Small Animal Article Summaries –
FELINE MEDICINE & SURGERY

March-April 2014

 CONTRIBUTOR

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The International Society of Feline Medicine

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Occurrence of extended spectrum beta-lactamase-producing Enterobacteriaceae among pet dogs and cats: An emerging public health threat outside health care facilities.
Am J Infect Control (2014)
Abdel-Moein, K. A., and A. Samir
We aimed to investigate the potential role of pet dogs and cats in the epidemiology of extended spectrum beta-lactamase-producing Enterobacteriaceae. Twenty bacterial isolates were recovered from rectal swabs obtained from 110 dogs and cats. The occurrence of extended spectrum beta-lactamase-producing Enterobacteriaceae in pets spotlights the emergence of a significant public health threat.

Mycobacterium bovis infection in cats and people.

Comparison of feline core bone marrow biopsies from different sites using 2 techniques and needles.
Abrams-Ogg, A. C., A. Defarges, and D. Bienzle
BACKGROUND: Commonly used 11ga or 13ga biopsy needles are relatively large for cats and often preclude successful collection of bone marrow (BM) core biopsies. OBJECTIVES: The objective was to compare 15ga to 13ga BM core biopsy ease of collection and specimen quality. METHODS: In 10 cats, humeral biopsies obtained with 15ga EZ-IO needles were compared with iliac biopsies obtained with 13ga Jamshidi needles. Body condition, ease of collection, section quality, postprocedure pain, and swelling at biopsy sites were scored. Specimen length on mounted slides was measured and specimens with quality scores of 3-5 out of a maximum value of 5 were considered to be of acceptable diagnostic quality. The distribution of all parameters was assessed by Shapiro-Wilk tests, and differences in parameters were assessed by ANCOVA. RESULTS: There were no significant differences between 15ga and 13ga biopsies, except that the 15ga humeral biopsy was judged to be easier to perform than 13ga iliac biopsy, and there was more severe postbiopsy swelling with 13ga biopsies. Facility score (mean +/- SD), section quality score (median +/- SD) and specimen length (mm, mean +/- SD) were 12.7 +/- 2.3, 2.0 +/- 1.4, and 6.0 +/- 2.1 for 15ga biopsies, respectively, and 8.9 +/- 2.4, 1.0 +/- 1.8, and 7.5 +/- 2.5 for 13ga biopsies, respectively. Three specimens of acceptable quality were obtained with each 15ga and 13ga biopsies. CONCLUSIONS: In cats, BM biopsy of the humerus with a 15ga needle is easier and causes less postbiopsy swelling than biopsy of the ilium with a 13ga needle. Sites and needles are equivalent with respect to yielding specimens of acceptable quality. Neither technique consistently captured high-quality specimens.

Hyperammonaemia in four cats with renal azotaemia.
Adagra, C., and D. J. Foster
Hyperammonaemia is well reported in animals with advanced hepatic disease and portosystemic shunts, but is unreported in cats with renal disease. This study describes a case series of four cats with severe renal azotaemia in which elevated ammonia levels were detected during the course of treatment. In two cases hyperammonaemia was detected at a time when neurological signs consistent with encephalopathy had developed. This raises the possibility that hyperammonaemia may play a role in the development of encephalopathy in cats with renal azotaemia.

Ultrasound-guided pudendal nerve block in cats undergoing perineal urethrostomy: a prospective, randomised, investigator-blind, placebo-controlled clinical trial.
Adami, C., T. Dayer, C. Spadavecchia, and G. Angeli
The objective of this study was to evaluate the clinical usefulness, in terms of analgesic efficacy and safety, of ultrasound-guided pudendal nerve block performed with bupivacaine in cats undergoing perineal urethrostomy. Eighteen client-owned male cats scheduled for perineal urethrostomy were enrolled in the study and assigned to one of two treatment groups. The pudendal nerve block was performed under general anaesthesia, as described elsewhere, with 0.3 ml/kg of either saline (group C) or 0.5% bupivacaine (group B) - the total injection volume being split equally between the two sites of injection (left and right). Intra-operatively, assessment of nociception was based on the rescue analgesics requirement, as well as on the evaluation of changes in physiological parameters in comparison with the baseline values. Postoperative pain assessment was performed using three different pain scales at recovery and then 1, 2 and 3 h after recovery. Cats in group B showed lower heart rates and required fewer analgesics during surgery than group C. Postoperatively, group B had lower pain scores and needed less rescue buprenorphine than group C. Iatrogenic block-related complications were not observed. In conclusion, the ultrasound-guided pudendal nerve block can be considered clinically useful in feline medicine as it provides reliable analgesia in cats undergoing perineal urethrostomy.

A retrospective analysis of urethral rupture in 63 cats.  
Addison, E. S., Z. Halfacree, A. H. Moore, J. Demetriou, K. Parsons, and M. Tivers  
The aim of this study was to investigate the short- and long-term morbidity and mortality associated with urethral rupture in cats. Medical records were reviewed from four veterinary hospitals. Diagnosis was made from retrograde urethrography or direct visualisation during surgery. Location of rupture was categorised as pre-, intra- or post-pelvic. Follow-up data were collected from referring veterinarians. Sixty-three cats were included in the study of which, males predominated (88.9%). Trauma was the most common cause (n = 35; 55.6%) with the remainder due to iatrogenic injury. Forty-eight cats (88.9%) were treated surgically and six (11.1%) managed conservatively. Significant differences between cats suffering traumatic versus iatrogenic injury included the presence of musculoskeletal injuries (P <0.001); the location of rupture (P <0.001); the degree of rupture (P <0.001); definitive management (P <0.001) and short-term complications (P = 0.026). Short-term complications were significantly associated with the following: musculoskeletal injuries (P = 0.012); uroabdomen/uroretroperitoneum (P = 0.004); azotaemia (P = 0.021); postoperative urinary diversion (P = 0.036) and >1 surgery performed (P = 0.006). Forty-seven cats (74.6%) survived to discharge. Prognostic factors associated with survival to discharge included the presence of musculoskeletal injuries (P = 0.017); cause of rupture (P = 0.017); location of rupture (P = 0.039) and definitive management (P = 0.020). Twenty-four cats (57.1%) suffered short-term complications and 10 (27.0%) suffered long-term complications. Of those cats surviving to discharge 30 (71.4%) had a good outcome. Median follow-up was 16 months. Outcome was significantly associated with cause of rupture (P = 0.04); short-term complications (P = 0.03) and long-term complications (P <0.001). In conclusion, a significantly greater proportion of cats with iatrogenic injuries survived to discharge and had a good outcome compared with those that suffered trauma.

Analgesic effects of maxillary and inferior alveolar nerve blocks in cats undergoing dental extractions.  
Aguir, J., A. Chebroux, F. Martinez-Taboada, and E. A. Leece  
The aim of this study was to evaluate the analgesic effects of maxillary and/or inferior alveolar nerve blocks with lidocaine and bupivacaine in cats undergoing dental extractions. Twenty-nine cats were enrolled. Using an adapted composite pain scale, cats were pain scored before the dental procedure and 30 mins, and 1, 2 and 4 h after isoflurane disconnection. Cats were sedated with buprenorphine (20 microg/kg), medetomidine (10 microg/kg) and acepromazine (20 microg/kg) intramuscularly. Anaesthesia was induced using alfaxalone (1.2 mg/kg) intravenously and maintained with isoflurane in oxygen. Each cat was randomly assigned to receive maxillary and/or inferior alveolar nerve blocks or no nerve blocks prior to dental extractions. Each nerve block was performed using lidocaine (0.25 mg/kg) and bupivacaine (0.25 mg/kg). Heart rate, systolic arterial blood pressure, respiratory rate, end tidal carbon dioxide and isoflurane vapouriser settings were recorded 5 mins before and after the dental extractions, and the difference calculated. Group mean differences (mean +/- SD) for heart rate (-9.7 +/- 10.6 vs 7.6 +/- 9.5 beats/min [nerve block vs control group, respectively], P <0.0001), systolic arterial blood pressure (-10.33 +/- 18.44 vs 5.21 +/- 15.23 mmHg, P = 0.02) and vapouriser settings (-0.2 +/- 0.2 vs 0.1 +/- 0.4, P = 0.023) were significantly different between groups. The control group had higher postoperative pain scores (median [interquartile range]) at 2 h (3 [1.75-4.00] vs 1 [0-2], P = 0.008) and 4 h (4 [2-6] vs 2 [1-2], P = 0.006) after the dental extractions. Maxillary and inferior alveolar nerve blocks with lidocaine and bupivacaine administered prior to dental extractions resulted in a reduction in heart rate and blood pressure while allowing for a reduction in isoflurane. Cats
receiving nerve blocks had lower postoperative pain scores than the group without nerve blocks.

**Genome-wide association and linkage analyses localize a progressive retinal atrophy locus in Persian cats.**
Mamm Genome (2014)

Hereditary eye diseases of animals serve as excellent models of human ocular disorders and assist in the development of gene and drug therapies for inherited forms of blindness. Several primary hereditary eye conditions affecting various ocular tissues and having different rates of progression have been documented in domestic cats. Gene therapy for canine retinopathies has been successful, thus the cat could be a gene therapy candidate for other forms of retinal degenerations. The current study investigates a hereditary, autosomal recessive, retinal degeneration specific to Persian cats. A multi-generational pedigree segregating for this progressive retinal atrophy was genotyped using a 63 K SNP array and analyzed via genome-wide linkage and association methods. A multi-point parametric linkage analysis localized the blindness phenotype to a ~1.75 Mb region with significant LOD scores (Z approximately 14, theta = 0.00) on cat chromosome E1. Genome-wide TDT, sib-TDT, and case-control analyses also consistently supported significant association within the same region on chromosome E1, which is homologous to human chromosome 17. Using haplotype analysis, a ~1.3 Mb region was identified as highly associated for progressive retinal atrophy in Persian cats. Several candidate genes within the region are reasonable candidates as a potential causative gene and should be considered for molecular analyses.

**Paragonimiasis in KwaZulu-Natal Province, South Africa.**
Appleton, C. C.

Nine cases of paragonimiasis have been reported from cats (4), dogs (2) and children (3) in South Africa, with an additional suspected case in an adult female patient. Details of these cases are reviewed. All nine cases, and perhaps the adult case as well, were from the province of KwaZulu-Natal but locality data are only available for six of them. These six cases represent four localities which all lie below 100 m above sea level in the province’s lowlands, suggesting that there may be a focus of transmission here. The molluscan first intermediate host must be one of the two prosobranch snail species present in the area, Melanoides tuberculata or Tomichia natalensis, and the decapod second intermediate host the common river crab Potamonautes sidneyi. All infected cats and dogs had pulmonary infections, while two human cases for which there is sufficient information had extrapulmonary infections. Transmission appears to be ongoing but the invasive snail Tarebia granifera may be competing with both M. tuberculata and T. natalensis. If so, this may bring transmission to an end.

