin and inversely associated with concentrations of adiponectin in nonobese cats. Additionally, serum concentrations of docosahexaenoic acid were directly associated with concentrations of adiponectin in obese cats. No significant associations between serum concentrations of docosahexaenoic acid or alpha-linolenic acid were detected in the analyses for all cats. Female cats had higher serum concentrations of adiponectin and lower concentrations of glucose than did male cats. Increased age was associated with a small increase in serum concentrations of leptin. CONCLUSIONS AND CLINICAL RELEVANCE: EPA may ameliorate the decrease in adiponectin and the increase in insulin and triglyceride concentrations in obese cats.

**Evaluation of auditory function in a population of clinically healthy cats using evoked otoacoustic emissions.**

Cats may demonstrate deafness due to a variety of aetiologies and the current preferred method for assessing auditory function is the brainstem auditory evoked response (BAER). The BAER has largely been replaced by otoacoustic emission (OAE) testing in human neonatal deafness screening as the equipment is more readily available, is cheaper and the test is less invasive and simpler. This is the first study to demonstrate that transient evoked OAEs (TEOAE) and distortion product OAEs (DPOAE) can be recorded in cats using commercially available equipment. Protocols for recording the emissions and analysing the results are given. DPOAE testing is suggested to be quicker in this population of healthy cats and shows promise in rapidly providing detailed information about auditory function at a variety of different frequencies.


**Trends in sheltering and welfare at the Hawaiian Humane Society, Oahu, Hawaii.**

One of the major goals of an animal welfare organization is to reduce the number of homeless, nonhuman animals in a community. In Hawaii, the Hawaiian Humane Society has provided numerous animal welfare services to work toward this goal, such as offering sterilizations and microchipping at reduced rates and facilitating animal adoptions and education. In addition, the Leash Law and the Cat Identification Program have increased animal welfare through increasing the responsibilities of companion animal caregivers (owners). The goal of this research was to assess if temporal changes in animal sheltering have occurred in Hawaii. The study assessed this by analyzing historical data on dogs (Canis familiaris) and cats (Felis catus) admitted, returned to owner, sterilized, euthanized, and adopted from the Humane Societies of Oahu, Hawaii, from 1993 to 2008. The study also analyzed dog and cat admittance and Honolulu population growth from 1975 to 2008. Sterilizations and pets returned to owners have increased significantly, whereas admittance and euthanasia rates have decreased significantly. Thus, although these data cannot conclusively state that there are fewer homeless animals in Hawaii, the results provide positive indicators of reducing homeless pets, especially when coupled with an increase in both the human population of Honolulu County and dog ownership.


**Feline glaucoma--a comprehensive review.**

Cats with glaucoma typically present late in the course of disease. It is likely that glaucoma in cats is under-diagnosed due to its insidious onset and gradual progression, as well as limitations of some commonly used tonometers in this species. Treatment of glaucoma in feline patients presents a clinical challenge, particularly as glaucoma is often secondary to other disease processes in cats. In this review, we consider the clinical features, pathophysiology, and classification of the feline glaucomas and provide current evidence to direct selection of appropriate treatment strategies for feline glaucoma patients.
**Bartonellae in animals and vectors in New Caledonia.**

Bartonellae are gram-negative facultative intracellular alpha-proteobacteria from the family Bartonellaceae. The natural history of bartonellae consists of a reservoir/host, which is a vertebrate with chronic intravascular infection with sustained bacteremia, and a vector (usually an arthropod) that transfers the bacteria from the reservoir to a susceptible yet uninfected host. In order to reveal the sources and reservoirs of Bartonella infection in animals and vectors in New Caledonia, we collected the blood samples of 64 dogs, 8 cats, 30 bovines, 25 horses and 29 wild deer Cervus timorensis russa and 308 associated blood-sucking parasites (14 keds Hippobosca equina, 258 ticks (22 Rhipicephalus microplus, 235 Rhipicephalus sanguineus, and 1 Haemaphysalis longicornis), 12 fleas Ctenocephalides felis and 24 dog lice Trichodectes canis). We isolated ten strains of Bartonella: four Bartonella henselae from cats and six Bartonella chomelii from cattle. The strains were characterized by sequencing of five genes (16S, ITS, rpoB, gltA and ftsZ). The six strains isolated from cattle were close to the reference strain of B. chomelii and were, probably, imported from France with cattle of Limousin race. PCR showed that 35% of keds collected from deer and 31% of deer were infected by B. aff. schoenbuchensis; all other samples were negative. Our data confirmed that in New Caledonia, as in other regions of the world, cats are the major reservoirs of B. henselae. We also confirmed that Hippoboscidae flies may serve as the vectors of ruminant-associated bartonellae.
Surgery of the upper airway is performed in dogs for the correction of brachycephalic airway syndrome and laryngeal paralysis and for temporary or permanent tracheostomy. Although technically simple to perform, upper airway surgeries can lead to the development of significant postoperative complications. This article reviews complications associated with common surgical conditions of the upper airway. It involves a discussion of brachycephalic airway syndrome and associated respiratory and gastrointestinal complications. It also covers laryngeal paralysis with a focus on unilateral arytenoid lateralization and the complication of aspiration pneumonia. The condition of acquired laryngeal webbing/stenosis and potential treatment options is also discussed. Finally, tracheostomies and associated complications in dogs and cats are reviewed.

Meyers-Wallen, V. N. (2011) Sex Dev

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.


Correlation of a feline muscle mass score with body composition determined by dual-energy X-ray absorptiometry.

Body condition scoring (BCS) systems primarily assess body fat. Both overweight and underweight animals may have loss of lean tissue that may not be noted using standard BCS systems. Catabolism of lean tissue can occur rapidly, may account for a disproportionate amount of body mass loss in sick cats and can have deleterious consequences for outcome. Therefore, along with evaluation of body fat, patients should undergo evaluation of muscle mass. The aims of the present study were first to evaluate the repeatability and reproducibility of a 4-point feline muscle mass scoring (MMS) system and second to assess the convergent validity of MMS by dual-energy X-ray absorptiometry (DXA). MMS was as follows: 3, normal muscle mass; 2, slight wasting; 1, moderate wasting; 0, severe wasting. For the first aim, forty-four cats were selected for evaluation based on age and BCS, and for the second aim, thirty-three cats were selected based on age, BCS and MMS. Cats were scored by ten different evaluators on three separate occasions. Body composition was determined by DXA. Inter- and intra-rater agreement were assessed using kappa analysis. Correlation between MMS and BCS, age, percentage lean body mass and lean body mass (LBM) was determined using Spearman’s rank-order correlation. The MMS showed moderate inter-rater agreement in cats that scored normal or severely wasted (kappa = 0.48-0.53). Intra-rater agreement was substantial (kappa = 0.71-0.73). The MMS was significantly correlated
with BCS (r 0.76, P < 0.0001), age (r - 0.75, P < 0.0001), LBM (g) (r 0.62, P < 0.0001) and percentage LBM (r - 0.49, P < 0.0035). Additional investigation is needed to determine whether the MMS can be refined and to assess its clinical applicability.


**Strain-specific viral distribution and neuropathology of feline immunodeficiency virus.**

Feline immunodeficiency virus (FIV) is a naturally occurring lentivirus of domestic cats, and is the causative agent of feline AIDS. Similar to human immunodeficiency virus (HIV), the pathogenesis of FIV involves infection of lymphocytes and macrophages, and results in chronic progressive immune system collapse and death. Neuropathologic correlates of FIV infection have not yet been elucidated, and may be relevant to understanding HIV-associated neurologic disease (neuroAIDS). As in HIV, FIV strains have been shown to express differential tendencies towards development of clinical neuroAIDS. To interrogate viral genetic determinants that might contribute to neuropathogenicity, cats were exposed to two well-characterized FIV strains with divergent clinical phenotypes and a chimeric strain as follows: FIV(PPR) (PPR, relatively apathogenic but associated with neurologic manifestations), FIV(C36) (C36, immunopathogenic but without associated neurologic disease), and Pcenv (a chimeric virus consisting of a PPR backbone with substituted C36 env region). A sham inoculum control group was also included. Peripheral nerve conduction velocity, CNS imaging studies, viral loads and hematologic analysis were performed over a 12 month period. At termination of the study (350 days post-inoculation), brain sections were obtained from four anatomic locations known to be involved in human and primate lentiviral neuroAIDS. Histological and immunohistochemical evaluation with seven markers of inflammation revealed that Pcenv infection resulted in mild inflammation of the CNS, microglial activation, neuronal degeneration and apoptosis, while C36 and PPR strains induced minimal neuropathologic changes. Conduction velocity aberrations were noted peripherally in all three groups at 63 weeks post-infection. Pcenv viral load in this study was intermediate to the parental strains (C36 demonstrating the highest viral load and PPR the lowest). These results collectively suggest that (i) 3’ C36 genomic elements contribute to viral replication characteristics, and (ii) 5’ PPR genomic elements contribute to CNS manifestations. This study illustrates the potential for FIV to provide valuable information about neuroAIDS pathogenesis related to genotype and viral kinetics, as well as to identify strains useful to evaluation of therapeutic intervention.


**First description of naturally acquired Tritrichomonas foetus infection in a Persian cattery in Spain.**

Tritrichomonas foetus has been identified as the causative agent of feline intestinal trichomonosis, characterized by clinical signs of chronic large bowel diarrhoea. This disease has been reported in cats from the USA, Europe and Australia. However, its epidemiology is still unclear. The aim of the present study was to describe T. foetus infection in a Persian cattery in Spain. T. foetus infection was sequentially diagnosed in 20 cats by direct faecal smear examined under the microscope, specific culture (In Pouch TF medium) and PCR. A standard coprological sedimentation method was also performed in order to screen for other intestinal parasites in all the cats included. In addition, sera were
tested for IgG antibodies against Leishmania infantum, Toxoplasma gondii, and for the detection of feline immunodeficiency virus (FIV) and feline leukaemia virus (FeLV). Five out of 20 cats were positive for T. foetus (25%), two of them by microscopy, culture and PCR and three by culture and PCR. No association was found between T. foetus infection and age or sex. L. infantum and T. gondii seroprevalence rates were 15% and 10%, respectively. The prevalence of FeLV p27 antigen and of FIV antibodies in the study population was zero. Cystoisospora spp. oocysts were detected in one cat. These preliminary results show that the transmission of T. foetus infection in cluster conditions may occur between asymptomatic cats and young or immunocompromised animals.


Pharmacokinetics of the low molecular weight heparin dalteparin in cats.

Low molecular weight heparin (LMWH) is used as an anticoagulant in cats although only limited pharmacokinetic data are available in this species. The aim of the present study was to establish the pharmacokinetics of dalteparin in cats based on anti-FXa heparin activities. Groups of clinically healthy cats (six animals per treatment) received individual LMWH injections at three different doses intravenously (IV) (25, 50, 100 anti-factor Xa international units [IU anti-FXa]/kg) or subcutaneously (SC) (50, 100, 200IU anti-FXa/kg). Blood samples were collected before and at various times after injection. Anti-FXa activity was measured with a chromogenic substrate test. Following IV injection, maximum plasma heparin activities (C(max)) were 0.67+/−0.14, 1.44+/−0.22 and 2.87+/−0.38IU anti-FXa/mL, respectively. The calculated mean half-life (t((1/2))) was between 39 and 57min and was not significantly dose-dependent (P=0.139). The volume of distribution (35-39mL/kg) was almost equivalent to the plasma volume. After SC injection, C(max) values of 0.41+/−0.10, 0.86+/−0.17 or 1.91+/−0.16IU anti-FXa/mL, respectively, were calculated at 91-110min post-injection. The t((1/2)) values were between 106 and 122min and were not significantly influenced by dose (P=0.784). The bioavailability after SC injection was approximately 100%. The high bioavailability of the SC administered LMWH dalteparin in cats was consistent with other species and indicated predictable blood levels. However, the comparatively short t((1/2)) may indicate the necessity of multiple daily injections, which should be verified in clinical trials.