**Owner Experiences in Treating Dogs and Cats Diagnosed With Diabetes Mellitus in the United States.**
J Am Anim Hosp Assoc (2014)
Aptekmann, K. P., J. Armstrong, M. Coradini, and J. Rand

The objective of this study was to report owner experiences and satisfaction in treating a pet with diabetes mellitus using a descriptive report from an Internet-based survey. Descriptive analysis of results was performed, chi2 tests were used to detect differences in responses between dog and cat owners, and correlations were assessed using the nonparametric Spearman rank correlation. A total of 834 owners participated in the survey. More diabetic dogs (97%) than cats (82%) were treated with insulin injections. Insulin was administered twice daily in 87% of dogs and 73% of cats. Porcine lente and neutral protamine Hagedorn were the most commonly administered insulins in dogs. In cats, glargine and protamine zinc insulin were the most commonly used insulins. Most pets were not fed a prescribed diabetes diet. More cat (66%) than dog (50%) owners were satisfied with the diabetic control achieved. Cat owners were more likely to use home blood glucose monitoring. Treatment was considered expensive by the majority of owners. Few published reports follow diabetic pets after diagnosis or report owner satisfaction. The results of this study provide useful information that may help veterinarians better educate owners and set expectations regarding diabetes treatment and quality of life for diabetic pets.
Flow cytometric immunophenotyping of feline bone marrow cells and haematopoietic progenitor cells using anti-human antibodies.
Araghi, A., S. M. Nassiri, N. Atyabi, R. Rahbarghazi, and E. Mohammadi
There is a paucity of species-specific antibodies available for feline haematopoietic conditions. The purpose of this study was to broaden the panel of antibodies available for use in the immunophenotypic characterisation of feline haematopoietic cells by testing clones of anti-human monoclonal antibodies (mAbs) on normal, neoplastic and cultured feline haematopoietic progenitors to determine cross-reactivity to feline counterparts. In this study, 24 clones of anti-human mAbs were tested on normal or neoplastic feline bone marrow and peripheral blood cells. Six of these mAbs, including anti-cluster of differentiation (CD)61, anti-CD18, anti-CD14, anti-CD235a, anti-CD41 and anti-CD29, cross-reacted with normal feline bone marrow cells, whereas anti-CD33 and anti-CD117 cross-reacted with the blast cells in the bone marrow of two cats with myelodysplastic syndrome, and anti-CD71, anti-235a, anti-41 and anti-42 cross-reacted with immature erythroid cells in a cat with erythroleukaemia. In a feline immunodeficiency virus-positive cat, bone marrow cells were labelled with anti-CD33, anti-14 and anti-45. Anti-CD18, anti-CD14, anti-CD41 and anti-CD61 also reacted with the peripheral blood cells of the healthy cats. The feline haematopoietic progenitors formed colonies in the methylcellulose-based semisolid medium with significant enrichment of colony-forming unit-granulocyte, monocyte and burst-forming unit-erythroid. A panel of six anti-feline mAbs (anti-CD21-like, anti-T lymphocytes, anti-CD172a, anti-granulocyte, anti-CD45-like and anti-CD18) and eight anti-human antibodies (anti-CD71, anti-CD33, anti-CD235a, anti-CD41, anti-CD61, anti-CD117, anti-CD38 and anti-CD34) were used for the immunophenotypic characterisation of the feline bone marrow progenitors. CD45, CD33, CD235a and CD18 were expressed by the feline haematopoietic progenitor cells, with the highest expression level for CD45.

Ultrasonographic appearance of histoplasmosis identified in the spleen in 15 cats.
Aitice, G., H. Kvitko-White, K. Spaulding, and M. Johnson
Histoplasmosis is the second most common fungal infection reported in the cat. The disseminated form involving lung, liver, lymph nodes, spleen, and bone marrow is a frequent manifestation of the disease. Limited information is available in the literature regarding the ultrasonographic appearance of the spleen in cats with disseminated or splenic histoplasmosis. A retrospective review of splenic ultrasound images from 15 cats confirmed to have histoplasmosis by splenic aspirates was performed. Size, echotexture, echogenicity, margin appearance, presence of nodules, and the overall shape of the spleen were reported in each case. Splenomegaly was documented in all cases (15/15) and a hypoechoic appearance of the spleen was documented in 14/15 of cases. The spleen was diffusely and uniformly affected in 14/15 (six homogenous and eight with a subtle mottled appearance) and had discrete nodules in 1/15 cats. Histoplasmosis should be included in the differential list for an enlarged and hypoechoic spleen in cats with consistent clinical findings. Additionally, ultrasound guided splenic aspirate may be a useful method to obtain a cytology sample for diagnosis.

Efficacy of a novel topical combination of fipronil, (S)-methoprene, eprinomectin and praziquantel against adult and immature stages of the cat flea (Ctenocephalides felis) on cats.
The efficacy of a novel topical combination of fipronil 8.3% (w/v), (S)-methoprene 10% (w/v), eprinomectin 0.4% (w/v) and praziquantel 8.3% (w/v) (BROADLINE((R))) was tested against adult and immature stages of Ctenocephalides felis fleas in six studies. For that purpose, fleas from different colonies from North America, Germany and South Africa were used to induce infestations in cats under laboratory conditions. In each study, between 12 and 16 cats were allocated randomly to 2 groups. Cats in Group 1 were not treated and served as controls. Cats in Group 2 were treated once on Day 0 with BROADLINE((R)) at the minimum recommended dosage of 0.12 mg/kg body weight. In 4 studies, all animals were infested experimentally with unfed C. felis (100 +/- 5) on Days 2 (or 1), 7, 14, 21, 28 and 35. Live fleas were counted 24h post-treatment or infestation. In 2 additional studies, animals were infested at the same frequency with gravid C. felis fleas (100 +/- 5) that were fed previously on an untreated host. Forty-eight hours post-infestation, flea eggs were collected, counted and incubated for the evaluation of the reduction of emergence of adults. The combined curative efficacy against adult fleas at 24h after treatment was 94.3% and the combined preventive efficacy values remained greater than 95.9% at 24h after 5 subsequent weekly infestations. In addition, the product reduced dramatically the emergence of new adult fleas.
for at least 5 weeks (>98.1% for one month and 93.2% at 5 weeks after infestation), demonstrating its efficiency in preventing environmental contamination by immature stages.

**Efficacy of a single dose of a novel topical combination product containing eprinomectin to prevent heartworm infection in cats.**


Cats may be infected by heartworm, _Dirofilaria immitis_, through mosquito bites. They can develop severe heartworm disease when infective _D._ immitis larvae migrate and develop into adults in the pulmonary vasculature or other tissues. As there is no curative treatment for feline heartworm infection, the monthly administration of preventative treatment is recommended in endemic areas. Three controlled, blinded laboratory studies were conducted to evaluate the preventative efficacy of BROADLINE(R), a novel combination of fipronil, (S)-methoprene, eprinomectin, and praziquantel against _D._ immitis in cats. In each study, 28 cats were inoculated with approximately 100 (studies 1 and 2) or 40 (study 3) infective third stage _D._ immitis larvae by subcutaneous injection, thirty days prior to treatment. The larvae were from recent field isolates from naturally infected dogs from three distinct geographic areas (two in the USA and one in Europe). In each study, the cats were allocated randomly to two study groups of 14 cats each. The control group remained untreated. On Day 0, each cat in the treated group received one topical application of the novel topical formulation, delivering the minimum intended dose of 0.5mg of eprinomectin per kilogram of body weight. At 6 months after infection, all cats were humanely euthanized and examined for adult _D._ immitis. Across all three studies, 28 (68%) of the 41 untreated cats harbored one or more heartworms, while 100% of the 42 treated cats remained free of heartworm infection, demonstrating the 100% preventive efficacy of BROADLINE(R)) against _D._ immitis in cats. The treatment was well tolerated and no health abnormality was observed in any treated cat.

**Recombinant feline coronaviruses as vaccine candidates confer protection in SPF but not in conventional cats.**


_Balint, A., A. Farsang, L. Szeredi, Z. Zadori, and S. Belak_

Feline infectious peritonitis virus (FIPV) is a major pathogen of Felidae. Despite the extensive efforts taken in the past decades, development of the “ideal” live attenuated FIPV vaccine was not successful yet. In the present study, we provide data of immunisation experiments with a recombinant FCoV pair differing only in the truncation (PBFIPV-DF-2) or completion (PBFIPV-DF-2-R3i) of their ORF3abc regions. In our previous in vivo studies, these viruses proved to show the characters of low virulent or avirulent FCoV phenotypes, respectively. Therefore, we hypothesised the ability of these viruses, as possible vaccine candidates, in conferring protection in specific pathogen free (SPF) Domestic Shorthair as well as in conventional purebred British Shorthair cats. In SPF cats, after two oronasal and two intramuscular vaccinations with two weeks intervals, both vaccine candidates provided 100% protection against lethal homologous challenge with the highly virulent FIPV DF-2 strain. In contrast, the conventional purebred British Shorthair cats did not develop protection when they were immunised with the same vaccination regimes. In these groups 100% of the PBFIPV-DF-2-R3i immunised animals developed antibody-dependent enhancement (ADE). Prolonged survival was observed in 40% of the animals, while 60% showed fulminant disease course. Genetic and more probably immunological differences between the SPF and non-SPF purebred kittens can explain the different outcome of the vaccination experiment. Our data highlight the diverse immune responses between SPF and conventional cats and suggest a decisive role of previous infection by heterologous causative agents in the outcome of the vaccination against FIP.

**Cats in recent Chinese study on cat domestication are commensal, not domesticated.**


_Bar-Oz, G., L. Weissbrod, and E. Tsahar_
Biological variation and reference change values of feline plasma biochemistry analytes.
Baral, R. M., N. K. Dhand, K. P. Freeman, M. B. Krockenberger, and M. Govendir
This is the first report concerning biological variation and reference change values of feline plasma biochemistry components in the peer-reviewed literature. Biological variation refers to inherent physiological variation of analytes. The ratio of individual biological variation to group biological variation is referred to as an analyte’s index of individuality. This index determines the suitability of an analyte to be assessed in relation to population- or subject-based reference intervals. A subject-based reference interval is referred to as a reference change value or critical difference, and is calculated from individual biological variation. Fourteen cats were sampled for plasma biochemistry analysis once weekly for 6 weeks. Samples were stored and then tested at the same time. Results were assessed in duplicate and coefficients of variation for each analyte were isolated to distinguish variation within each subject, between all subjects and by the analyser. From these results, an index of individuality and reference change values were determined for each analyte. Five plasma biochemistry analytes (alkaline phosphatase, alanine aminotransferase, cholesterol, creatinine and globulin) had high individuality and, therefore, subject-based reference intervals are more appropriate; only one analyte (sodium) had low individuality, indicating that population-based reference intervals are appropriate. Most analytes had intermediate individuality so population-based reference intervals should be assessed in relation to subject-based reference intervals. The results of this study demonstrate high individuality for most analytes and, therefore, that population-based reference intervals are of limited utility for most biochemical analytes in cats.

Pancreatitis in cats: Is it acute, is it chronic, is it significant?
Bazelle, J., and P. Watson
Practical relevance: Pancreatitis is a frequent finding in cats, the chronic form being more common than the acute form. Despite the large number of diseases or conditions that may be associated with feline pancreatitis, in most cases no cause is diagnosed and the pancreatitis is said to be idiopathic. The chronic form can be mild and asymptomatic, and has a high prevalence in apparently healthy cats. This has generated debate concerning the clinical significance of chronic feline pancreatitis. However, several reports have demonstrated the severity of clinical signs in certain forms of acute feline pancreatitis, while other studies have reported a strong association between chronic pancreatitis and the development of comorbidities such as hepatic lipidosis, diabetes mellitus, inflammatory bowel disease or exocrine pancreatic insufficiency. This suggests that feline pancreatitis should not be overlooked. Clinical challenges: Diagnosis of feline pancreatitis is complicated by the non-specific clinical signs and poor diagnostic value of basic biochemistry and haematology or imaging techniques. Development of a feline-specific pancreatic lipase immunoassay has improved our diagnostic ability in the past decade, but may have more limited application for mild and chronic forms of pancreatitis. Moreover, histopathology (the ‘gold standard’ diagnostic test) can be associated with false-negative results due to multifocal distribution of lesions or mild forms of the disease. With respect to treatment, it is important to take into account the idiosyncrasies of the feline species when considering medical therapies. Evidence base: This article reviews the literature on feline pancreatitis, focusing on the different forms and their relative clinical significance, while explaining difficulties inherent in the diagnosis of this disease. An overview of current recommendations for the management of cats with pancreatitis is also provided.

Molecular Characterization of Cat Factor XII Gene and Identification of a Mutation Causing Factor XII Deficiency in a Domestic Shorthair Cat Colony.
Vet Pathol (2014)
Bender, D. E., M. T. Kloos, J. U. Pontius, M. E. Hinsdale, and D. A. Bellinger
Coagulation factor XII (FXII) may be important in cardiovascular and inflammatory diseases. We have identified and characterized a naturally occurring mutation in the feline FXII gene that results in a mutant protein and enzymatic loss of activity. Feline intron/exon gene structure and sequence were acquired by comparing DNA sequences obtained from a fragmented Felis catus genomic sequence and the National Center for Biotechnology Information’s Cross Species Megablast of multiple species’ FXII gene sequences. Fourteen exons ranging in size from 57 to 222 base pairs were confirmed spanning 8 Kb on chromosome A1. The 1828-base pair feline FXII messenger RNA (mRNA) sequence contains an open reading frame that encodes a protein of 609 amino acids with high homology to human FXII protein. Total RNA and mRNA purified from liver tissue of 4 wild-type/normal and 8 FXII-deficient cats confirmed the predicted mRNA
sequence and identified one important single-nucleotide polymorphism (SNP). A single base deletion in exon 11 of the FXII coding gene in our colony of cats results in deficient FXII activity. Translation of the mRNA transcript shows a frame shift at L441 (C441fsX119) resulting in a nonsense mutation and a premature stop codon with a predicted 560-amino acid protein. The mutant FXII protein is truncated in the 3’ proteolytic light chain region of the C-terminus, explaining its loss of enzymatic activity. This study is the first molecular characterization of the feline FXII gene and the first identification of an FXII mutation in the domestic cat, providing insights into the origin and nature of feline FXII deficiency.

Berent, A. C., C. W. Weisse, K. Todd, and D. H. Bagley
OBJECTIVE--To evaluate the technical, short-term, and long-term outcomes in cats with benign ureteral obstructions treated by means of double-pigtail ureteral stent placement. DESIGN--Retrospective case series. ANIMALS--69 cats (79 ureters). PROCEDURES--The diagnosis of benign ureteral obstruction was made via abdominal ultrasonography, radiography, and ureteropyelography. Ureteral stent placement was attempted endoscopically, surgically, or both, with fluoroscopic guidance. The medical records were reviewed for pre-, intra-, and postoperative data; complications; and outcome. RESULTS--69 cats (79 ureters) had stent placement attempted for various causes: ureterolithiasis (56/79 [71%]), stricture (10/79 [13%]), both ureterolithiasis and stricture (12/79 [15%]), or a purulent plug (1/79 [1%]). Stent placement was successful in 75 of 79 ureters (95%). Median number of stones per ureter was 4 (range, 0 to > 50), and 67 of 79 (85%) had concurrent nephrolithiasis. Preoperative azotemia was present in 95% (66/69) of cats (median creatinine concentration, 5.3 mg/dL [range, 1.1 to 25.8 mg/dL]), and 71% (49/69) remained azotemic (median, 2.1 mg/dL [range, 1.0 to 11.8 mg/dL]) after successful surgery. Procedure-related, postoperative (< 7 days), short-term (7 to 30 days), and long-term (> 30 days) complications occurred in 8.7% (6/69; 7/79 ureters), 9.1% (6/66), 9.8% (6/61), and 33% (20/60) of cats, respectively; most of these complications were minor and associated with intermittent dysuria or the need for ureteral stent exchange. The perioperative mortality rate was 7.5% (5/69), and no deaths were procedure related. The median survival time was 498 days (range, 2 to > 1,278 days). For patients with a renal cause of death, median survival time was > 1,262 days, with only 14 of 66 cats (21%) dying of chronic kidney disease. Nineteen (27%) cats needed a stent exchange (stricture in-growth [n = 10], migration [4], ureteritis [2], dysuria [2], pyelonephritis [1], or reflux [1]). No patient died of the procedure or recurrent ureteral obstruction. CONCLUSIONS AND CLINICAL RELEVANCE--Results of the present study indicated that ureteral stenting is an effective treatment for benign ureteral obstructions in cats regardless of obstructive location, cause, or stone number. The perioperative morbidity and mortality rates were lower than those reported with traditional ureteral surgery. The short- and long-term complications were typically minor but may necessitate stent exchange or use of an alternative device, particularly with ureteral strictures. The prognosis for feline ureteral obstructions after ureteral stenting could be considered good when the procedure is performed by trained specialists.

Bille, C., V. Auvigne, E. Bomassi, P. Durieux, S. Libermann, and E. Rattez
OBJECTIVE: To evaluate anaesthetic death after implementation of recommendations and its risk factors in a small animal practice. STUDY DESIGN: Observational cohort study. ANIMALS: All cats and dogs anaesthetized at the Centre Hospitalier Veterinaire des Cordeliers during two periods, from April 15th, 2008 to April 15th, 2010 (period 1) and from June 15th, 2010 to August 24th, 2011 (period 2). METHODS: Death occurring during or before full recovery from anaesthesia was recorded. At the end of period 1, a logistic regression model was generated to describe anaesthetic death and identify risk factors. Potential risk factors in our practice setting were identified, and three recommendations, relating to improving physical status and anaesthetic/analgesic regimen implemented for period 2. The relationship between anaesthetic death and recorded variables were analyzed, and where relevant, compared between periods. RESULTS: Six thousand two hundred and thirty-one animals underwent general anaesthesia. The overall death rate during period 1 was 1.35% (48 in 3546, 95% CI [1.0-1.7%]) and during period 2 was 0.8% (21 in 2685, 95% CI [0.6-1.2%]). For sick animals (ASA status 3 and over), the overall death rate was 4.8% (45 of 944 95% [CI 3.5-6.4%]) during period 1 and 2.2% (18 of 834 95% CI [1.3-3.5%]) during period 2; this represented a significant decrease in death rate in period 2 (p = 0.002). In period 2, the main factors associated with an increased odds ratio of anaesthetic death were poor health status (ASA physical status classification) and old age. Species, gender, anaesthetic regimen, the nature and urgency of the procedure
were not associated with risk. CONCLUSION AND CLINICAL RELEVANCE: Following evidence-based recommendations, the death rate related to anaesthesia was significantly decreased during period 2 compared to period 1. Application of evidence-based medicine may contribute to an effective approach to decrease death rates. Other factors, not monitored in this study, may also have had an impact.

Localized demodicosis due to Demodex cati on the muzzle of two cats treated with inhalant glucocorticoids.
Bizikova, P.
BACKGROUND: Feline demodicosis due to Demodex cati is a rare skin disease often associated with concurrent disease and generalized immunosuppression. Local immunosuppression due to the application of topical immunomodulatory drugs, such as glucocorticoids and tacrolimus, or by tumour cells has been suggested as a potential trigger for development of localized demodicosis in humans and animals. OBJECTIVES: The goal was to describe two cats with asthma that developed localized demodicosis on the muzzle as a result of chronic therapy with a glucocorticoid administered via dispensing inhaler mask. RESULTS: In both cats, the muzzle area exposed to the fluticasone-dispensing chamber exhibited patchy alopecia, mild erythema, crusting and scaling. Deep skin scraping revealed D. cati. Discontinuation or reduction of fluticasone and administration of milbemycin resulted in resolution of clinical signs within 2 months in both cats. A negative skin scrape was obtained after 7 months of milbemycin in one of the cats. CONCLUSIONS AND CLINICAL IMPORTANCE: Demodicosis should be considered as a possible differential diagnosis in cats with primary alopecia or other skin lesions on the face exposed to inhalant glucocorticoids. Minimization of contact between the inhalant glucocorticoid and the skin can be achieved by wiping residual powder from the face and by keeping the mask tightly pressed to the skin to avoid contact with the surrounding area.

Obesity and sex influence insulin resistance and total and multimer adiponectin levels in adult neutered domestic shorthair client-owned cats.
Domest Anim Endocrinol (2014) 47:55-64.
In this study, we estimated insulin sensitivity and determined plasma concentrations of total-, low-molecular-weight (LMW), and high-molecular-weight (HMW) adiponectin and leptin in 72 domestic shorthair, neutered, client-owned cats. Glucose tolerance was assessed with an intravenous glucose tolerance test and body fat percentage (BF%) was measured with dual-energy x-ray absorptiometry. Total adiponectin was measured with 2 different ELISAs. Low-molecular-weight and HMW adiponectin plasma concentrations were determined by Western blot analysis after sucrose-gradient velocity centrifugation, and the adiponectin multimer ratio [SA = HMW/(HMW + LMW)] was calculated. Differences in glucose tolerance, leptin, total adiponectin, and multimer ratio among lean (BF% <35; n = 26), overweight (35 <BF% <45; n = 28), and obese (BF% >45; n = 18) cats as well as between male (n = 34) and female (n = 38) neutered cats were evaluated by linear regression and 2-way ANOVA. Sex and age were included as covariates for analysis of BF%, whereas BF%, fat mass, and lean body mass were covariates for analysis of sex differences. Increased BF% was negatively correlated with multimer ratio (SA, r = -45; P < 0.002), whereas no differences were found in total adiponectin concentrations among BF% groups (P > 0.01). Male cats had indices of decreased insulin tolerance and significantly lower total adiponectin concentrations than did female cats (mean +/- SEM, 3.7 +/- 0.4 vs 5.4 +/- 0.5 mug/mL; P < 0.02). Altered SAs could contribute to an obesity-associated decreasing glucose tolerance in cats, and low total adiponectin concentrations may relate to increased risk of diabetes mellitus in neutered male cats.