Maintenance energy requirement determination of cats after spaying.

Neutering is often associated with obesity in companion animals. However, the maintenance energy requirement (MER) for these animals has not been clearly defined. The present study investigated the MER for spayed cats whose body weights (BW) began to increase shortly after ovariohysterectomy. A total of twenty-two shorthair adult female cats were fed complete and balanced diets in amounts to maintain their BW and body condition score (BCS) before the present study. All cats were spayed and the diet was fed for 11 weeks using the same MER as previously. During these weeks, all cats gained weight. Beginning with week 12, a weight-loss regimen was initiated until each cat achieved a BCS of 5 out of 9. After each cat obtained a BCS of 5, an appropriate amount of diet was fed to maintain its BW for at least 4 weeks to determine a modified MER. Daily food consumption, weekly BW and BCS were monitored. Blood was collected before and after weight loss for plasma biochemistry profiles. BW and BCS increased by 16 % and one point (P < 0.01), respectively, during the first 11 weeks after surgery, although food consumption was constant both pre- and post-surgery. The mean MER after
obtaining a BCS of 5 was 313.6 (SEM 23.6) kJ/BW(0.67), which is 25% lower than the current National Research Council recommendation and lower than the cat’s requirement before surgery (P < 0.05). In conclusion, spaying significantly increased BW when using MER values for intact cats. Thus, 313.6 x ideal BW(0.67) kJ is proposed for the MER of spayed adult cats.


Screening for proteinuria in cats using a conventional dipstick test after removal of cauxin from urine with a Lens culinaris agglutinin lectin tip.

Proteinuria is an important indicator of urinary tract disease and urine dipsticks are simple and sensitive tools to screen for this marker. However, the use of dipsticks to screen for proteinuria may not be appropriate in cats, since cauxin, a 70 kDa glycoprotein, is secreted by the kidneys in clinically normal animals of this species. To circumvent this problem, a Lens culinaris agglutinin (LCA) lectin tip was developed to remove cauxin from feline urine, followed by conventional urine dipstick testing for proteinuria. Sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE) with Coomassie brilliant blue R-250 staining indicated that >90% cauxin in the urine of 13 clinically normal cats was trapped by the LCA lectin tip, so that the dipstick protein ‘score’ changed from ‘positive’ (≥30 mg/dL) for untreated urine to ‘negative’ (<10 mg/dL) for lectin tip-treated urine. In contrast, SDS-PAGE indicated that lectin tip-treated samples from 20 animals with renal disease contained high concentrations of albumin and low-molecular weight proteins; dipstick testing of lectin tip-treated urine resulted in a consistently positive protein score. The accuracy of the dipstick method for detecting cats with abnormal proteinuria is enhanced if dipsticks are used with urine samples that have first been passed through the LCA lectin tip.


With 6 figures SUMMARY: The purpose of this study was to provide a clinical anatomy atlas of the feline brain using magnetic resonance imaging (MRI). Brains of twelve normal cats were imaged using a 1.5 T magnetic resonance unit and an inversion/recovery sequence (T1). Fourteen relevant MRI sections were chosen in transverse, dorsal, median and sagittal planes. Anatomic structures were identified and labelled using anatomical texts and Nomina Anatomica Veterinaria, sectioned specimen heads, and previously published articles. The MRI sections were stained according to the major embryological and anatomical subdivisions of the brain. The relevant anatomical structures seen on MRI will assist clinicians to better understand MR images and to relate this neuro-anatomy to clinical signs.


Birth weight and postnatal growth of pure-bred kittens.

Data on body weight of pure-bred kittens (Maine Coon, Norwegian Forest Cat, Birman, Persian, Siamese/Oriental Shorthair Cat) from birth (n 245) to 12 weeks of age (n 135) were obtained from
breeders. Absolute birth weight (in g) was higher in larger breeds than in smaller breeds, whereas relative birth weight (in % of mature female weight) tended to be higher in smaller breeds (Maine Coon 115 g, 2.3 %; Norwegian Forest Cat 106 g, 2.7 %; Birman 97 g, 2.8 %; Siamese 92 g, 2.8 %; Persian 82 g, 3.2 %). Relative birth weight was lower than that described in the literature for colony cats. Relative litter weight was highest in Norwegian Forest Cats (14.6 (SD 1.8) %; n 10) and lowest in Birmans (8.8 (SD 3.1) %, n 7; P < 0.05); the other breeds were in-between (11.9 (SD 2.0) %; n 19). Absolute growth was faster in larger breeds than in smaller breeds. In relation to expected mature weight, there was good agreement with data from colony cats but no clear-cut effect of breed size. There appeared to be a trend to an earlier onset of sexual dimorphism in larger breeds.


Managing cats with cancer An examination of ethical perspectives.

ETHICAL ISSUES: Caring for cancer patients presents many ethical issues for veterinarians and other veterinary health workers. The issues that most veterinarians think of relate to management of the patient when the owners’ preferences for treatment do not appear to be in the animal’s best interest, as well as concerns about toxicities and about costs of veterinary services (advanced imaging, surgery, radiation therapy and chemotherapy). While not limited to the veterinary profession, we are more often faced with dilemmas about the appropriateness of palliative care and decisions about euthanasia than our medical colleagues. Equally important are the ethics of not treating patients, and the integration of unproven and alternative strategies into conventional care. A separate ethical issue arises from investigational therapies and research. Less often considered, but nonetheless relevant, are the ethics of suboptimal evaluation (staging) of patients prior to treatment, or of not informing owners about all the options available. CLIENT COMMUNICATION: Ethical veterinary care is intertwined with good client communication. Without good communication, it is impossible, for example, to gain informed consent; and without informed consent, the ethics of cancer treatment are uncertain. GOAL: This article, which draws in part on published research, where stated, and otherwise on the author’s personal experiences/opinions and those of veterinary colleagues, is intended to provoke further thought and discussion on the ethics of caring for our cancer patients.


Gurltia paralysans : Description of adults and additional case reports of neurological diseases in three domestic cats from southern Chile.

Adults of Gurltia paralysans were obtained from veins of the spinal cord subarachnoid space from three domestic cats presenting with chronic paraparesis/paraplegia from rural areas of southern Chile. Four adult nematodes were collected (2 males and 2 females) were recovered from cat 1, 14 adult nematodes (12 females and 2 males) from cat 2, and 12 nematodes (10 females and 2 males) were collected from cat 3. Parasite induced lesions that compromised subarachnoid vein microvasculature at the thoracic, lumbar, sacral spinal cord segments extending to conus medularis. Female nematodes measured 25mm long (range=25-30mm) and 0.1mm wide. Male measured a mean of 16mm length (range=13-18mm) with a body diameter of 0.1mm (range=0.08-0.15mm). The present study described structural features of G. paralysans, a rare parasite first reported in the 1930s, and provides additional reports on associated clinical and pathological findings in naturally infected domestic cats.

Proportion of pet cats registered with a veterinary practice and factors influencing registration in the UK.

Registration of a cat with a veterinary practice is likely to be a critical factor for access to key preventative medicine. A cross-sectional study was conducted to collect data in the United Kingdom on the registration status of cats and potential explanatory variables. These data were also used to identify potential sources of bias associated with selecting controls from veterinary registered populations of cats due to differences between registered and unregistered cats. Cat owners reported that 13.6% (84/616) of their cats had not been registered with a veterinary practice since living at their current address. Multivariable logistic regression indicated that unregistered cats were significantly more likely than registered cats to be entire, to have not been vaccinated within the previous year, to be living in households in Northern Ireland and in households with an annual income < £10,000. Whilst the neuter status and the vaccination status of the cat are likely to result from non-registration, the household location and annual income are factors that can be used to inform future interventions designed to increase the proportion of veterinary registered cats.


Characterization of feline hereditary retinal dystrophies using clinical, functional, structural and molecular genetic studies.

Only in recent years have specific mutations been elucidated for feline hereditary retinal dystrophies. Molecular genetic characterization of feline diseases has so far been a slow process but with a full genome sequence for the cat recently completed and the development of a feline single nucleotide polymorphism chip, the characterization of feline monogenic disorders will be significantly simplified. This review summarizes current knowledge with regard to specific hereditary retinal dystrophies in cats and gives an overview of how cats can be used as models in translational research.


Porphyrians are not present in feline ocular tissues or corneal sequestra.

OBJECTIVE: To determine if feline lacrimal glands, glands of the third eyelid, corneas, and corneal sequestra contain porphyrins, which could be responsible for the brown/amber discoloration of corneal sequestra and tears in affected cats. PROCEDURES: Samples of grossly normal cornea, lacrimal gland, gland of the third eyelid, and sequestra obtained via keratectomy were collected. Porphyrin concentrations of the homogenate were determined by spectrofluorometry with protoporphyrin IX and coproporphyrin III dihydrochloride used as standards. A hamster harderian gland was used as a positive control. RESULTS: Normal tissues were harvested from one eye each of 14 nonclient owned, adult, mixed-breed, short-hair cats euthanized for reasons not associated with this study. Eighteen sequestra were acquired from cats undergoing unilateral lamellar keratectomies. Breeds of the affected cats included eight Himalayan, five domestic shorthair, and one each of four other breeds. Only the positive control and standards contained levels of porphyrins above background. All feline samples examined
were histologically normal with no evidence of porphyrins. CONCLUSIONS: Porphyrins are absent in normal feline lacrimal glands, corneas, and corneal sequestra. Porphyrins do not appear to be the cause of the brown/amber color of feline corneal sequestra.


**Experimental Hyperlipemia Induces Insulin Resistance in Cats.**

The effect of experimental hyperlipemia on insulin sensitivity was evaluated in seven healthy cats. Serum triglyceride and free fatty acid concentrations were significantly (P<0.05) higher when lipid-heparin was administered (2,894 +/- 1,526 mg/dl and 4.54 +/- 0.70 mEq/l, respectively) than when saline was administered (70 +/- 42 mg/dl and 0.22 +/- 0.08 mEq/l, respectively). A glucose clamp test revealed that the mean glucose infusion rate when lipid-heparin was administered (5.80 +/- 0.67 mg/kg/min) was significantly (P<0.05) lower than when saline was administered (8.52 +/- 1.83 mg/kg/min). These results suggest that experimental hyperlipemia induced insulin resistance in the healthy cats.