Acute effects of ivabradine on dynamic obstruction of the left ventricular outflow tract in cats with preclinical hypertrophic cardiomyopathy.
Blass, K. A., K. E. Schober, X. Li, B. A. Scansen, and J. D. Bonagura
BACKGROUND: Ivabradine is a negative chronotropic drug with minimal effects on central hemodynamics. Its effect on dynamic obstruction of the left ventricular outflow tract (LVOT) in cats with hypertrophic cardiomyopathy (HCM) remains unknown. HYPOTHESIS/OBJECTIVES: Ivabradine reduces dynamic obstruction of the LVOT in cats with HCM.
ANIMALS: Twenty-eight client-owned cats with preclinical HCM and dynamic LVOT obstruction. METHODS: Randomized, double-blind, active-control single dose study. Cats received a single dose of either ivabradine (0.3 mg/kg PO) or atenolol (2 mg/kg PO). Heart rate, echocardiographic variables, and systolic blood pressure (SBP) were recorded before and 3 hours after drug administration. Statistical comparisons were made using ANCOVA. RESULTS: Peak velocity in the LVOT was significantly decreased compared to baseline for both drugs; however, the effect was more prominent with atenolol (mean reduction 2.53 m/s; 95% CI 2.07-3.13 m/s) compared to ivabradine (mean reduction 0.32 m/s; 95% CI 0.04 to 0.71 m/s; P <.0001). Echocardiographic indices of systolic function were largely unchanged by ivabradine, but significantly reduced by atenolol. CONCLUSIONS AND CLINICAL IMPORTANCE: A single dose of ivabradine decreases dynamic LVOT obstruction in cats with HCM, but the clinical effect is negligible and inferior compared to that achieved by atenolol.

PRACTICAL RELEVANCE: Diabetes mellitus is a common endocrine disorder in feline practice, affecting approximately 1 in 200 cats. The majority of diabetic cats have type 2 diabetes mellitus, which results from a combination of peripheral insulin resistance and a progressive reduction in insulin production. CLINICAL CHALLENGES: While usually easy to diagnose, management of diabetes mellitus presents a number of challenges for practitioners and clients alike. Practitioners must decide on diet, insulin type and dose, monitoring method and intensity, and concomitant therapy, which will vary based on individual patient and client needs, and geographic location. Practitioners may also encounter patients with diabetic ketoacidosis or other diabetic complications, and patients with multiple concurrent diseases. Clients may be challenged by the substantial time and financial commitment involved in owning a diabetic cat. AUDIENCE: Understanding the pathophysiology, optimal treatment protocols and current goals of diabetes management will benefit practitioners managing diabetic cats. This article reviews the most current management plans for feline diabetics. It places particular emphasis on best practice for achieving diabetic remission, which is an attainable goal in the majority of newly diagnosed diabetic cats. EVIDENCE BASE: The information in this article is drawn from the recent human and veterinary literature, including prospective and retrospective studies. The body of prospective clinical data on the use of newer, long-acting insulins (glargine and especially detemir) in cats is limited, but growing.

The aim of this report was to investigate whether the diagnosis of feline leukemia virus (FeLV) infection by serology might be feasible and useful. Among the various viral proteins, the FeLV env-gene product (SU) and the envelope transmembrane protein p15E were considered promising candidates for the serological diagnosis of FeLV infection. Thus, we evaluated p15E and three other FeLV antigens, namely, a recombinant env-gene product, whole FeLV, and a short peptide from the FeLV transmembrane protein, for their potential to detect FeLV infection. To evaluate possible exposure of cats to FeLV, we tested serum and plasma samples from experimentally and naturally infected and vaccinated cats for the presence of antibodies to these antigens by enzyme-linked immunosorbent assays (ELISAs). The serological results were compared with the p27 and proviral real-time PCR results. We found that p15E displayed a diagnostic sensitivity of 95.7% and a specificity of 100% in experimentally infected cats. In naturally infected cats, p15E showed a diagnostic sensitivity of 77.1% and a specificity of 85.6%. Vaccinated cats displayed minimal antibody levels to p15E, suggesting that anti-p15E antibodies indicate infection rather than vaccination. The other antigens turned out to be too unspecific. The lower specificity in cats exposed to FeLV under field conditions may be explained by the fact that some cats become infected and seroconvert in the absence of detectable viral nucleic acids in plasma. We conclude that p15E serology may become a valuable tool for diagnosing FeLV infection; in some cases, it may replace PCR.

Lungworms of the genus Troglostrongylus (Strongylida: Crenosomatidae): Neglected parasites for domestic cats.
Feline lungworms belonging to the Troglostrongylus genus have been neglected for a long time. However, recent reports of Troglostrongylus brevior and Troglostrongylus subcrenatus in domestic cats have stimulated the interest of the scientific community on these lungworms. Troglostrongylus spp. have an indirect life cycle, which overlaps that of the better known Aelurostrongylus abstrusus. Nonetheless, adult worms of both genera have a distinct morphology and localization within the respiratory system of definitive hosts and, potentially, a different epidemiology and pathogenicity. As copromicroscopy has a low specificity for metastrongyloids due to the similarities of first-stage larvae, specific morphometrical keys and/or PCR diagnostic tools are advocated. Accordingly, more clinical studies and necropsy data are needed to elucidate the impact of Troglostrongylus spp. on the health of domestic cats. This article reviews current information on Troglostrongylus spp. as well as data on their occurrence in Europe and reports specific key morphological characters for the identification of adults and larvae, which is important to refine their diagnosis and for a better understanding of the feline lungworm infections.

Degenerative left shift as a prognostic tool in cats.
Burton, A. G., L. A. Harris, S. D. Owens, and K. E. Jandrey
BACKGROUND: A degenerative left shift (DLS) is reported to be a poor prognostic indicator in dogs and cats. Limited data in dogs and no studies in cats have been published to investigate this claim. HYPOTHESIS/OBJECTIVES: To characterize the feline population affected by DLS and to determine if the presence and severity of DLS are associated with increased risk of euthanasia or death. METHODS: One hundred and eight cats with DLS (cases) and 322 cats without DLS (controls) presented to the University of California, Davis Veterinary Medical Teaching Hospital between April 1, 1995 and April 1, 2010. METHODS: Retrospective case-control study. All cases had a CBC performed within 24 hours of presentation in which immature granulocytic precursors exceeded mature neutrophils. Controls were matched by year of presentation and primary diagnosis. Survival analysis was used to determine risk of death or euthanasia from DLS and other potential predictors of outcome. RESULTS: Cases were more likely to die or be euthanized in hospital compared to controls (60/108 [56%] versus 107/322 [33%]). DLS was a significant predictor of death or euthanasia in hospitalized cats in both univariate and multivariate analysis (hazard ratio, 1.57; 95% confidence interval, 1.13-2.18). Trend analysis showed an increasing trend in the hazard of euthanasia or death with increasing severity of DLS. CONCLUSIONS AND CLINICAL IMPORTANCE: Cats with DLS are 1.57 times more likely to die or be euthanized in hospital than cats without DLS. In addition, increasing severity of DLS is associated with increased likelihood of death or euthanasia.

Epidemiological study (2006-2012) on the poisoning of small animals by human and veterinary drugs.
Caloni, F., C. Cortinovis, F. Pizzo, M. Rivolta, and F. Davanzo
A retrospective study was conducted on the exposure of dogs and cats to drugs, reported to the Poison Control Centre of Milan (Centro Antiveleni di Milano (CAV)) between January 2006 and December 2012. Calls related to drugs for human use and veterinary drugs accounted for 23.7 per cent of total inquiries (1415) received by CAV and mostly involved dogs (70 per cent of enquiries). Exposure to drugs for human use accounted for 79 per cent of cases involving dogs, whereas veterinary drugs were the main culprit (77 per cent) in the case of cats. The most common class of drugs for human use proved to be CNS drugs (26.8 per cent), followed by NSAIDs (19.6 per cent) and cardiovascular and endocrine drugs (12.9 per cent each). The majority of calls (95.2 per cent) related to veterinary drugs involved dogs and cats exposed to parasiticides. The outcome was reported in only 58.2 per cent of cases, and fatal poisoning accounted for 8.7 per cent of these cases. Epidemiological data from this Italian survey provide useful information on animal exposure to drugs. The knowledge of agents involved in poisoning episodes can help veterinarians make the correct diagnosis and institute preventive measures to possibly reduce animal exposure to drugs.

Effect of GnRH analogs in postnatal domestic cats.
Theriogenology (2014)
Carranza, A., M. Faya, M. L. Merlo, P. Batista, and C. Gobello
Prevalence and demographics of the MYBPC3-mutations in ragdolls and Maine coons in the British Isles.

OBJECTIVES: To determine prevalence and demographics of two myosin-binding protein C (MYBPC3) mutations that affect ragdolls (R820W) and Maine coons (A31P) in the British Isles. METHODS: From the database of a genetic testing laboratory samples from 2018 ragdolls and 742 Maine coons were analysed with respect to mutation status, age, sex and county of origin. The actual prevalence was compared to the expected Hardy-Weinberg prevalence by chi-squared test. RESULTS: The prevalence of the R820W mutation in ragdolls was 27% (25.6% heterozygous, 1.4% homozygous), and that of the A31P mutation in Maine coons was 39.4% (36.4% homozygous, 3% heterozygous). There were more female cats (69.5% ragdoll, 70.3% Maine coon). The median age was 6.4 months (ragdolls) and 5.9 months (Maine coons). Cats from more than 60 counties were represented for each breed. The difference between the expected and observed allele frequency was significant in Maine coons (P=0.047) but not in ragdolls (P=0.092). CLINICAL SIGNIFICANCE: This is the first report of prevalence and demographics of the R820W and A31P mutations in ragdolls and Maine coons, respectively, in the British Isles. The prevalence is high, which is of relevance for breeding and screening programmes. The significant difference in genetic distribution may suggest early death of homozygous Maine coons.

Cytological and molecular detection of Leishmania infantum in different tissues of clinically normal and sick cats.

Objective: To determine the prevalence and distribution of Leishmania infantum infection in different tissues of clinically normal and sick cats. METHODS: A total of 100 cats were included: 50 clinically normal (group A) and 50 with various clinical signs (group B). Blood, skin biopsy, bone marrow, conjunctiva, lymph node, and liver were collected from each cat. PCR and molecular diagnostic tests were performed on all samples, and cytological examination was performed on blood and skin biopsy samples. RESULTS: The overall prevalence of Leishmania infantum infection was 20% (95% CI: 14.3-25.7%). The highest prevalence was found in blood (7.4%), followed by skin biopsy (5.8%), bone marrow (5.8%), conjunctiva (4.5%), lymph node (4.3%), and liver (1.6%). Cytological examination of blood and skin biopsy samples revealed no evidence of Leishmania infection. CONCLUSION: Leishmania infantum infection should be considered in the differential diagnosis of cats with unexplained clinical signs, and multiple tissue samples should be collected for accurate diagnosis.
Pegylated feline granulocyte colony-stimulating factor increases neutrophil levels in cats.

Neutropenia can often be corrected by treatment with granulocyte-colony stimulating factor (G-CSF) and off-label use of commercial human G-CSF (HuG-CSF) is a commonly used treatment for neutropenic animals. However, long-term HuG-CSF treatment can be associated with adverse effects, including neutropenia. Here, feline (Fe) G-CSF was produced in Pichia pastoris, pegylated (Peg) FeG-CSF and tested in cats. A randomized controlled clinical trial was conducted to evaluate the efficacy of PegFeG-CSF compared to FeG-CSF or HuG-CSF in FIV-infected (n=14), FIV-uninfected healthy cats (n=19), and in HuG-CSF-induced neutropenic cats (n=4). Daily FeG-CSF doses induced higher neutrophil production than HuG-CSF after the second week of treatment (P 0.002). Weekly doses of PegFeG-CSF induced higher neutrophil counts and showed greater sustained activity than weekly doses of FeG-CSF. PegFeG-CSF provided the most therapeutic and sustainable neutrophil production (P<0.001) in both FIV-uninfected and FIV-infected cats, without the development of neutralizing antibodies. Conversely, all HuG-CSF-treated cats developed neutralizing antibodies, suggesting cross-reactive antibodies to endogenous G-CSF in a majority of the cases with severe neutropenia. Strikingly, when PegFeG-CSF was used to rescue cats with HuG-CSF-induced neutropenia, clinically normal neutrophil numbers returned. Thus, PegFeG-CSF appears to be a superior treatment for neutropenia in feline patients.

Comparison of histomorphology and DNA preservation produced by fixatives in the veterinary diagnostic laboratory setting.
Craft, W. F., J. A. Conway, and M. J. Dark

Histopathology is the most useful tool for diagnosis of a number of diseases, especially cancer. To be effective, histopathology requires that tissues be fixed prior to processing. Formalin is currently the most common histologic fixative, offering many advantages: it is cheap, readily available, and pathologists are routinely trained to examine tissues fixed in formalin. However, formalin fixation substantially degrades tissue DNA, hindering subsequent use in diagnostics and research. We therefore evaluated three alternative fixatives, TissueTek((R)) Xpress((R)) Molecular Fixative, modified methacarn, and PAXgene((R)), all of which have been proposed as formalin alternatives, to determine their suitability for routine use in a veterinary diagnostic laboratory. This was accomplished by examining the histomorphology of sections produced from fixed tissues as well as the ability to amplify fragments from extracted DNA. Tissues were sampled from two dogs and four cats, fixed for 24-48 h, and processed routinely. While all fixatives produced acceptable histomorphology, formalin had significantly better morphologic characteristics than the other three fixatives. Alternative fixatives generally had better DNA amplification than formalin, although results varied somewhat depending on the tissue examined. While no fixative is yet ready to replace formalin, the alternative fixatives examined may be useful as adjuncts to formalin in diagnostic practices.

Palatability evaluation study of a new oral formulation of marbofloxacin in cats.
Vet Rec (2014)
Cron, M., C. Zemirline, J. Beranger, and V. Privat

At a time when antimicrobial resistance is a global concern in human and animal health, it is of primary importance to draw attention to the problem of compliance with antibiotic therapy in animals hard to medicate such as cats. Resistance may develop because of poor patient compliance with the prescribed course of antibiotic therapy. Increasing palatability might enhance administration compliance. We assessed the acceptability of EFEX tablets, a new oral marbofloxacin formulation for cats. The objective of this study was to compare EFEX to two commercial formulations of marbofloxacin: MARBOCYL P palatable tablets and MARBOCYL Vet tablets. Acceptance tests were run in experimental conditions in 24 cats to compare the spontaneous intake and full consumption of the three pharmaceutical products. The results indicated that EFEX was more palatable than MARBOCYL Vet (0.001<P<0.01) and equally comparable with MARBOCYL P in palatability. There was no difference in the short-term adverse effects between the products.
Spinal neurons bursting in phase with fictive scratching are not related to spontaneous cord dorsum potentials.
Spontaneous cord dorsum potentials (spontaneous CDPs) are produced by the activation of dorsal horn neurons distributed along the L4 to S1 spinal cord segments, in Rexed’s laminae III-VI, in the same region in which there are interneurons rhythmically bursting during fictive scratching in cats. An interesting observation is that spontaneous CDPs are not rhythmically superimposed on the sinusoidal CDPs generated during fictive scratching episodes, thus suggesting that the interneurons producing both types of CDPs belong to different spinal circuits. In order to provide experimental data to support this hypothesis, we recorded unitary activity of neurons in the L6 spinal cord segment. We found that the neurons firing rhythmically during the sinusoidal CDPs associated with the extensor, flexor or intermediate phases of scratching were not synchronized with the spontaneous CDPs. Moreover, we found that the neurons firing during the spontaneous CDPs were not synchronized with the sinusoidal CDPs. These results suggest that the neurons involved in the occurrence of spontaneous CDPs are not part of the spinal cord central pattern generators (CPGs). This study will be relevant for understanding the relationships between the spinal cord neuronal populations firing spontaneously and the CPGs, in the intact and injured spinal cord.

Measuring level of agreement between values obtained by directly measured blood pressure and ultrasonic Doppler flow detector in cats.
OBJECTIVE: To determine if blood pressure measured with an ultrasonic Doppler flow detector (Doppler) is in good agreement with directly measured blood pressures in anesthetized cats. DESIGN: Prospective observational study. SETTING: University veterinary teaching hospital. ANIMALS: Thirty-nine cats undergoing routine neutering. INTERVENTIONS: Cats were divided into 2 groups; 19 cats enrolled in Group A had a 24-Ga catheter inserted into a dorsal pedal artery; 20 cats in Group B had a 20-Ga catheter placed in a femoral artery. In both groups, systolic, diastolic, and mean arterial pressures were directly measured using a validated pressure measurement system. Indirect values were compared against direct blood pressure measurements. RESULTS: There was no difference between groups. Overall, there was poor agreement with a significant bias observed between Doppler and directly measured blood pressures. For the systolic arterial pressure the bias was -8.8 with limits of agreements (LOA) of -39.3 and 21.7. For the mean arterial pressure, the bias was 14.0 with LOA of -13.9 and 41.9. For the diastolic arterial pressure, the bias was 27.9 with LOA of -4.4 and 60.2. Methodology, weight, sex, and replicates did not have a significant effect on the difference between indirect and direct measurements in any model. CONCLUSIONS: Results suggest poor agreement between Doppler values and directly measured blood pressures in anesthetized cats. Use of Doppler in cats could be misleading and readings should be interpreted with caution in a clinical context.

Pregeneral anaesthetic blood screening of dogs and cats attending a UK practice.
Davies, M., and S. Kawaguchi

Carriage of methicillin-resistant staphylococci by healthy companion animals in the US.
Lett Appl Microbiol (2014)
Antimicrobial-resistant staphylococci have been associated with wounded or ill companion animals, but little is known about the prevalence of resistant staphylococci among healthy animals. In this study, 276 healthy dogs and cats from
veterinary clinics were tested for the presence of antimicrobial-resistant Staphylococcus spp. Isolates were tested for antimicrobial susceptibility and the presence of select resistance genes, and typed using Pulsed-Field Gel Electrophoresis (PFGE). Staphylococcus aureus and Staphylococcus pseudintermedius were also characterized using multilocus sequence typing (MLST), spa typing and SCCmec typing. Approximately 5% (14/276) of the animals were positive by enrichment for five species of staphylococci [Staph. aureus (n = 11), Staph. pseudintermedius (n = 4), Staphylococcus sciuri (n = 6), Staphylococcus simulans (n = 1) and Staphylococcus warneri (n = 1)]. Seventy-eight per cent (18/23) of staphylococci were resistant to oxacillin and also multidrug resistant (resistance to ≥2 antimicrobials). All Staph. aureus isolates were mecA+ and blaZ+, SCCmec type II, spa type t002, ST5 and clonal using PFGE. Staphylococcus pseudintermedius were SCCmec type IV or V, spa type t06 and ST170; two of the isolates were pvl+. These results suggest that healthy companion animals may be a reservoir of multidrug-resistant staphylococci, which may be transferred to owners and others who handle companion animals. **SIGNIFICANCE AND IMPACT OF THE STUDY:** In this study, antimicrobial-resistant coagulase-negative and coagulase-positive staphylococci were isolated from various body sites on healthy dogs and cats. Resistance to 14 antimicrobials was observed including resistance to oxacillin; the majority of staphylococci were also multidrug resistant. Results from this study suggest that healthy dogs and cats may act as reservoirs of antimicrobial-resistant bacteria that may be transferred to people by simple interaction with the animals. Such carriage poses an underlying risk of infection, which should be considered during handling of healthy dogs and cats by pet owners and veterinary personnel.

**Sporotrichosis with bone involvement: an alert to an occupational disease.**
de Carvalho Aguinaga, F., B. M. Trope, N. C. Fernandes, D. C. Engel, and M. Ramos-E-Silva

Sporotrichosis is a subacute or chronic mycosis caused by a fungus of the genus Sporothrix, which is found in soil. It can be acquired by trauma to the skin. Bone and joint lesions are very rare. The city of Rio de Janeiro is undergoing an epidemic transmitted by cats, and this should be an alert for the risk to professionals in contact with these animals. The patient was a veterinarian who developed occupational sporotrichosis with osteoarticular involvement transmitted by a cat during a consultation.