**Macroyclic Lactones in the Treatment and Control of Parasitism in Small Companion Animals.**

Macroyclic lactones (MLs) have many anti-parasitic applications in small companion animal medicine. They were first developed as chemoprophylactics against heartworm (Dirofilaria immitis) infection to be applied monthly for retroactive killing of third- and fourth-stage larvae. ML-containing products formulated for oral (ivermectin, milbemycin oxime), topical (selamectin, moxidectin) or injectable sustained release (moxidectin, ivermectin) are approved for heartworm prevention in dogs or cats. Clearance of microfilariae and gradual or “soft” killing of adult heartworms constitute increasingly prevalent extra-label uses of MLs against D. immitis. Some commercial ML formulations contain sufficient levels of active ingredient (milbemycin oxime, selamectin, moxidectin) to support additional label claims against gastrointestinal nematode parasites such as hookworms (Ancylostoma spp.) and ascarid round worms (Toxocara spp. and Toxascaris leonina). Beyond these approved applications, safe, extra-label uses of MLs against nematodes parasitizing the urinary tract, such as Capillaria spp., and parasites of the tissues, such as Dipetalonema reconditum, Dirofilaria repens, Thelazia spp. and Spirocerca lupi, in dogs and cats as well as exotic pets have been reported. MLs as a group have intrinsic insecticidal and acaricidal activity, and topical or otic formulations of certain compounds (selamectin, moxidectin, milbemycin oxime or ivermectin) are approved for treatment and control of fleas, certain ixodid ticks, sarcoptiform and demodectic mange mites and psoroptiform ear mites. Extra-label applications of MLs against ectoparasites include notoedric mange mites, dermanyssids such as Ormythonusus bacoti, numerous species of fur mite (e.g. Cheyletiella spp. and Lynxacarus) and trombiculids (“chiggers”) in cats, dogs and nontraditional or exotic pets.


**Real-time detection and identification of Chlamydophila species in veterinary specimens by using SYBR green-based PCR assays.**
Infections caused by members of the Chlamydiaceae family have long been underestimated due to the requirement of special laboratory facilities for the detection of this group of intracellular pathogens. Furthermore, new studies of this group of intracellular pathogens have revealed that host specificity of different species is not as clear as recently believed. As most members of the genus Chlamydophila have shown to be transmissible from animals to humans, sensitive and fast detection methods are required. In this study, SYBR green-based real-time assays were developed that detect all members of Chlamydiaceae and differentiate the most prevalent veterinary Chlamydophila species: Cp. psittaci, Cp. abortus, Cp. felis, and Cp. caviae. By adding bovine serum albumin to the master mixes, target DNA could be detected directly in crude lysates of enzymatically digested conjunctival or pharyngeal swabs or tissue specimens from heart, liver, and spleen without further purification. The assays were evaluated on veterinary specimens where all samples were screened using a family-specific PCR, and positive samples were further tested using species-specific PCRs. Cp. psittaci was detected in 47 birds, Cp. felis was found in 10 cats, Cp. caviae was found in one guinea pig, and Cp. abortus was detected in one sheep. The screening assay appeared more sensitive than traditional microscopical examination of stained tissue smears. By combining a fast, robust, and cost-effective method for sample preparation with a highly sensitive family-specific PCR, we were able to screen for Chlamydiaceae in veterinary specimens and confirm the species in positive samples with additional PCR assays.


A clinical comparison of remifentanil or alfentanil in propofol-anesthetized cats undergoing ovariohysterectomy.

Sixteen cats were used to compare the cardiovascular and anesthetic effects of remifentanil (REMI) or alfentanil (ALF) in propofol-anesthetized cats undergoing ovariohysterectomy. After premedication with acepromazine, anesthesia was induced and maintained with a constant rate infusion of propofol (0.3 mg/kg/min). REMI or ALF infusions were administered simultaneously with propofol. Heart rate (HR), systolic arterial pressure (SAP), pulse oximetry (SpO(2)), rectal temperature (RT), and response to surgical stimulation were recorded at predefined time points during anesthesia. Data [mean+/-standard deviation (SD)] were analyzed by analysis of variance (ANOVA) for repeated measures followed by a Dunnett’s test and Student t-test (P<0.05). SAP was significantly lower in ALF group than in REMI group. Extubation time was significantly shorter in REMI than in ALF group. Overall infusion rate of REMI and ALF was 0.24+/-0.05 mug/kg/min and 0.97+/-0.22 mug/kg/min, respectively. The combination of propofol and REMI or ALF provided satisfactory anesthesia in cats undergoing ovariohysterectomy.


Complex partial cluster seizures in cats with orofacial involvement.

Seventeen cats were presented with acute onset of complex partial seizures with orofacial involvement (salivation, facial twitching, lip smacking, chewing, licking or swallowing), motor arrest (motionless staring) and behavioural changes. In 11 cats hippocampal necrosis (HN) was confirmed by histopathology. In a further six cats hippocampal changes were suggested by magnetic resonance imaging. The mean monitoring time of eight cats which were not euthanased in the acute phase of the
disease, was 408 days (60-908): four cats are still alive. In all surviving cases, the owners reported a good quality of life. We conclude that an acute cluster of complex partial seizures with orofacial involvement are often associated with HN and that HN is not necessarily a fatal condition. Supportive and antiepileptic therapy can result in remission. The long-term outcome can be good to excellent; therefore, euthanasia should be avoided in the acute phase of the signs.


Cats and calcium oxalate: strategies for managing lower and upper tract stone disease.

PRACTICAL RELEVANCE: Calcium oxalate (CaOx) containing stones are among the most common of the urinary tract stones identified in cats. RISK FACTORS: Risk factors for CaOx stone formation include such things as breed, gender and diet; stress and obesity have also been hypothesized to be risk factors for this disease. MANAGEMENT APPROACH: A tailored, individual management strategy for preventing CaOx stone recurrence is important and should include addressing the diet, environment and any other comorbid conditions present. Increasing the cat’s moisture intake is one of the key mechanisms for preventing recurrence. CLINICAL CHALLENGES: CaOx ureterolithiasis has emerged as a difficult and sometimes life-threatening problem for cats. In those cats where stones are found incidentally, periodic monitoring may be required to assess for disease progression. Intervventional procedures such as ureteral stent placements are now increasingly being performed for recurrent cases or those with larger stone burdens. Periodic radiographs for more severe cases and frequent client communication can help ensure successful outcomes for cats with lower and upper CaOx stone disease. EVIDENCE BASE: Limited evidence-based studies are published regarding management of feline upper and lower urinary tract CaOx stone disease, making this a difficult condition to manage in some cats. Studies designed to evaluate the relationship to dietary modifications, medical management, stress, obesity and surgical techniques are warranted in cats with upper and lower urinary tract CaOx stones.


MRI FEATURES OF CNS LYMPHOMA IN DOGS AND CATS.

The magnetic resonance (MR) imaging features of central nervous system lymphoma in eight dogs and four cats are described. Intracranial lesions affected the rostral tentorial structures in six dogs and caudal tentorial structures in two cats. Lesions affected the spinal cord in two dogs and in two cats. One dog and one cat with intracranial lymphoma had signs of local extracranial extension and lymphadenopathy. Lesions were considered extraparenchymal in four dogs and three cats, intraparenchymal in two dogs and one cat, and appeared to have both intra- and extraparenchymal components in two dogs. All lesions were hyperintense in T2-weighted images when compared to white matter, most were hypointense in T1-weighted images (7/12), and most were hyperintense in fluid-attenuated inversion recovery (FLAIR) images (5/9). When compared to grey matter, these lesions appear either isointense (5/12) or hyperintense (7/12) on T2-weighted images, half of them were hypointense in T1-weighted images (6/12), and most were isointense in FLAIR images (7/9). Lesion margins were usually indistinct in T2-weighted images (10/12) and had perilesional hyperintensity in FLAIR images (7/9). The majority of lesions (10/12) had abnormal meninges around the lesion and half (6/12) had generalized contrast enhancement. Mass effect was evident in all lesions.
Although not specific, when combined with the history and neurologic signs, MR features aid presumptive diagnosis that should be confirmed by cytology or histopathology.


Astaxanthin stimulates cell-mediated and humoral immune responses in cats.

Astaxanthin is a potent antioxidant carotenoid and may play a role in modulating immune response in cats. Blood was taken from female domestic shorthair cats (8-9mo old; 3.2+/−0.04kg body weight) fed 0, 1, 5 or 10mg astaxanthin daily for 12wk to assess peripheral blood mononuclear cell (PBMC) proliferation response, leukocyte subpopulations, natural killer (NK) cell cytotoxic activity, and plasma IgG and IgM concentration. Cutaneous delayed-type hypersensitivity (DTH) response against concanavalin A and an attenuated polyvalent vaccine was assessed on wk 8 (prior to vaccination) and 12 (post-vaccination). There was a dose-related increase in plasma astaxanthin concentrations, with maximum concentrations observed on wk 12. Dietary astaxanthin enhanced DTH response to both the specific (vaccine) and nonspecific (concanavalin A) antigens. In addition, cats fed astaxanthin had heightened PBMC proliferation and NK cell cytotoxic activity. The population of CD3(+) total T and CD4(+) T helper cells were also higher in astaxanthin-fed cats; however, no treatment difference was found with the CD8(+) T cytotoxic and MHC II(+) activated lymphocyte cell populations. Dietary astaxanthin increased concentrations of plasma IgG and IgM. Therefore, dietary astaxanthin heightened cell-mediated and humoral immune responses in cats.


A preliminary study of changes in tear film proteins in the feline eye following nictitating membrane removal.

Objective To investigate the influence of nictitating membrane (third eyelid) removal on selected proteins in feline tears. Animal studied Domestic short-haired cats (7-17 months; 2.6-5.2 kg) were used. Procedures Eye-flush tears were collected periodically for up to 18 weeks from both eyes of animals with nictitating membranes removed, but nictitating gland left intact, (n = 4) or with nictitating membranes intact (n = 4). Tear comparisons were based on total protein content (TPC) using micro bicinchoninic acid assay, immunoglobulin A (IgA), and matrix-metalloproteinase (MMP)-9 measurements using sandwich enzyme-linked immunosorbent assay (ELISA) and tear gelatinase activity using gelatin zymography. Expression of MMP-2 and -9 in nictitating membranes removed at baseline (week 0) and eyes collected at 18 weeks were also investigated in histological sections using immunoperoxidase for visualization. Results Nictitating membrane removal did not significantly change TPC and MMP-9 in tears within the first 4 weeks. MMP-9 was not detected by ELISA in tears from eyes without nictitating membranes from week 5 onwards. IgA (%IgA of TPC) data varied between animals. Gelatin zymography showed increased MMP-2 and -9 activity in tears from eyes without nictitating membranes at week 1 and a decrease following week 2 post-surgery. MMP-2 and -9 were immunolocalised to conjunctival goblet cells of removed nictitating membranes and to the conjunctival epithelium, respectively. After 18 weeks, the distribution of MMPs in tissue was comparable between eyes with and without nictitating membranes. Conclusions Based on this preliminary study, nictitating membrane removal appeared to cause long-term changes in expression of tear proteins, including reduced MMP-9 expression.
Estimation of the dietary nutrient profile of free-roaming feral cats: possible implications for nutrition of domestic cats.

Cats are strict carnivores and in the wild rely on a diet solely based on animal tissues to meet their specific and unique nutritional requirements. Although the feeding ecology of cats in the wild has been well documented in the literature, there is no information on the precise nutrient profile to which the cat’s metabolism has adapted. The present study aimed to derive the dietary nutrient profile of free-living cats. Studies reporting the feeding habits of cats in the wild were reviewed and data on the nutrient composition of the consumed prey items obtained from the literature. Fifty-five studies reported feeding strategy data of cats in the wild. After specific exclusion criteria, twenty-seven studies were used to derive thirty individual dietary nutrient profiles. The results show that feral cats are obligatory carnivores, with their daily energy intake from crude protein being 52%, from crude fat 46% and from N-free extract only 2%. Minerals and trace elements are consumed in relatively high concentrations compared with recommended allowances determined using empirical methods. The calculated nutrient profile may be considered the nutrient intake to which the cat’s metabolic system has adapted. The present study provides insight into the nutritive, as well as possible non-nutritive aspects of a natural diet of whole prey for cats and provides novel ways to further improve feline diets to increase health and longevity.