**Treatment of acquired nasopharyngeal stenosis using a removable silicone stent.**
*J Feline Med Surg (2014)*
*De Lorenzi, D., D. Bertoncello, S. Comastri, and E. Bottero*

The aim of this prospective study was to characterise patient characteristics and the histories of cats with acquired nasopharyngeal stenosis (ANS), and to describe the use of a removable silicone stent for treatment. ANS was diagnosed in 15 cats with clinical signs present for a median of 4 months. Clinical signs included stertor and inspiratory difficulty, nasal discharge, sneezing, dysphagia, regurgitation, vomiting and anorexia. Radiographs revealed a dorsal deviation or deformation of the caudal part of the soft palate in 10 of the cats, a soft tissue density across the cranial nasopharynx in four and no abnormality in one. The stenosis was initially dilated with a Kelly forceps in 10 of the cats and by balloon dilatation in five. A segment of a 24 Fr silicone thoracic catheter was used for the stent in five cats; in the other 10 cats a segment of a 28 Fr catheter was used. The stent was removed after 3 weeks in 12 cats and after 4 weeks in the other three. Endoscopy revealed an adequate nasopharyngeal diameter in all of the cats. At both 3 and 10 months after surgery the response was considered to be satisfactory, with complete resolution of clinical signs in 14 cats and improvement in the remaining cat. The treatment of ANS by stenosis dilatation followed by temporary stenting with a silicone stent is a rapid, safe, economical and effective procedure.

**Evidence for widespread Leishmania infantum infection among wild carnivores in L. infantum periendemic northern Spain.**

Leishmania spp. infection was investigated in tissue samples of wild carnivores from the Spanish Basque Country (BC), by PCR and DNA sequencing. The region is at the northern periphery of Leishmania infantum endemic Iberian Peninsula and
infection in the dog (reservoir) or other species has not been previously reported. Leishmania kinetoplast DNA was detected by real-time PCR (rtPCR) in 28% (44/156) of animals. Specifically, in 26% of Eurasian badgers (n=53), 29% of foxes (n=48), 29% of stone martens (n=21) and in 25-50% of less numerous species including genets, wild cats, pole cats, European mink and weasels. Infected animals particularly badgers, were most prevalent in the southernmost province of the BC (Araba) in areas dominated by arable land. Subsequent amplification and sequencing of a fragment of the rRNA internal transcribed spacer 2 (ITS2) from a subset of rtPCR positives samples confirmed the species as L. infantum, showing a high sequence homogeneity with ITS2 sequences of L. infantum from dogs and humans from southern Spain. In summary, this study reports for the first time L. infantum infection in wild carnivores from the BC including in stone martens, pole cats and minks in which infection has not been previously described. It supports the need to study infection in dogs and people in this region and is an example of the value of infection surveillance in wildlife to assess potential risks in the domestic environment and their role in spreading infections in non-endemic areas.

Syndrome of inappropriate antidiuretic hormone secretion in a cat with a putative Rathke’s cleft cyst.
Demonaco, S. M., M. W. Koch, and T. L. Southard
An 11-year-old spayed female domestic shorthair cat was evaluated for anorexia, lethargy and weight loss of 6 days’ duration. Bilateral mydriasis, absent menace response, slow-to-absent pupillary light reflexes, bilateral retinal detachment, intermittent horizontal nystagmus, intermittent ventral strabismus and systemic hypertension were present. Biochemical analysis revealed severe hyponatremia, severe hypochloremia and mild hypokalemia. Multifocal central nervous system disease was suspected based on optic, trigeminal sensory (ophthalmic branch), vestibulocochlear and possible oculomotor nerve dysfunction. Thoracic radiographs showed mild cardiomegaly without evidence of congestive heart failure. Ultrasound revealed mild pleural and peritoneal effusion. A cause of the severe hyponatremia was not identified, and it persisted despite fluid therapy. Syndrome of inappropriate antidiuretic hormone secretion (SIADH) was suspected as the cause of hyponatremia. Humane euthanasia was elected owing to continued clinical decline. Serum hyposmolality, urine hyperosmolality, natriuresis and lack of confirmed renal, thyroid and pulmonary disease aided in the presumed diagnosis of SIADH. Post-mortem histopathology of the brain revealed degeneration of the hypothalamus and optic tracts, along with a prominent fluid-filled craniopharyngeal duct (putative Rathke’s cleft cyst) separating the pars distalis and the pars intermedia. The hypothalamic degeneration, possibly secondary to a Rathke’s cleft cyst, was hypothesized to be the cause of presumptive SIADH in the patient. Although rare in occurrence, Rathke’s cleft cyst should be included as a differential diagnosis in dogs and cats with signs of pituitary dysfunction.

Effects of feeding frequency and dietary water content on voluntary physical activity in healthy adult cats.
Deng, P., E. Iwazaki, S. A. Suchy, M. R. Pallotto, and K. S. Swanson
Low physical activity has been identified as a major risk factor for the development of feline obesity and diabetes. This study aimed to evaluate the effects of increased meal frequency and dietary water content on voluntary physical activity in cats fed to maintain BW. Ten adult lean neutered male cats were used in 2 tests, both crossover studies composed of a 14-d adaptation period, followed by a 7-d measurement of physical activity from d 15 to d 22 using Actical activity collars. Cats were group housed for most of the day, except for times when they were individually housed in cages to access their diet. Cats were randomly assigned to 2 rooms and fed a dry commercial diet with or without added water (70% hydrated) twice daily. Activity levels were expressed as “activity counts” per epoch (15 s). In Exp. 1, the difference in voluntary physical activity among cats fed 1, 2, 4, or a random number of meals per day were tested in a 4 x 4 Latin square design in 4 individual rooms. In Exp. 2, the effect of increasing dietary water content on voluntary physical activity was tested in a crossover design including a 3-d phase for fecal and urine collection from d 22 to 27. Cats were randomly assigned to 2 rooms and fed a dry commercial diet with or without added water (70% hydrated) twice daily. Activity levels were expressed as “activity counts” per epoch (15 s). In Exp. 1, average daily activity level for 1-meal-fed cats was lower than 4-meal-fed (P = 0.004) and random-meal-fed (P = 0.02) cats, especially during the light period. The activity level of cats during the dark period was greater in 1-meal-fed cats compared with cats fed 2 meals (P = 0.008) or 4 meals (P = 0.007) daily. Two-hour food anticipatory activity (FAA) before scheduled meal times for 1-meal-fed cats was lower (P < 0.001) than for the multiple-meal-fed cats. In Exp. 2, average daily activity level of cats fed the 70% hydrated diet tended to be higher (P = 0.06) than cats fed the dry diet, especially during the dark period (P = 0.007). Two-hour FAA before the afternoon meal for cats fed the 70% hydrated diet was lower (P < 0.05) than for cats fed the dry diet. Cats fed the 70% hydrated diet had greater daily fecal (P = 0.008) and urinary (P = 0.001) outputs and lower (P < 0.001) urinary specific gravity compared to cats fed the dry diet. In conclusion, increased feeding frequency
and dietary water content, without changing energy intake or dietary macronutrient composition, appear to promote physical activity, which may aid in weight management in cats.

Treatment of Troglostrongylus brevior (Metastrongyloidea, Crenosomatidae) in mixed lungworm infections using spot-on emodepside.

Di Cesare, A., R. Iorio, P. Crisi, B. Paoletti, R. Di Costanzo, C. F. Dimitri, and D. Traversa

Feline lungworms have long been known as pathogens of cats. However, an increased incidence of clinical cases in some areas has been the focus of a number of recent epidemiological and clinical studies. While Aelurostrongylus abstrusus causes respiratory signs in cats all over the world, Troglostrongylus brevior has recently been found in domestic cats from Spain and Italy (where it often causes severe clinical signs). Capillaria aerophila, a parasite that infects many wild carnivores may cause respiratory distress in cats. A variety of treatment options are known for A abstrusus, while almost no information is available on the treatment of troglostrongylosis and capillariosis. This series describes two mixed infections in clinically affected kittens with T brevior, one with concurrent A abstrusus and the other with C aerophila. In both cases, the nematodes were identified and confirmed by copromicroscopic examination and specific DNA-based assays. Kittens showed respiratory signs that resolved after one or two administrations of a spot-on solution containing emodepside. Larval (T brevior and A abstrusus) and egg (C aerophila) shedding was also eliminated 2-4 weeks after treatment. New clinical insights into these parasitoses are discussed.

Ultrasonographic measurement of the relative thickness of intestinal wall layers in clinically healthy cats.

Di Donato, P., D. Penninck, M. Pietra, M. Cipone, and A. Diana

The normal sonographic thickness of the individual layers (ie, mucosa, submucosa, muscularis and subserosa-serosa) of the intestinal wall was evaluated in 20 clinically healthy cats. The mean thickness of the wall was 2.20, 2.22, 3.00 and 2.04 mm for duodenum, jejunum, ileum (fold) and ileum (between folds), respectively. The mean thickness of the mucosal layer was 1.27, 1.20, 0.46 and 0.49 mm for duodenum, jejunum, ileum (fold) and ileum (between folds), respectively, and its contribution to wall thickness was significantly greater than that of the other layers in the duodenum (57.7%) and jejunum (55.2%). The mean thickness of the submucosal layer was 0.36, 0.36, 1.49 and 0.53 mm for duodenum, jejunum, ileum (fold) and ileum (between folds), respectively, and its contribution to wall thickness was greater than that of the muscularis in the duodenum (16.3%), jejunum (16%) and ileum (fold) (49.8%). The mean thickness of muscularis was 0.28, 0.35, 0.66 and 0.65 mm for duodenum, jejunum, ileum (fold) and ileum (between folds), respectively, with a corresponding contribution to wall thickness of 12.7 %, 14.4%, 22% and 31.6%. Finally, the mean thickness of serosa was 0.29, 0.31, 0.38 and 0.38 mm for duodenum, jejunum, ileum (fold) and ileum (between folds), respectively, with a corresponding contribution to wall thickness of 13.3%, 14.4%, 12.7 % and 18.7%. These values can provide baseline information that might be useful in evaluating intestinal disorders affecting preferentially some of the intestinal layers.

Factors contributing to the variation in feline urinary oxalate excretion rate.

Dijcker, J. C., E. A. Hagen-Plantinga, H. Everts, Y. Queau, V. Biourge, and W. H. Hendriks

This study aimed to identify factors (season, animal, and diet) contributing to the variation in urinary oxalate (Uox) excretion rate, Uox concentration, and urine volume in healthy adult cats. A data set (1,940 observations) containing information on Uox excretion rate of 65 cats fed 252 diets (i.e., each diet was fed to a group of 6 to 8 cats), with known dietary oxalate concentrations, collected over a 6 yr period at a feline nutrition facility, were retrospectively analyzed. Data related to season, animal (i.e., age, gender, body weight, and breed), and diet (i.e., nutrient content) characteristics were subjected to stepwise multivariate regression analysis to identify factors significantly correlated to Uox excretion rate (mmol/(kg BW(0.67).d)) and concentration (mmol/L) as well as urine volume (mL/(kg BW(0.67).d)). Independent factors significantly (P < 0.05) associated with lower Uox concentration (mmol/L) included greater ash, Ca, and Na intake and lower nitrogen-free extract, total dietary fiber, P, and oxalate intake, and a body weight <5 kg. Factors significantly associated with lower Uox excretion rate (mmol/(kg BW(0.67).d)) included greater crude fat and Ca intake and lower CP,
total dietary fiber, P, and oxalate intake. However, a considerable part of the variation in Uox excretion rate remained unexplained. The majority of the unexplained variation in Uox excretion rate is likely to be related to factors involved in endogenous oxalate synthesis, as the majority of the dietary factors involved in intestinal oxalate absorption were included in the model. Apparent intestinal oxalate absorption was estimated to be 6.2% on average; however, much variation was present. Future research on Uox excretion rate in cats should focus on the influence of dietary protein sources, amino acid composition, vitamin C (that was not included in the present study), and variations in apparent intestinal oxalate absorption.

**TNR and conservation on a university campus: a political ecological perspective.**
*Dombrosky, J., and S. Wolverton*

How to manage the impact of free-ranging cats on native wildlife is a polarizing issue. Conservation biologists largely support domestic cat euthanasia to mitigate impacts of free-ranging cat predation on small animal populations. Above all else, animal welfare activists support the humane treatment of free-ranging cats, objecting to euthanasia. Clearly, this issue of how to control free-ranging cat predation on small animals is value laden, and both positions must be considered and comprehended to promote effective conservation. Here, two gaps in the free-ranging cat-small-animal conservation literature are addressed. First, the importance of understanding the processes of domestication and evolution and how each relates to felid behavioral ecology is discussed. The leading hypothesis to explain domestication of wildcats (Felis silvestris) relates to their behavioral ecology as a solitary predator, which made them suited for pest control in early agricultural villages of the Old World. The relationship humans once had with cats, however, has changed because today domesticated cats are usually household pets. As a result, concerns of conservation biologists may relate to cats as predators, but cat welfare proponents come from the position of assuming responsibility for free-ranging household pets (and their feral offspring). Thus, the perceptions of pet owners and other members of the general public provide an important context that frames the relationship between free-ranging cats and small animal conservation. The second part of this paper assesses the effects of an information-based conservation approach on shifting student’s perception of a local Trap-Neuter-Return (TNR) program in introductory core science classes at the University of North Texas (UNT). UNT students are (knowingly or unknowingly) regularly in close proximity to a TNR program on campus that supports cat houses and feeding stations. A survey design implementing a tailored-information approach was used to communicate what TNR programs are, their goals, and the “conservationist” view of TNR programs. We gauged favorability of student responses to the goals of TNR programs prior to and after exposure to tailored information on conservation concerns related to free-ranging cats. Although these results are from a preliminary study, we suggest that an information-based approach may only be marginally effective at shifting perceptions about the conservation implications of free-ranging cats. Our position is that small animal conservation in Western societies occurs in the context of pet ownership, thus broader approaches that promote ecological understanding via environmental education are more likely to be successful than information-based approaches.

**The clinical utility of two human portable blood glucose meters in canine and feline practice.**
*Domori, A., A. Sunahara, M. Tateno, T. S. Miyama, A. Setoguchi, and Y. Endo*

**BACKGROUND:** Portable blood glucose meters (PBGMs) are useful for serial measurements of blood glucose and creation of blood glucose curves in veterinary practice. However, it is necessary to validate PBGMs designed for people for veterinary use. **OBJECTIVES:** Our objective was to evaluate the accuracy of 2 PBGMs designed for people for use in dogs and cats. **METHODS:** The blood glucose levels were determined in blood samples collected from 69 dogs and 26 cats admitted to the Kagoshima University Veterinary Teaching Hospital, using a MEDISAFE [PBGM-T] and an Antsense III [PBGM-H], and a FUJI DRI-CHEM 7000V as reference method. The correlations and agreements among the results were statistically analyzed. **RESULTS:** Simple regression analyses revealed a high correlation between values from both PBGMs and the reference method in both dogs and cats. However, Passing-Bablok regression and Bland-Altman analyses revealed that the data from both PBGMs did not show statistical agreement with the reference values. Concordance correlated coefficients were moderate for the PBGM-T and almost perfect for the PBGM-H for canine samples, and were poor for the PBGM-T and substantial for the PBGM-H for feline samples. Hematocrit values significantly affected the results of the PBGM-T, but not the PBGM-H. Error grid analyses revealed that all measurements from both PBGMs would lead to acceptable treatment decisions. **CONCLUSIONS:** Our findings suggest that both PBGMs, especially the PBGM-H, would be clinically useful in small animal practice, although there was a bias between each PBGM and the reference method.
Extended-spectrum-beta-lactamases, AmpC beta-lactamases and plasmid mediated quinolone resistance in klebsiella spp. from companion animals in Italy.
Donati, V., F. Feltrin, R. S. Hendriksen, C. A. Svendsen, G. Cordaro, A. Garcia-Fernandez, S. Lorenzetti, R. Lorenzetti, A. Battisti, and A. Franco
We report the genetic characterization of 15 Klebsiella pneumoniae (KP) and 4 isolates of K. oxytoca (KO) from clinical cases in dogs and cats and showing extended-spectrum cephalosporin (ESC) resistance. Extended spectrum beta-lactamase (ESBL) and AmpC genes, plasmid-mediated quinolone resistance (PMQR) and co-resistances were investigated. Among KP isolates, ST101 clone was predominant (8/15, 53%), followed by ST15 (4/15, 27%). ST11 and ST340, belonging to Clonal Complex (CC)11, were detected in 2012 (3/15, 20%). MLST on KP isolates corresponded well with PFGE results, with 11 different PFGE patterns observed, including two clusters of two (ST340) and four (ST101) indistinguishable isolates, respectively. All isolates harbored at least one ESBL or AmpC gene, all carried on transferable plasmids (IncR, IncFII, IncI1, IncN), and 16/19 were positive for PMQR genes (qnr family or aac(6’)-Ib-cr). The most frequent ESBL was CTX-M-15 (11/19, 58%), detected in all KP ST101, in one KP ST15 and in both KP ST340. blaCTX-M-15 was carried on IncR plasmids in all but one KP isolate. All KP ST15 isolates harbored different ESC resistance genes and different plasmids, and presented the non-transferable blaSHV-28 gene, in association with blaCTX-M-15, blaCTX-M-1 (on IncR, or on IncN), blaSHV-2a (on IncR) or blaCMY-2 genes (on IncI1). KO isolates were positive for blaCTX-M-9 gene (on IncHI2), or for the blaSHV-12 and blaDHA-1 genes (on IncL/M). They were all positive for qnr genes, and one also for the aac(6’)-Ib-cr gene. All Klebsiella isolates showed multiresistance towards aminoglycosides, sulfonamides, tetracyclines, trimethoprim and amphenicols, mediated by strA/B, aadA2, aadB, ant (2”)-Ia, aac(6’)-Ib, sul, tet, dfr and cat genes in various combinations. The emergence in pets of multidrug-resistant Klebsiella with ESBL, AmpC and PMQR determinants, poses further and serious challenges in companion animal therapy and raise concerns for possible bi-directional transmission between pets and humans, especially at household level.

Double-outlet right atrium in a 9 year-old cat.
J Vet Cardiol (2014)
Durham, J., and H. Maisenbacher
Double-outlet right atrium (DORA) is a type of atrioventricular septal defect that is described as an extreme leftward deviation of the lower portion of the interatrial septum, resulting in insertion into the atrial wall left and posterior to the mitral orifice. This rare anomaly, which has been reported in humans and only just recently in cats, was identified by transthoracic echocardiography in a 9 year-old cat that was presented for further evaluation of a tachyarrhythmia and cardiomegaly. This case report describes the diagnostic findings in this cat and summarizes the anatomy, classification and clinical consequences of this rare congenital heart defect.

High levels of Trypanosoma cruzi DNA determined by qPCR and infectiousness to Triatoma infestans support dogs and cats are major sources of parasites for domestic transmission.
Enriquez, G. F., J. Bua, M. M. Orozco, S. Wirth, A. G. Schijman, R. E. Gurtler, and M. V. Cardinal
The competence of reservoir hosts of vector-borne pathogens is directly linked to its capacity to infect the vector. Domestic dogs and cats are major domestic reservoir hosts of Trypanosoma cruzi, and exhibit a much higher infectiousness to triatomines than seropositive humans. We quantified the concentration of T. cruzi DNA in the peripheral blood of naturally-infected dogs and cats (a surrogate of intensity of parasitemia), and evaluated its association with infectiousness to the vector in a high-risk area of the Argentinean Chaco. To measure infectiousness, 44 infected dogs and 15 infected cats were each exposed to xenodiagnosis with 10-20 uninfected, laboratory-reared Triatoma infestans that blood-fed to repletion and were later individually examined for infection by optical microscopy. Parasite DNA concentration (expressed as equivalent amounts of parasite DNA per mL, Pe/mL) was estimated by real-time PCR amplification of the nuclear satellite DNA. Infectiousness increased steeply with parasite DNA concentration both in dogs and cats. Neither the median parasite load nor the mean infectiousness differed significantly between dogs (8.1Pe/mL and 48%) and cats (9.7Pe/mL and 44%),
respectively. The infectiousness of dogs was positively and significantly associated with parasite load and an index of the host’s body condition, but not with dog’s age, parasite discrete typing unit and exposure to infected bugs in a random-effects multiple logistic regression model. Real-time PCR was more sensitive and less time-consuming than xenodiagnosis, and in conjunction with the body condition index, may be used to identify highly infectious hosts and implement novel control strategies.

Ultrasonographic Percutaneous Anatomy of the Atlanto-Occipital Region and Indirect Ultrasound-Guided Cisternal Puncture in the Dog and the Cat.

Etienne, A. L., F. Audigie, D. Peeters, A. Gabriel, and V. Busoni

Cisternal puncture in dogs and cats is commonly carried out. This article describes the percutaneous ultrasound anatomy of the cisternal region in the dog and the cat and an indirect technique for ultrasound-guided cisternal puncture. Ultrasound images obtained ex vivo and in vivo were compared with anatomic sections and used to identify the landmarks for ultrasound-guided cisternal puncture. The ultrasound-guided procedure was established in cadavers and then applied in vivo in seven dogs and two cats. The anatomic landmarks for the ultrasound-guided puncture are the cisterna magna, the spinal cord, the two occipital condyles on transverse images, the external occipital crest and the dorsal arch of the first cervical vertebra on longitudinal images. Using these ultrasound anatomic landmarks, an indirect ultrasound-guided technique for cisternal puncture is applicable in the dog and the cat.

Radiographic and histopathologic characteristics of pulmonary fibrosis in nine cats.