Epileptic brain damage in dogs and cats: myth or reality?


Controlled but pragmatic investigations of interventions for behavioural disturbances in dogs and cats.

Veterinarians are often directly involved in clinical studies or requested for information to help interpret their results. Therefore, it is reasonable to examine the reservoir of study methods. This article transfers methodological considerations from clinical research into veterinary medicine. The study question determines the appropriate study method. Recently a ten-step procedure was suggested for selection of appropriate study designs in humans. Based on this approach, a pragmatic study design was adapted to the conditions prevailing in interventional studies in dogs and cats with disturbed behaviour. The different concepts for clinical studies are introduced. Whether or not the design and the evaluation of pragmatic studies in dogs and cats with disturbed behaviour has been maintained and the prerequisites have thereby been fulfilled so that the obtained results are suitable to be applied under everyday conditions can be tested in eight steps. Using the pragmatic design the superiority of complex interventions can be investigated. The results of pragmatic studies help to substantiate a value judgement, i.e., the recommendation or rejection of a specific therapeutic intervention for a defined disease entity in a specific therapeutic setting. The goal of pragmatic studies is to obtain results appropriate for use in everyday situations. In conclusion, the suggested procedure is useful for the selection of the appropriate study designs for specific questions. This procedure is also suitable to test
whether the conclusions of published study results coincide with the chosen methods.


Evaluation of the effects of hospital visit stress on physiologic parameters in the cat.

Physiologic parameters such as blood pressure, rectal temperature, heart rate, and respiratory rate are an important part of the medical assessment of a patient. However, these factors can potentially be affected by stress. The purpose of this study was to compare physiologic parameter data gathered from cats in the home environment with those gathered in a veterinary hospital. Thirty healthy cats were evaluated both at home and at Colorado State University’s Veterinary Medical Center. Doppler systolic blood pressure, temperature, heart rate, and respiratory rate were recorded, and the differences between the values obtained in the home and veterinary clinic environments were evaluated using the Wilcoxon sign rank test. A significant difference was found in blood pressure, heart rate, and respiratory rate between the home and veterinary hospital environments. This information may help practitioners recognize that physiologic abnormalities can sometimes be due to transportation or environmental stress rather than medical illness.


The pharmacokinetics of mirtazapine in cats with chronic kidney disease and in age-matched control cats.

BACKGROUND: Cats with chronic kidney disease (CKD) often experience inappetence, and may benefit from administration of mirtazapine, an appetite stimulant. The pharmacokinetics of mirtazapine in CKD cats is unknown. HYPOTHESIS: CKD delays the clearance/bioavailability (CL/F) of mirtazapine. ANIMALS: Six CKD cats and 6 age-matched controls (AMC) were enrolled. Two CKD cats each from International Renal Interest Society (IRIS) stage II, III and IV were included. METHODS: Blood samples were collected before and 0.5, 1, 1.5, 2, 4, 8, 24, and 48 hours after a single PO dose of 1.88 mg of mirtazapine. Mirtazapine concentrations were measured by liquid chromatography coupled to tandem mass spectrometry. Non-compartmental pharmacokinetic modeling was performed. RESULTS: Mean age was 11 years (CKD cats) and 10.8 years (AMC cats). Mean serum creatinine concentration +/- standard deviation (SD) was 3.8 +/- 1.6 mg/dL (CKD) and 1.3 +/- 0.4 mg/dL (AMC). Mean half-life +/- SD was 15.2 +/- 4.2 hours (CKD) and 12.1 +/- 1.1 hours (AMC). Mean area under the curve (AUC) +/- SD was 770.6 +/- 225.5 ng/mL*hr (CKD) and 555.5 +/- 175.4 ng/mL*hr (AMC). Mean CL/F +/- SD was 0.6 +/- 0.1 L/hr/kg (CKD) and 0.8 +/- 0.16 L/hr/kg (AMC). A Mann-Whitney test indicated statistically significant differences in AUC (P = 0.01) and CL/F (P = 0.04) between groups. Calculated accumulation factor for 48-hour dosing in CKD cats was 1.15. CONCLUSION: CKD may delay the CL/F of mirtazapine. A single low dose of mirtazapine resulted in a half-life compatible with a 48-hour dosing interval in CKD cats.


Antibacterial prescribing patterns in small animal veterinary practice identified via SAVSNET: the small animal veterinary surveillance network.
In this study, data from veterinary clinical records were collected via the small animal veterinary surveillance network (SAVSNET). Over a three-month period, data were obtained from 22,859 consultations at 16 small animal practices in England and Wales: 69 per cent from dogs, 24 per cent from cats, 3 per cent from rabbits and 4 per cent from miscellaneous species. The proportion of consults where prescribing of antibacterials was identified was 35.1 per cent for dogs, 48.5 per cent for cats and 36.6 per cent for rabbits. Within this population, 76 per cent of antibacterials prescribed were beta-lactams, including the most common group of clavulanic acid-potentiated amoxicillin making up 36 per cent of the antibacterials prescribed. Other classes included lincosamides (9 per cent), fluoroquinolones and quinolones (6 per cent) and nitroimidazoles (4 per cent). Vancomycin and teicoplanin (glycopeptide class), and imipenem and meropenem (beta-lactam class) prescribing was not identified. Prescribing behaviour varied between practices. For dogs and cats, the proportion of consults associated with the prescription of antibacterials ranged from 0.26 to 0.55 and 0.41 to 0.73, respectively.


Beneficial cross-protection of allergen-specific immunotherapy on airway eosinophilia using unrelated or a partial repertoire of allergen(s) implicated in experimental feline asthma.

The study hypothesis was that in experimentally asthmatic cats rush immunotherapy (RIT) using allergens not completely matched with sensitizing allergen(s) would at least partially attenuate the asthmatic phenotype and modulate the aberrant immune response. In phase I, cats sensitized to Bermuda grass allergen (BGA), house dust mite allergen (HDMA) or placebo received BGA RIT. In phase II, cats dually sensitized to BGA and HDMA received RIT using BGA, HDMA or placebo. Efficacy of RIT was assessed using percentage bronchoalveolar lavage fluid (BALF) eosinophils. Additionally, a variety of immunologic assays were performed. Eosinophilic airway inflammation significantly decreased over time in asthmatic cats given RIT using sensitizing allergen or unrelated allergen (P<0.001). In dually sensitized cats, single allergen RIT but not placebo reduced airway eosinophilia (P=0.038). Differences in allergen-specific lymphocyte proliferation, in the number of IL-10 producing cells and in the percentage T regulatory cells were detected between asthmatic cats getting RIT and controls. Cross-protection manifested by reduced airway eosinophilia was noted in cats treated with RIT allergens which did not completely match allergen used in asthma induction. However, the mechanism of immunologic tolerance may differ when improperly matched allergens to the sensitizing allergens are used in RIT.


Advances in the understanding of pathogenesis, and diagnostics and therapeutics for feline allergic asthma.

Asthma is a common inflammatory disease of the lower airways and is believed to be of allergic etiology in cats. As little progress has been made in establishing rigorous criteria to differentiate it from other inflammatory lower airway diseases such as chronic bronchitis, descriptions of ‘asthma’ in the literature have often been inaccurate, grouping this syndrome with other feline airway diseases. With the development of more sensitive and specific diagnostics, it will become easier to distinguish asthma as a disease entity. Pulmonary function testing with bronchoprovocation/bronchodilator responsiveness
trials and biomarkers hold particular promise. Discrimination is of critical importance as targeted therapies for the allergic inflammatory cascade are developed and become available for therapeutic trials in pet cats.


Trichomonas foetus isolates from cats and cattle show minor genetic differences in unrelated loci ITS-2 and EF-1alpha

The protozoan parasite Trichomonas foetus is well known as an important causative agent of infertility and abortion in cattle (bovine trichomonosis). This World Organisation for Animal Health (O.I.E.) notifiable disease is thought to be under control in many countries including Switzerland. In recent studies, however, T. foetus has also been identified as an intestinal parasite that causes chronic large-bowel diarrhoea in cats. Since the feline isolates were considered indistinguishable from bovine isolates, the possibility and risk of parasite transmission from cats to cattle and vice versa has been intensively discussed in current literature. Therefore, we investigated if cat and cattle isolates are genetically distinct from each other or in fact represent identical genotypes. For this purpose, two independent genetic loci were selected that turned out to be well-suited for a PCR sequencing-based genotyping of trichomonad isolates: (i) previously published internal transcribed spacer region 2 (ITS-2) and (ii) a semi-conserved sequence stretch of the elongation factor-1 alpha (EF-1alpha) gene used for the first time in the present study. Respective comparative analyses revealed that both loci were sufficiently variable to allow unambiguous genetic discrimination between different trichomonad species. Comparison of both genetic loci confirmed that T. suis and T. mobilensis are phylogenetically very close to T. foetus. Moreover, these two genetic markers were suited to define host-specific genotypes of T. foetus. Both loci showed single base differences between cat and cattle isolates but showed full sequence identity within strains from either cat or cattle isolates. Furthermore, an additional PCR with a forward primer designed to specifically amplify the bovine sequence of EF-1alpha was able to discriminate bovine isolates of T. foetus from feline isolates and also from other trichomonads. The implications these minor genetic differences may have on the biological properties of the distinct isolates remain to be investigated.


Pharmacokinetics of oral ivabradine in healthy cats.

A liquid chromatography-tandem mass spectrometry (LC-MS/MS) analytical method for the measurement of the novel heart rate-lowering drug ivabradine and its major metabolite, S-18982, was cross-validated in the plasma of eight healthy cats. Plasma concentrations were then determined after single and repeated oral administration of ivabradine. Individual plasma concentrations versus time from each cat were used in compartmental analysis using the commercially available software WinNonlin. Both ivabradine and S-18982 reached their maximum concentrations of 103.33 and 3.86 ng/mL within 1 h. Following repeated administration, areas under the plasma concentration-time curves for ivabradine and S-18982 did not significantly increase. Two-compartmental and one-compartmental models with first-order input and elimination provided the best fit to the data for ivabradine and S-18982, respectively. Both models were combined to produce a single 4-compartment model
characterizing ivabradine and S-18982 pharmacokinetics. The results of this study indicate that repeated oral doses of ivabradine produced plasma drug concentrations suitable for 12-h dosing intervals in healthy cats. Furthermore, the analytical assay and combined ivabradine/S-18982 model provide tools for further evaluation of ivabradine pharmacokinetics and pharmacodynamics in future studies in cats.


The innate antiviral immune system of the cat: molecular tools for the measurement of its state of activation.

The innate immune system plays a central role in host defence against viruses. While many studies portray mechanisms in early antiviral immune responses of humans and mice, much remains to be discovered about these mechanisms in the cat. With the objective of shedding light on early host-virus interactions in felids, we have developed 12 real-time TaqMan(R) qPCR systems for feline genes relevant to innate responses to viral infection, including those encoding for various IFNalpha and IFNomega subtypes, IFNb, intracellular antiviral factor Mx, NK cell stimulator IL-15 and effectors perforin and granzyme B, as well as Toll-like receptors (TLRs) 3 and 8. Using these newly developed assays and others previously described, we measured the relative expression of selected markers at early time points after viral infection in vitro and in vivo. Feline embryonic fibroblasts (FEA) inoculated with feline leukemia virus (FeLV) indicated peak levels of IFNalpha, IFNbeta and Mx expression already 6h after infection. In contrast, Crandell-Rees feline kidney (CrFK) cells inoculated with feline herpes virus (FHV) responded to infection with high levels of IFNalpha and IFNb only after 24h, and no induction of Mx could be detected. In feline PBMCs challenged in vitro with feline immunodeficiency virus (FIV), maximal expression levels of IFNalpha, beta and omega subtype genes as well as IL-15 and TLRs 3, 7 and 8 were measured between 12 and 24h after infection, whereas expression levels of proinflammatory cytokine gene IL-6 were consistently downregulated until 48h post inoculation. A marginal upregulation of granzyme B was also observed within 3h after infection. In an in vivo experiment, cats challenged with FIV exhibited a 2.4-fold increase in IFNalpha expression in blood 1 week post infection. We furthermore demonstrate the possibility of stimulating feline immune cells in vitro with various immune response modifiers (IRM)s already known for their immunostimulatory properties in mice and humans, namely Poly IC, Resiquimod (R-848) and dSLIM, a synthetic oligonucleotide containing several unmethylated CpG motifs. Stimulation of feline PBMCs with dSLIM and R-848 effectively enhanced expression of IFNalpha within 12h by factors of 6 and 12, respectively, and Poly IC induced an increase in Mx mRNA expression of 28-fold. Altogether, we describe new molecular tools and their successful use for the characterization of innate immune responses against viruses in the cat and provide evidence that feline cells can be stimulated by synthetic molecules to enhance their antiviral defence mechanisms.

Rochereau, P., and A. Bernarde (2011) Vet Comp Orthop Traumatol 25


This retrospective study documents deep gluteal tenodesis (DGT) used to stabilize coxo- femoral
luxation (CFL) in dogs and cats, and to report reluxation 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. Reluxation 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. Reluxation 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.


Symptomatic Capillaria plica infection in a young European cat.

An 8-month-old owned European cat showing abdominal pain, fever, distended painful bladder and urinary blockage was presented. Intravenous fluids were immediately administered and, after sedation, a urinary catheter was applied. Blood and urine analysis revealed cystitis and a moderate-to-severe degree of renal failure. About 20 thread-like nematodes, identified as Capillaria plica larvae and fragments of adult stages, were found in the urine sediment. After treatment with an oral formulation of fenbendazole at 25 mg/kg q 12 h for 10 days, urinary signs and bladder worms disappeared. Cases of Capillaria species bladder worms in cats are rarely reported and most infected cats show no clinical signs, presumably because of a low parasite burden. In the present study, feline capillariosis was associated to urethral obstruction, severe difficulties in urination, cystitis and renal failures.


First clinical case of cutaneous leishmaniasis due to Leishmania (Viannia) braziliensis in a domestic cat from French Guiana.

We report the first case of natural infection of a domestic female cat (Felis catus) by Leishmania (Viannia) braziliensis in French Guiana. The infected animal had a cutaneous ulcer on the nose and nodules of different sizes in the ears. The diagnosis was confirmed by molecular analysis of cutaneous samples that detected the presence of Leishmania parasites and allowed identifying the Leishmania (Viannia) braziliensis species. The discovery of a cat infected by L. (V.) braziliensis suggests the possibility that cats could be potential secondary reservoirs of Leishmania parasites in French Guiana. Thus, it would be important to investigate the possible epidemiological role of domestic cats in domestic foci of Leishmania in this region.

The effect of boric acid on bacterial culture of canine and feline urine.

OBJECTIVE: To identify the optimal method of submission of canine and feline urine for bacterial culture. METHODS: Cystocentesis samples from 250 animals (200 dogs, 50 cats) suspected of having urinary tract infections were collected. The reference aliquot, without preservative, was processed on site within 2 hours. Two further aliquots (one without preservative, one with boric acid) were stored at room temperature for up to 7 hours and then posted by guaranteed next day delivery to a commercial laboratory for analysis. RESULTS: Forty-seven of the samples were positive on culture in the reference test. There was no significant difference between reference test results and those of samples posted without preservative (P=0.39), but samples posted in boric acid were significantly less likely to give a positive result (P=0.01). Samples posted without preservative had a sensitivity of 82% and a specificity of 98%; for boric acid, sensitivity was 73% and specificity 99%. CLINICAL SIGNIFICANCE: Postal urine samples should be submitted to the laboratory in a plain sterile tube.


Genome of Mycoplasma haemofelis, unraveling its strategies for survival and persistence.

ABSTRACT: Mycoplasma haemofelis is a mycoplasmal pathogen (hemoplasma) that attaches to the host’s erythrocytes. Distributed worldwide, it has a significant impact on the health of cats causing acute disease and, despite treatment, establishing chronic infection. It might also have a role as a zoonotic agent, especially in immunocompromised patients. Whole genome sequencing and analyses of M. haemofelis strain Ohio2 was undertaken as a step toward understanding its survival and persistence. Metabolic pathways are reduced, relying on the host to supply many of the nutrients and metabolites needed for survival. M. haemofelis must import glucose for ATP generation and ribose derivates for RNA/DNA synthesis. Hypoxanthine, adenine, guanine, uracil and CMP are scavenged from the environment to support purine and pyrimidine synthesis. In addition, nicotinamide, amino acids and any vitamins needed for growth, must be acquired from its environment. The core proteome of M. haemofelis contains an abundance of paralogous gene families, corresponding to 70.6% of all the CDSs. This “paralog pool” is a rich source of different antigenic epitopes that can be varied to elude the host’s immune system and establish chronic infection. M. haemofelis also appears to be capable of phase variation, which is particularly relevant to the cyclic bacteremia and persistence, characteristics of the infection in the cat. The data generated herein should be of great use for understanding the mechanisms of M. haemofelis infection. Further, it will provide new insights into its pathogenicity and clues needed to formulate media to support the in vitro cultivation of M. haemofelis.


The in vitro effects of proxymetacaine, fluorescein, and fusidic acid on real-time PCR assays used for the diagnosis of Feline herpesvirus 1 and Chlamyphila felis infections.

PURPOSE: To investigate the possible inhibition of qPCR assays used for the diagnosis of ocular infections in cats by proxymetacaine, fluorescein, and fusidic acid, which are commonly used in veterinary ophthalmology. METHODS: Fluorescein, proxymetacaine, and fusidic acid were tested for possible inhibition of a triplex qPCR assay designed to detect Chlamyphila felis, Feline herpesvirus
1 (FHV-1), and the feline 28S ribosomal DNA (28S rDNA) gene by comparing threshold cycle (C(t)) values of samples with and without the three products. A second experiment was carried out to measure the effects of various dilutions of fusidic acid. RESULTS: No statistically significant differences were detected between the C. felis, FHV-1, and 28S rDNA C(t) values with and without proxymetacaine or fluorescein. However, there was a statistically significant increase in FHV-1 (P < 0.01), C. felis (P < 0.01), and 28S rDNA (P < 0.05) C(t) values when fusidic acid was used. When dilutions of fusidic acid were tested, the results revealed that only the 1:2 dilution caused a statistically significant increase (P < 0.01) in the FHV-1 Ct values. CONCLUSION: Proxymetacaine and fluorescein did not interfere with our qPCR assays for the detection of C. felis and FHV-1. The presence of fusidic acid caused a small inhibitory effect of doubtful clinical significance. In vivo studies are required to establish the clinical relevance of this study and to confirm our findings.


Bacterial and fungal colonisation of peripheral intravenous catheters in dogs and cats.

OBJECTIVES: The purposes of this study were to determine the prevalence of intravenous catheter colonisation in a routine clinical setting, to identify pathogens involved and to explore factors associated with an increased risk of colonisation. METHODS: A prospective study of 100 peripherally placed intravenous catheters from 13 cats and 78 dogs was conducted. The distal two-thirds were removed and submitted for bacterial and fungal cultures. Antimicrobial susceptibility of each isolate was determined. RESULTS: Nineteen peripheral catheters were positive for microbiologic culture from 14 animals. Twenty organisms were isolated among which Staphylococcus species was the most common. Isolates displayed lower levels of resistance against the antimicrobial agents amoxicillin-clavulanate, cephalosporins and gentamicin than against other agents tested. Major risk factors predisposing to catheter-related colonisation included dextrose infusion, duration of catheter placement, local complications and immunosuppressive diseases or drugs. CLINICAL SIGNIFICANCE: In a routine clinical setting, the prevalence of microbial colonisation of peripheral intravenous catheters is comparable to that found in an intensive care unit. However, consequences on morbidity and mortality rates differ.


PREVALENCE OF CLINICAL AND SUBCLINICAL MIDDLE EAR DISEASE IN CATS UNDERGOING COMPUTED TOMOGRAPHIC SCANS OF THE HEAD.

Three hundred and ten cats that had CT imaging of the head between January 2000 and December 2007 were evaluated retrospectively. Data that were recorded included signalment, presenting complaint, clinical signs, presence of upper respiratory tract disease, and CT findings. One hundred and one cats had evidence of middle ear disease on CT. Thirty-four of the 101 cats (34%) did not have a primary complaint of ear-related disease, clinical signs or physical findings consistent with ear disease, suggesting that the middle ear disease was subclinical. Twenty-seven of the 34 cats (79%) had concurrent nasal disease. Middle ear lesions were chronic in appearance. With the exception of tympanic bulla lysis, CT findings were similar in cats presenting with primary aural disease versus cats with presumptive subclinical middle ear disease. The majority of the cats did not return for treatment of the identified middle ear abnormalities. Subclinical middle ear disease is relatively frequent in cats undergoing CT imaging of the head. Few cats required subsequent treatment for ear disease although
follow up was limited. Identification of subclinical middle ear abnormalities on CT should prompt acquisition of a detailed patient history and bilateral otoscopic examination.


Detection of Chlamydomphila pneumoniae in cats with conjunctivitis.

OBJECTIVE: To determine the presence of chlamydial species including recently described chlamydial agents as well as the human pathogen Chlamydomphila pneumoniae in feline conjunctivitis. ANIMAL STUDIED: Twenty five cats without and 49 cats with conjunctivitis were tested for chlamydia using a Chlamydiaceae real time (RT) PCR (targeting the 23S rRNA gene sequence), a Chlamydiales PCR (targeting the 16S rRNA gene sequence), and cell culture. The PCR products of all positive samples were sequenced and subsequently analyzed using a basic local alignment search tool search. RESULTS: Chlamydiaceae RT PCR and subsequent sequence analyses identified C. pneumoniae in five cats in the conjunctivitis group. The presence of Chlamydomphila felis was shown in two cats with conjunctivitis. Chlamydiae related to uncultured members of Chlamydiales were detected in three conjunctivitis cases and in one cat without clinical symptoms. CONCLUSION: This study detects for the first time, the known human pathogen C. pneumoniae in feline conjunctivitis cases using Chlamydiaceae RT PCR and sequence analyses.


The effect of dorzolamide 2% on circadian intraocular pressure in cats with primary congenital glaucoma.

OBJECTIVE: To determine the extent of fluctuation in circadian intraocular pressure (IOP) and the efficacy of topical dorzolamide 2% q 8 h in lowering IOP and blunting circadian fluctuation in IOP in glaucomatous cats. ANIMALS STUDIED: Seven adult cats with primary congenital glaucoma (PCG). PROCEDURES: Measurements of IOP and pupil diameter were obtained for both eyes (OU) of each cat q 4 h for 12 days. Cats were housed in a laboratory animal facility with a 12-h light:dark cycle. Baseline values were established for 2 days. For the next 5 days, placebo (1.4% polyvinyl alcohol) was administered OU q 8 h. Dorzolamide 2% was then administered OU q 8 h for a further 5 days. A multivariate mixed linear model was fitted to the data, with parameters estimated from a Bayesian perspective. The 4 am time point was selected as the reference for the purposes of comparisons. RESULTS: Estimated mean IOP for the reference time point pre-treatment was symmetric (about 33 mmHg OU). In all cats, IOP was significantly lower during the diurnal phase, relative to the 4 am measurements, with highest IOP observed 2-6 h after the onset of the dark phase. Circadian fluctuations in IOP were dampened during the treatment period. There was a significant decrease in IOP in all cats during the dorzolamide treatment period (estimated mean for the treatment period reference = 17.9 mmHg OU). CONCLUSIONS: Topical dorzolamide 2% q 8 h is effective in reducing IOP and IOP fluctuation in cats with PCG.

**Rickettsia felis and Bartonella spp. in Fleas from Cats in Albania.**

Abstract 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.


**Linear-circular external skeletal fixation of intra-condylar humeral fractures with supracondylar comminution in four cats.**

Objectives: Intra-condylar humeral fracture with supracondylar comminution in cats is rare, and the stabilisation for such fractures is challenging. The purpose of our study was to describe the use of a hybrid external skeletal fixator, and to report the complications and outcomes of this surgical technique. Methods: A retrospective review was performed of clinical, radiographic and surgical records of all cats with intra-condylar humeral fractures and non-reconstructable supracondylar comminution stabilized by linear-circular external skeletal fixator in two institutions between January 2005 and March 2010. Results: Four cats met the inclusion criteria of the study. All cases achieved fracture union and clinical outcome was considered excellent at the time of the final assessment (11 - 24 weeks). Clinical significance: This study demonstrates that a linear-circular fixator system can be used successfully in the management of intra-condylar humeral fractures with non-reconstructable supracondylar comminution in cats.


**Buprenorphine in combination with naloxone at a ratio of 15:1 does not enhance antinociception from buprenorphine in healthy cats.**

Naloxone can enhance the antinociceptive/analgesic effects of buprenorphine in humans and rats. The antinociceptive effects of a patented 15:1 buprenorphine:naloxone combination was investigated in cats using a thermal and mechanical nociceptive model. Twelve cats received buprenorphine 10μg/kg, naloxone 0.67μg/kg or a buprenorphine-naloxone combination intramuscularly in a randomised cross over study. Using thermal and mechanical analgesiometry validated in the cat, pre-treatment baselines were measured. Following test drug administration, thresholds were studied for the next 24h. Naloxone did not enhance the thermal antinociceptive effect of buprenorphine. The results from this study are in agreement with previously published work showing that naloxone antagonises the effects of clinically analgesic doses of buprenorphine. Mechanical nociceptive thresholds were not affected by buprenorphine.
Management of complications associated with total ear canal ablation and bulla osteotomy in dogs and cats.

Total ear canal ablation combined with bulla osteotomy is a salvage procedure recommended primarily for end-stage inflammatory ear canal disease but also for neoplasia and severe traumatic injuries. Due to the complexity of the procedure and the poor exposure associated with the surgical approach, there is significant risk for a variety of complications. This review discusses intraoperative, early postoperative, and late postoperative complications reported in large retrospective studies, the causes for these complications, and recommendations about how to prevent them.

Development and evaluation of a real-time polymerase chain reaction method for the detection of Mycoplasma felis.

Infection by Mycoplasma felis is associated with ocular and respiratory disease in cats and respiratory disease in horses. A correct diagnosis is beneficial since the use of specific antimycoplasmal treatment can lead to resolution. The objective of the present study was to develop a real-time polymerase chain reaction (PCR) method based on dual-labeled fluorogenic probe technology, targeting the gene encoding elongation factor Tu (tuf), for the fast and specific detection of M. felis. Specificity was achieved by basing the assay design on partial sequencing of the tuf gene in strains and clinical isolates of M. felis as well as other mycoplasma species. The detection limit of the developed assay was in the order of 10 copies of target DNA, and no cross-reaction was observed with a panel of several mycoplasma species. Compared to a previously published conventional PCR protocol, the novel assay had equal or slightly improved performance in terms of sensitivity and specificity when analyzing 100 conjunctival swab samples from cats with clinical signs of infection.

Babesiosis in dogs and cats--expanding parasitological and clinical spectra.

Canine babesiosis caused by different Babesia species is a protozoal tick-borne disease with worldwide distribution and global significance. Historically, Babesia infection in dogs was identified based on the morphologic appearance of the parasite in the erythrocyte. All large forms of Babesia were designated Babesia canis, whereas all small forms of Babesia were considered to be Babesia gibsoni. However, the development of molecular methods has demonstrated that other Babesia species such as Babesia conradae, Babesia microti like piroplasm, Theileria spp. and a yet unnamed large form Babesia spp. infect dogs and cause distinct diseases. Babesia rossi, B. canis and Babesia vogeli previously considered as subspecies are identical morphologically but differ in the severity of clinical manifestations which they induce, their tick vectors, genetic characteristics, and geographic distributions, and are therefore currently considered separate species. The geographic distribution of the causative agent and thus the occurrence of babesiosis are largely dependent on the habitat of relevant tick vector species, with the exception of B. gibsoni where evidence for dog to dog transmission...
indicates that infection can be transmitted among fighting dog breeds independently of the limitations of vector tick infestation. Knowledge of the prevalence and clinicopathological aspects of Babesia species infecting dogs around the world is of epidemiologic and medical interest. Babesiosis in domestic cats is less common and has mostly been reported from South Africa where infection is mainly due to Babesia felis, a small Babesia that causes anemia and icterus. In addition, Babesia cati was reported from India and sporadic cases of B. canis infection in domestic cats have been reported in Europe, B. canis presentii in Israel and B. vogeli in Thailand. Babesiosis caused by large Babesia spp. is commonly treated with imidocarb dipropionate with good clinical response while small Babesia spp. are more resistant to anti-babesial therapy. Clinical and parasitological cure are often not achieved in the treatment of small Babesia species infections and clinical relapses are frequent. The spectrum of Babesia pathogens that infect dogs and cats is gradually being elucidated with the aid of molecular techniques and meticulous clinical investigation. Accurate detection and species recognition are important for the selection of the correct therapy and prediction of the course of disease.


Interspecies transmission of the canine influenza H3N2 virus to domestic cats in South Korea, 2010.

In the past 4 years, incidences of endemic or epidemic respiratory diseases associated with canine influenza H3N2 virus in Asian dogs have been reported in countries such as South Korea and China. Canine species were considered to be the new natural hosts for this virus. However, at the beginning of 2010, influenza-like respiratory signs, such as dyspnoea, were also observed among cats as well as in dogs in an animal shelter located in Seoul, South Korea. The affected cats showed 100 % morbidity and 40 % mortality. We were able to isolate a virus from a lung specimen of a dead cat, which had suffered from the respiratory disease, in embryonated-chicken eggs. The eight viral genes isolated were almost identical to those of the canine influenza H3N2 virus, suggesting interspecies transmission of canine influenza H3N2 virus to the cat. Moreover, three domestic cats infected with intranasal canine/Korea/GCVP01/07 (H3N2) all showed elevated rectal temperatures, nasal virus shedding and severe pulmonary lesions, such as suppurative bronchopneumonia. Our study shows, for the first time, that cats are susceptible to canine influenza H3N2 infection, suggesting that cats may play an intermediate host role in transmitting the H3N2 virus among feline and canine species, which could lead to the endemic establishment of the virus in companion animals. Such a scenario raises a public health concern, as the possibility of the emergence of new recombinant feline or canine influenza viruses in companion animals with the potential to act as a zoonotic infection cannot be excluded.


Chlamydia in canine or feline coronary arteriosclerotic lesions.

ABSTRACT: BACKGROUND: There are numerous reports linking Chlamydia infection to human coronary atherosclerosis. However, there is a lack of data regarding this correlation in dogs and cats, and there are no reports investigating coronary arteriosclerosis and Chlamydia in these species. The aim of the present study was to examine whether there is a correlation between canine and feline
spontaneous atherosclerosis or arteriosclerosis and the presence of Chlamydia. Archived histopathological samples of dogs (n = 16) and cats (n = 13) with findings of atherosclerosis or arteriosclerosis in heart tissue were examined for the presence of Chlamydiaceae using real-time PCR, ArrayTube Microarray and immunohistochemistry. Additionally, arteriosclerotic lesions of all cases were histologically classified and graded. RESULTS: Both canine atherosclerotic cases, and all 14 canine arteriosclerotic cases were negative for Chlamydia. Only one of the 13 arteriosclerotic feline cases was positive for Chlamydia by real-time PCR, revealing C. abortus by ArrayTube Microarray. To our knowledge, this is the first description of C. abortus in a cat. Overall, the type and grade of canine and feline arteriosclerotic lesions revealed similarities, and were predominantly moderate and hyperplastic. CONCLUSIONS: These findings suggest that there is no obvious correlation between canine and feline coronary arteriosclerosis and the presence of Chlamydia. In order to draw final conclusions about the correlation between Chlamydia and canine atherosclerosis, examination of more samples is required.


Electrochemotherapy with cisplatin enhances local control after surgical ablation of fibrosarcoma in cats: an approach to improve the therapeutic index of highly toxic chemotherapy drugs.

BACKGROUND: Cancer is one of the most difficult current health challenges, being responsible for millions of deaths yearly. Systemic chemotherapy is the most common therapeutic approach, and the prevailing orientation calls for the administration of the maximum tolerated dose; however, considerable limitations exist including toxicities to healthy tissues and low achievable drug concentrations at tumor sites. Electrochemotherapy (ECT) is a tumor treatment that combines the systemic or local delivery of anticancer drugs with the application of permeabilizing electric pulses. In this article we evaluate the capability of ECT to allow the use of cisplatin despite its high toxicity in a spontaneous feline model of soft tissue sarcoma. METHODS: A cohort of sixty-four cats with incompletely excised sarcomas were treated with cisplatin-based adjuvant ECT and monitored for side effects. Their response was compared to that of fourteen cats treated with surgery alone. RESULTS: The toxicities were minimal and mostly treated symptomatically. ECT resulted in increased local control (median not reached at the time of writing) with a mean time to recurrence of 666 days versus 180 of controls. CONCLUSIONS: We conclude that ECT is a safe and efficacious therapy for solid tumors; its use may be considered as part of strategies for the reintroduction of drugs with a narrow therapeutic index in the clinical protocols.


Use of an inguinal approach adapted from equine surgery for cryptorchidectomy in dogs and cats: 26 cases (1999-2010).

OBJECTIVE-To determine whether a surgical technique used in cryptorchid horses can be used successfully to remove testicles retained in the inguinal region or abdominal cavity in dogs and cats. DESIGN-Retrospective case series. ANIMALS-22 dogs and 4 cats with cryptorchidism. PROCEDURES-In 1999 through 2010, 26 cryptorchid patients underwent surgery during which an incision was made over the inguinal ring and the undescended testicle was located for removal via
identification of the vaginal process and the embryonic gubernaculum. Castration was performed once a testicle was located in the inguinal region or via removal of an intra-abominally located testicle through the inguinal canal. RESULTS-4 dogs and 1 cat were bilaterally cryptorchid. Testicles were retained in the abdominal cavity in 18 dogs and in the inguinal region in 4 dogs; in all 4 cats, undescended testicles were located in the inguinal region. Twenty-one dogs and 4 cats were castrated without breaching the abdominal cavity; in one of those dogs, the inguinal ring was enlarged to permit extraction of a tumorous testicle. In 1 dog, the inguinal ring was enlarged into a paramedian laparotomy and viscera were manipulated to exteriorize an intra-abdominally located testicle because the gubernaculum had ruptured. Major intraoperative or long-term complications did not occur. CONCLUSIONS AND CLINICAL RELEVANCE-Results suggested that as in horses, the surgical approach over the inguinal ring, wherein the vaginal process and the remnant of the gubernaculum are identified and used to locate an undescended testicle for removal, can be used successfully in dogs and cats.


**Are endogenous feline leukemia viruses really endogenous?**

Full length endogenous feline leukemia virus (FeLV) proviruses exist within the genomes of many breeds of domestic cat raising the possibility that they may also exist in a transmissible exogenous form. Such viruses would share receptor usage with the recombinant FeLV-B subgroup, a viral subgroup that arises in vivo by recombination between exogenous subgroup A virus (FeLV-A) and endogenous FeLV. Accordingly, all isolates of FeLV-B made to date have contained a “helper” FeLV-A, consistent with their recombinatorial origin. In order to assess whether endogenous viruses are transmitted between cats, we examined primary isolates of FeLV for which the viral subgroup had been determined for the presence of a subgroup B virus that lacked an FeLV-A. Here we describe the identification of two primary field isolates of FeLV (2518 and 4314) that appeared to contain subgroup B virus only by classical interference assays, raising the possibility of between-host transmission of endogenous FeLV. Sequencing of the env gene and U3 region of the 3’ long terminal repeat (LTR) confirmed that both viral genomes contained endogenous viral env genes. However the viral 3’ LTRs appeared exogenous in origin with a putative 3’ recombination breakpoint residing at the 3’ end of the env gene. Further, the FeLV-2518 virions also co-packaged a truncated FeLV-A genome containing a defective env gene, termed FeLV-2518(A) whilst no helper subgroup A viral genome was detected in virions of FeLV-4314. The acquisition of an exogenous LTR by the endogenous FeLV in 4314 may have allowed a recombinant FeLV variant to outgrow an exogenous FeLV-A virus that was presumably present during first infection. Given time, a similar evolution may also occur within the 2518 isolate. The data suggest that endogenous FeLVs may be mobilised by acquisition of exogenous LTRs yielding novel viruses that type biologically as FeLV-B.


**Bartonellosis in cats: a role in uveitis?**

Bartonellosis has been widely studied in human and veterinary medicine over the past two decades. Despite this fact, it remains an enigmatic disease in many ways. The causative bacteria, Bartonella spp, are transmitted to cats by fleas and thus the prevalence in cat populations, particularly in temperate climates, is high. Most cats, whether infected naturally or experimentally, remain asymptomatic. Thus,
correlating the presence of the organism to clinical disease, including uveitis, in cats has been difficult. This review summarizes what is known of the transmission and pathogenesis of Bartonella spp in cats, the possible role of the organism in feline ocular disease, as well methods of diagnosis and treatment.


**Safety and palatability of polyethylene glycol 3350 as an oral laxative in cats.**

Recurrent constipation is a common problem in cats. Laxatives often are the cornerstone for management of recurrent constipation; however, there is a paucity of published research on laxative use in cats. This study investigated the safety and palatability of polyethylene glycol (PEG3350) in normal cats. All cats consumed the PEG3350 laxative for 4 weeks without changes in weight or food intake. In all cats soft stools were achieved. Effective doses varied widely in experimental cats, so individualized dosing is important. Mild, non-clinical hyperkalemia was noted although the cause is unknown.


**Isolation and partial characterization of Brazilian samples of feline immunodeficiency virus.**

Feline immunodeficiency virus (FIV) causes a slow progressive degeneration of the immune system which eventually leads to a disease comparable to acquired immune deficiency syndrome (AIDS) in humans. FIV has extensive sequence variation, a typical feature of lentiviruses. Sequence analysis showed that diversity was not evenly distributed throughout the genome, but was greatest in the envelope gene, env. The virus enters host cells via a sequential interaction, initiated by the envelope glycoprotein (env) binding the primary receptor molecule CD134 and followed by a subsequent interaction with chemokine co-receptor CXCR4. The purpose of this study was to isolate and characterize isolates of FIV from an open shelter in Sao Paulo, Brazil. The separated PBMC from 11 positive cats were co-cultured with MYA-1 cells. Full-length viral env glycoprotein genes were amplified and determined. Chimeric feline x human CD134 receptors were used to investigate the receptor utilization of 17 clones from Brazilian isolates of FIV. Analyses of the sequence present of molecular clones showed that all clones grouped within subtype B. In contrast to the virulent primary isolate FIV-GL8, expression of the first cysteine-rich domain (CRD1) of feline CD134 in the context of human CD134 was sufficient for optimal receptor function for all Brazilian FIV isolates tested.


**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.


**Radiographic diameter of the colon in normal and constipated cats and in cats with megacolon.**

Radiographs of 50 cats with no history of gastrointestinal disease were evaluated to establish a normal reference range for radiographic diameter of the feline colon. Thirteen cats with constipation and 26 with megacolon were also evaluated and compared with the normal cats to characterize the accuracy of the reference range and to identify a cutoff to distinguish constipation from megacolon. A ratio of maximal diameter of the colon to L5 length was the most repeatable and accurate measurement. A ratio <1.28 is a strong indicator of a normal colon (sensitivity 96%, specificity 87%). A value >1.48 is a good indicator of megacolon (sensitivity 77%, specificity 85%).


**Parotid salivary duct sialocele associated with glandular duct stenosis in a cat.**

Feline parotid salivary duct sialocele is an uncommon disorder that has been previously reported in association with traumatic rupture of the duct in only two cats. Both cases were successfully treated by proximal duct ligation. We describe the successful surgical treatment of a parotid duct sialocele, secondary to spontaneous salivary duct stenosis, in an adult domestic shorthair cat. The cat was referred for assessment of a recurrent fluid-filled swelling on the left side of the face. Cytology of the aspirated fluid was consistent with serous saliva. The anatomical localisation of the lesion and the nature of the fluid were indicative of parotid gland/duct involvement. Retrograde sialography by parotid duct cannulation was unsuccessful because the left parotid duct opening was stenosed and obstructed by scar tissue. Surgical exploration revealed a parotid salivary duct sialocele, which was completely removed along with the parotid gland without complications.

Propionate absorbed from the colon acts as gluconeogenic substrate in a strict carnivore, the domestic cat (Felis catus).

In six normal-weight and six obese cats, the metabolic effect of propionate absorbed from the colon was assessed. Two colonic infusions were tested in a crossover design with intervals of 4 weeks. The test solution contained 4 mmol sodium propionate per kg ideal body weight in a 0.2% NaCl solution. Normal saline was given as control solution. Solutions were infused into the hindgut over 30 min. Blood samples were obtained prior to and at various time points after starting the infusion. As body condition did not affect evaluated parameters, all data were pooled. Plasma glucose concentrations showed differences neither over time nor during or after infusion with propionate or control. Plasma amino acid concentrations rose over time (p < 0.001), but were similar for both infusions. Plasma propionylcarnitine rose markedly towards the end of the propionate infusion and decreased afterwards (p < 0.001), whereas 3-hydroxy-3-methylglutaryl carnitine was lower 30 (p = 0.005) and 60 min (p = 0.032) after ending propionate infusions and acetylcarnitine tended to fall at the same time points (p = 0.079; p = 0.080), suggesting inhibition of gluconeogenesis from pyruvate and amino acids, but initiation of propionate-induced gluconeogenesis. In conclusion, propionate absorbed from the colon is hypothesized to act as gluconeogenic substrate, regardless of the cat’s body condition.


Gabapentin as part of multi-modal analgesia in two cats suffering multiple injuries.


Clinical use of cyclosporine as an adjunctive therapy in the management of feline idiopathic pure red cell aplasia.

The clinical use of cyclosporine is described in a group of client-owned cats diagnosed with idiopathic pure red cell aplasia (PRCA). All 10 cats were treated with combinations of glucocorticoids and cyclosporine. Of the 10 cats, the eight for which follow-up data was available achieved and maintained remission for a median of 31 and 406 days, respectively. Therapy was reduced or discontinued in 7/8 cats; 2/7 maintained remission off therapy and 5/7 cats relapsed. Remission was reinduced in four cats, with 3/4 cats maintained long-term on low dose therapy. Adverse effects associated with cyclosporine therapy were responsive to dose reduction or drug withdrawal. Feline idiopathic PRCA was responsive to combination immunosuppressive therapy with glucocorticoids and cyclosporine. Relapse was common, particularly after drug discontinuation; therefore, most cats required maintenance long-term low dose therapy.


Evaluation of predictors for the diagnosis of hyperthyroidism in cats.

BACKGROUND: In humans, subclinical hyperthyroidism is diagnosed when serum thyroid hormone concentrations are within the reference range but thyroid stimulating hormone (TSH) concentration is subnormal. In a previous study, a higher prevalence of thyroid nodular disease was found in euthyroid geriatric cats with undetectable TSH (<0.03 ng/mL) compared to those with detectable TSH
concentrations, suggesting subclinical hyperthyroidism might also exist in cats. HYPOTHESIS: Euthyroid cats with undetectable TSH concentrations have subclinical hyperthyroidism and may subsequently develop overt signs of hyperthyroidism. ANIMALS: One-hundred four client-owned cats. METHODS: In this prospective cohort study, euthyroid geriatric (>9 years) cats were recruited during routine health checks. Plasma biochemistry was performed at baseline and every 6 months thereafter. Total thyroxine and TSH concentrations were determined annually. Short-term follow-up data (within 14 months of recruitment) were used to detect variables at entry that were predictive of the diagnosis of hyperthyroidism, using univariable analysis followed by multivariable logistic regression analysis. Log rank analysis was used to test the association of initial TSH concentration with diagnosis of hyperthyroidism during the total available follow-up. RESULTS AND CONCLUSIONS: Median (range) follow-up was 26 (0-54) months and annual incidence of hyperthyroidism during the study was 7.4%. Cats that became hyperthyroid within 14 months had higher ALKP activity (P = 0.02) and higher prevalence of goiter (P = .03) at baseline than controls. Cats with undetectable TSH at baseline (29/104; 28%) were significantly (P <.001) more likely to be diagnosed with hyperthyroidism. However, not all cats with undetectable TSH became hyperthyroid during the study.


5-lipoxygenase expression and tepoxalin-induced cell death in squamous cell carcinomas in cats.

OBJECTIVE: To assess expression pattern and subcellular compartmentalization of 5-lipoxygenase in cutaneous, UV radiation-induced, and oral squamous cell carcinomas (SCCs) in cats and determine the effects of cyclooxygenase or 5-lipoxygenase inhibition on proliferation or apoptosis in a feline oral squamous cell carcinoma (SCCF1) cell line. SAMPLE: 60 archived paraffin-embedded samples of SCCs from 60 cats and SCCF1 cells. PROCEDURES: Retrospective immunohistochemical analysis of the archived samples of SCCs (20 cutaneous, 20 UV radiation-induced, and 20 oral tumors) was performed. Cell culture proliferation assays involving SCCF1 cells were performed, and tepoxalin-induced apoptosis and signaling were examined via western blotting and annexin V staining. RESULTS: Immunohistochemically, staining for 5-lipoxygenase was most frequently of greatest intensity in oral SCCs, whereas staining of cutaneous and UV radiation-induced lesions had less consistent 5-lipoxygenase expression. Exposure of SCCF1 cells to the 5-lipoxygenase inhibitor tepoxalin resulted in apoptosis; the effect appeared to be mediated via alteration of cell signaling rather than via suppression of lipid mediators that are typically produced as a result of 5-lipoxygenase activity. CONCLUSIONS AND CLINICAL RELEVANCE: In cats, expression of 5-lipoxygenase in SCCs appeared to differ depending on tumor location. The influence of tepoxalin-induced 5-lipoxygenase inhibition on a 5-lipoxygenase-expressing cell line coupled with the notable expression of 5-lipoxygenase in oral SCCs suggested that 5-lipoxygenase inhibition may have therapeutic benefits in affected cats. Although the safety of tepoxalin in cats has yet to be investigated, 5-lipoxygenase inhibitors should be evaluated for use as a potential treatment for SCCs in that species.


Heterogeneity and phylogenetic relationships of community-associated methicillin-sensitive/resistant Staphylococcus aureus isolates in healthy dogs, cats and their owners.

Aims: To investigate the distribution of staphylococcal enterotoxin genes (se) and the molecular features of community-associated methicillin-sensitive/resistant Staphylococcus aureus (CA-
MSSA/MRSA) isolates in the nostrils of healthy pets and their owners. Methods and Results: A total of 114 Staph. aureus isolates were identified from 1563 nasal swab samples, and CA-MRSA accounted for 20.2% (n = 23) of the total identified isolates. CA-MRSA isolates (91.3%, 21/23) harboured higher percentage of se than did CA-MSSA isolates (58.2%, 53/91) (P < 0.01), and the two highest se profiles of CA-MRSA were seb-sek-seq (42.9%, 9/21) and seb-sek-seq-sep (28.6%, 6/21). Of the MSSAs, 42.8% (39/91) were resistant to at least one antimicrobial drug and 8.8% (8/91) were multidrug resistant (MDR). We identified nine staphylococcal coagulase (SC) types (I-VIII and X) and three multilocus sequence types (ST59-MRSA-IV/V, ST239-MRSA-V, and ST241-MRSA-V). SC VII (23.4%, 22/94), a staphylococcal food poisoning isolate found mainly in Japan, and ST59-MRSA-IV/V (85%, 17/20), a widespread CA-MRSA clone found mainly in Taiwan, both were the most predominant types. Phylogenetic analysis together with se and molecular characteristics obtained using pulsed-field gel electrophoresis showed that high levels of antimicrobial resistance and the se-carrying clone ST59-MRSA-IV/V-SC VII were all clustered in genogroup 5. Conclusions: The CA-MRSA clone of se-carrying-MDR-ST59-IV/V-SC VII was identified predominantly in this study, and this clone might play a significant role in staphylococcal food poisoning in community settings. Significance and Impact of the Study: To our knowledge, this is the first study focusing on enterotoxin-carrying CA-MRSA/MSSA in pets and their owners, and the results support the future warnings in animal-human bond caused by CA-staphylococci in the commonwealth and the need to take cautions worldwide.


Retention of provided identification for dogs and cats seen in veterinary clinics and adopted from shelters in Oklahoma City, OK, USA.

Personalized identification (ID) tags that contain contact information for the dog or cat owner can help assure lost animals are quickly reunited with their owners. The authors have previously reported that while the majority of pet owners stated that ID tags were very important, only a third responded that their pet wears an ID tag. The objective of this study was to evaluate if providing and putting on the pet a free collar and ID tag during an owner’s visit to a veterinary hospital or spay/neuter facility increased the likelihood that the pet owners would actually keep the identification on their pet at least 6-8 weeks after they were placed on the pet. A second population of dogs and cats that were adopted from animal control and humane society shelters were also studied to assess retention of a collar and personalized ID tag. Telephone follow-up occurred a mean of 8 weeks after the tag was applied. Retaining and using the tag significantly increased for the veterinary group with 13.8% reporting their pets were currently wearing an ID tag pre-intervention, and 84.3% reporting their pets were currently wearing and ID tag post-intervention. Of the dogs and cats that were adopted, at follow-up 94% of owners reported their pets were currently wearing an ID tag. Approximately 5% of those who participated in the post-intervention survey lost a pet and recovered that pet because of the ID tag. This suggests that ID tagging is an effective method to potentially decrease stray intake into shelters and return pets home. The data also support placing tags and collars directly on pets as a method to retain those ID tags and collars on the animals, thus increasing the likelihood they will be returned home if lost or during a disaster.


Effect of sedation protocol on glomerular filtration rate in cats as determined by use of quantitative renal scintigraphy.
OBJECTIVE: To evaluate the effect of several sedation protocols on glomerular filtration rate (GFR) in cats as measured by use of quantitative renal scintigraphy and to analyze interobserver differences in GFR calculation. ANIMALS: 5 cats (1 sexually intact male, 1 neutered male, and 3 sexually intact females). PROCEDURES: Effects on GFR of 3 sedation protocols commonly used at the Iowa State University College of Veterinary Medicine were evaluated. The protocols were medetomidine (11 μg/kg) and butorphanol tartrate (0.22 mg/kg) administered i.m.; ketamine hydrochloride (10 mg/kg) and midazolam (0.5 mg/kg) administered i.v.; and ketamine (10 mg/kg), midazolam (0.5 mg/kg), and acepromazine maleate (0.05 mg/kg) administered i.m. Results for the 3 protocols were compared with results of GFR measurements obtained in these same cats without sedation (control protocol). RESULTS: No significant difference between GFR measurements was associated with the 3 sedation protocols, compared with GFR measurements for the control protocol. The greatest mean GFR values were for the medetomidine-butorphanol and ketamine-midazolam protocols. There were no significant differences between observers for calculation of GFR. CONCLUSIONS AND CLINICAL RELEVANCE: Results suggested that none of the 3 sedation protocols had significant effects on GFR calculated by use of quantitative renal scintigraphy, compared with results for GFR evaluations performed in the cats when they were not sedated. No significant interobserver error was evident. However, the statistical power of this study was low, and the probability of a type II error was high.


Insulin responses to administrations of amino acids and Fatty acids in healthy cats.

In order to compare the stimulation ability of insulin secretion, we determined changes in plasma glucose and insulin concentrations after intravenous administration of various amino acids and essential fatty acids in clinically healthy adult cats. Plasma glucose concentrations were within the normal ranges after injection of amino acids and fatty acids. Plasma insulin concentrations increased rapidly 2 to 4 min after injection of arginine, then decreased to the basal levels at 20 min in all five cats. Insulin peak responses were significantly greater in arginine injections than in normal saline (P<0.01). Areas under the curve (AUC) of plasma insulin concentrations from 0 to 10 min after injection of arginine were significantly larger than after injection of normal saline (P<0.01) and glucose (P<0.05). Increases in AUC of plasma insulin concentration from 0 to 60 min were observed after injection of arginine, leucine, alanine, and fat emulsion. Arginine had a strong insulinotropic effect, and leucine, alanine, and fatty acids had weak ones. Besides, valine, methionine, taurine and glutamine had no stimulant activity of insulin. Given the risk of glucose toxication and required time for testing, the intravenous arginine tolerance test may be useful for estimation of insulin responses in cats.


Bacteriological and molecular identification of Bartonella species in cats from different regions of China.

With the improvements in diagnostic techniques, Bartonella henselae (B. henselae) infection has recently been recognized to cause a widening spectrum of diseases. Cats are the natural reservoir hosts of B. henselae. The current study aims to investigate the prevalence of B. henselae infection in the cat populations in China. Polymerase chain reaction (PCR) and bacterial cultures confirm that 12.7% of the
tested cats were positive for the infection. Old age and outdoor exposure were statistically associated with the infection. Multilocus sequence typing and eBURST analysis of the cat isolates collected in the present study show that 65.4% of the isolates belong to sequence type 1 (ST1). Three new STs (ST16-18) were identified in Midwestern China. These results may aid our understanding of the population structure of B. henselae in China and the relationship between human and cat strains in subsequent studies.


**Orbito-nasal cyst in a young European short-haired cat.**

PURPOSE: To describe a case of an orbito-nasal cyst in a cat. PROCEDURE: An 18-month-old male European short-haired cat was presented to the Ophthalmology service of the Vetsuisse Faculty, University of Zurich for a subcutaneous swelling in the medial canthal region of the right eye (OD). Ophthalmologic, ultrasound and CT examinations, and fine needle aspiration were performed. After lesion excision, the removed tissue was submitted for histopathology. CT examination was repeated 5 months after removal of the cyst. RESULTS: Ophthalmologic examination revealed a large fluctuant swelling inferonasal to OD. Despite patent lacrimal puncta, only the first few mm of the lacrimal canaliculi could be cannulated. A normal globe with moderate enophthalmos was present. Ultrasound examination showed a well-defined lobulated cyst-like structure in the right orbit, inferonasal and anterior to the eye. CT examination revealed extension of this lesion through the medial orbital wall into the right nasal cavity. Fine needle aspiration confirmed the cystic nature of the lesion. An orbito-nasal cyst was diagnosed. The orbital part of the cyst was dissected from the surrounding tissue and excised from the periosteum in the medial orbital wall defect. Part of the maxillary bone was removed to allow removal of the cyst from the nasal cavity. Histologically, the cyst wall consisted of a single to multilayered, mostly cuboidal epithelium and surrounding connective tissue. Follow-up revealed a good functional result and no recurrence 7 months after cyst removal. CONCLUSIONS: Similar orbito-nasal cystic structures were reported in dogs but not in cats.


**Prior Virus Exposure Alters the Long-Term Landscape of Viral Replication during Feline Lentiviral Infection.**

We developed a feline model of lentiviral cross-species transmission using a puma lentivirus (PLV or FIV(Pco)) which infects domestic cats but does not cause disease. Infection with PLV protects cats from CD4+ T-cell decline caused by subsequent infection with virulent feline immunodeficiency virus (FIV). Previous studies implicate innate immune and/or cellular restriction mechanisms for FIV disease attenuation in PLV-infected cats. In this study, we evaluated viral infection and cytokine mRNA transcription in 12 different tissue reservoirs approximately five months post infection. We quantitated tissue proviral load, viral mRNA load and relative transcription of IL-10, IL-12p40 and IFNgamma from tissues of cats exposed to FIV, PLV or both viruses and analyzed these parameters using a multivariate statistical approach. The distribution and intensity of FIV infection and IFNgamma transcription differed between single and co-infected cats, characterized by higher FIV proviral loads and IFNgamma expression in co-infected cat tissues. Variability in FIV mRNA load and IFNgamma was significantly more constrained in co-infected versus singly infected cat tissues. Single-infected:co-
infected ratios of FIV mRNA load compared to FIV proviral load indicated that active viral transcription was apparently inhibited during co-infection. These results indicate that previous PLV infection increases activation of tissue innate immunity and constrains the ability of FIV to productively infect tissue reservoirs of infection for months, independent of FIV proviral load, supporting a model in which innate immunity and/or modulation of target cell susceptibility play a key role in PLV-induced protection from FIV disease.


Effects of nutrition choices and lifestyle changes on the well-being of cats, a carnivore that has moved indoors.