Pulmonary fibrosis is a progressive fatal interstitial lung disease that is often idiopathic, occurs in multiple species, and may be caused by a number of inciting factors. The purpose of this retrospective, multicenter study was to describe the radiographic and histopathologic characteristics of idiopathic and induced pulmonary fibrosis in a group of cats. Cats with thoracic radiographs and histopathologically confirmed pulmonary fibrosis were recruited using the American College of Veterinary Radiology list serve. A board-certified veterinary radiologist and diagnostic imaging intern reviewed radiographs and recorded characteristics by consensus. Findings from additional imaging modalities were also recorded when available. All histopathology samples were re-reviewed by a veterinary pathology resident. A total of nine cats met inclusion criteria. All patients had a broad range of radiographic characteristics that included broncho-interstitial pattern, alveolar pattern, pulmonary masses, pulmonary bullae, pleural effusion, and cardiomegaly. Cats with available echocardiographic studies had characteristics that included right ventricular dilation and hypertrophy and pulmonary arterial hypertension interpreted to be secondary to primary lung disease. Cats with available CT studies had characteristics that included focally increased soft tissue attenuation, masses, and ventral consolidation that exhibited no improvement with dorsal versus ventral recumbency. Histopathology showed pulmonary fibrosis, type II pneumocyte hyperplasia, and smooth muscle hypertrophy in all patients. Epithelial metaplasia was present only in one patient. Findings from the current study indicated that cats with pulmonary fibrosis have highly variable radiographic characteristics and that these characteristics may mimic other diseases such as asthma, pneumonia, pulmonary edema, or neoplasia.

Veterinary provision of analgesia for domestic cats (Felis catus) undergoing gonadectomy: a comparison of samples from New Zealand, Australia and the United Kingdom.

Farnworth, M., N. Adams, A. Keown, N. Waran, and K. Stafford

AIM: To compare the use and provision of analgesia to cats undergoing gonadectomy by a sample of veterinarians in New Zealand, Australia and the United Kingdom (UK). METHODS: Small animal veterinarians’ views and practices on provision of analgesia to cats at three different time phases (pre/intra-operatively, post-operatively and post-discharge) were gathered using an on-line questionnaire. Respondents were also asked to state the pharmacological agent(s) used and the dosage rate(s). Differences in provision of analgesia were assessed relative to the respondent using binary logistic regression. The effects of gender of the patient and time of provision were explored using McNewar’s Test and Cochran’s
Q, respectively. Differences between drug types used amongst countries were tested using chi(2) analysis. RESULTS: There were 717 responses to the survey. Of these 249 (34.7%) were from New Zealand, 269 (37.5%) were from the UK and 199 (27.8%) from Australia. The prevalence of analgesia provision declined across the three different time phases for spaying and castration (both p<0.001). Provision of analgesia for castration was less than for spaying at each of the pre/intra-operative (p=0.002), post-operative (p<0.001) and after discharge (p<0.001) phases. Post-operative provision of analgesia following both castration (p<0.001) and spaying (p<0.001) differed amongst countries of practice. Veterinarians in Australia and New Zealand were more likely to provide post-operative analgesia for both castration and spaying than those from the UK (p<0.001). Veterinarians from the UK more commonly used non-steroidal anti-inflammatory drugs (NSAID) in the pre/intra-operative phase (p<0.001) than veterinarians from either New Zealand or Australia.

CONCLUSIONS AND CLINICAL RELEVANCE: Contemporary use of analgesics for cats appears focused on provision at clinic and may not address the effects of surgery beyond the first 24 hours. The UK, Australia and New Zealand clearly differ in the types of analgesia administered, possibly reflecting differing professional considerations of the risks associated with the use of NSAID. In the interests of animal welfare, pain relief should perhaps be provided or offered more frequently for owner administration.

Polyostotic hyperostosis in a domestic shorthair cat.
Clinical presentation: An 11-year-old male neutered domestic shorthair cat was presented for investigation of weight loss and inappetence. On physical examination there was palpable enlargement and thickening of many bones, and this finding was confirmed radiographically. Proposed diagnosis: Based on clinical, radiological and histopathological findings, a polyostotic bone disease, best described as generalised idiopathic hyperostosis, was diagnosed. This condition has not been reported in cats previously. Canine and human diseases with similarities to this presentation are discussed.

Lagochilascariasis in cats (Felis catus domesticus) in southern Brazil.
Lagochilascariasis, a parasitic disease little known in Brazil, is caused by an ascarid nematode that has a peculiar life cycle, with a predilection site for the cervical region in the final hosts: humans, cats and dogs. We aimed to record the occurrence of Lagochilascaris minor in domestic cats from rural areas in the Municipality of Pelotas, Rio Grande do Sul State, Brazil, with reports of clinical signs and the treatment applied.

A critically appraised topic (CAT) to compare the effects of single and multi-cat housing on physiological and behavioural measures of stress in domestic cats in confined environments.
Finka, L. R., S. L. Ellis, and J. Stavisky
BACKGROUND: Domestic cats have evolved from solitary, asocial predators and whilst they may display social behaviours, they can still exist as solitary survivors. Over-population and relinquishment of pet cats are ubiquitous problems worldwide, and rehoming centres (also known as rescues/ shelters) aim to ameliorate this by holding cats in confinement for a variable period until a new home is found. The provision of optimal housing for large numbers of cats in close confinement, such as in rehoming centres, is therefore inherently difficult. Under these conditions there is the potential for individuals to develop signs of physical and psychological ill health, and thus experience compromised welfare. Available information regarding housing practices that maximise welfare currently provides conflicting results, and as a consequence there are no unanimous housing recommendations. The aim of this study was therefore to review the evidence on the impact of single housing compared to multi-cat housing on stress in confined cats, as measured by physiological and/or behavioural outcomes. The review was conducted using a Critically Appraised Topic (CAT) format. A systematic search of electronic databases (CAB Abstracts, Zoological Records and Medline) was carried out to identify peer-reviewed literature comparing single and multi-cat housing in confined environments. RESULTS: A total of 959 papers were initially identified, six of
which met sufficient criteria based on their relevance to be included within this review. All of the studies had significant limitations in design and methodology, including a lack of information on how groups were assigned, inconsistent handling and enrichment provision between groups, and lack of information on the socialisation status of cats. CONCLUSIONS: Whilst some studies suggested that single housing may be less stressful for cats, others suggested group housing was less stressful. Several other important factors were however identified as potential mediators of stress within the different housing systems, and recommendations based upon these findings are presented.

**Analytical performance of a dry chemistry analyzer designed for in-clinic use.**

*Vet Clin Pathol (2014)*

**Flatland, B., L. C. Breickner, and M. M. Fry**

**BACKGROUND:** The Heska Dri-Chem 4000 uses dry slide technology to evaluate serum or plasma. No previous independent performance evaluation is published to the authors’ knowledge. **OBJECTIVES:** The objectives were to (1) characterize analytical performance of a Dri-Chem 4000 by measuring precision and bias, (2) compare analytical performance of that Dri-Chem 4000 unit with a predetermined quality requirement, and (3) determine whether statistical QC of the Dri-Chem 4000 is possible using the 13s control rule. **METHODS:** Sixteen analytes were measured using plasma from dogs, cats, and horses. Coefficient of variation (CV), bias, and observed total error (TEobs) were calculated. TEobs was compared with allowable total error (TEa). Sigma metric and quality goal index were calculated where relevant. QC validation was performed. **RESULTS:** Bias and TEobs calculated using quality control material (QCM) data were smaller than those calculated using method comparison data. Using TEobs calculated from species-specific CV and QCM-based bias, 100% of analytes in each species met ASVCP-recommended TEa. Desired error detection and false rejection rates were achieve using the 13s control rule and ASVCP-recommended TEa values for 9/16 (56%) of analytes in dogs, 9/14 (64%) of analytes in cats, and 8/13 (62%) of analytes in horses. **CONCLUSIONS:** Analytical performance of the Dri-Chem 4000 is comparable to that reported by other authors for other small benchtop biochemistry analyzers. Statistical QC using a simple control rule is possible for most analytes in dogs, cats, and horses.

**A polymorphism in the melanocortin 4 receptor gene (MC4R:c.92C>T) is associated with diabetes mellitus in overweight domestic shorthaired cats.**


**Forcada, Y., A. Holder, D. B. Church, and B. Catchpole**

**BACKGROUND:** Feline diabetes mellitus (DM) shares many pathophysiologic features with human type 2 DM. Human genome-wide association studies have identified genes associated with obesity and DM, including melanocortin 4 receptor (MC4R), which plays an important role in energy balance and appetite regulation. **HYPOTHESIS/OBJECTIVES:** To identify single nucleotide polymorphisms (SNPs) in the feline MC4R gene and to determine whether any SNPs are associated with DM or overweight body condition in cats. **ANIMALS:** Two-hundred forty domestic shorthaired (DSH) cats were recruited for the study. Of these, 120 diabetics were selected (60 overweight, 60 lean), along with 120 nondiabetic controls (60 overweight and 60 lean). Males and females were equally represented. **METHODS:** A prospective case-control study was performed. Genomic DNA was extracted from blood samples and used as template for PCR amplification of the feline MC4R gene. The coding region of the gene was sequenced in 10 cats to identify polymorphisms. Subsequently, genotyping by restriction fragment length polymorphism (RFLP) analysis assessed MC4R:c.92C>T allele and genotype frequencies in each group of cats. **RESULTS:** No significant differences in MC4R:c.92C>T allele or genotype frequencies were identified between nondiabetic overweight and lean cats. In the overweight diabetic group, 55% were homozygous for the MC4R:c.92C allele, compared to 33% of the lean diabetics and 30% of the nondiabetics. The differences between the overweight diabetic and the nondiabetics were significant (P <.01). **CONCLUSIONS AND CLINICAL IMPORTANCE:** We identified a polymorphism in the coding sequence of feline MC4R that is associated with DM in overweight DSH cats, similar to the situation in humans.

**A randomized study assessing the effect of diet in cats with hypertrophic cardiomyopathy.**


**Freeman, L. M., J. E. Rush, S. M. Cunningham, and B. J. Bulmer**
BACKGROUND: Diet might influence progression of hypertrophic cardiomyopathy (HCM). OBJECTIVE: To investigate whether diet composition could alter clinical, biochemical, or echocardiographic variables in cats with HCM. ANIMALS: Twenty-nine cats with HCM (International Small Animal Cardiac Health Council stage 1b) examined at a university teaching hospital. METHODS: Randomized, placebo-controlled trial. After physical examination, echocardiogram, and blood collection, cats were randomized to 1 of 3 diets, which varied in carbohydrate and fat content and ingredients. Measurements were repeated after 6 months. RESULTS: There were no significant differences among the 3 groups at baseline. After 6 months, there were no significant changes in the primary endpoints, left ventricular free wall (Group A, P = .760; Group B, P = .475; Group C, P = .066) or interventricular septal thickness in diastole (Group A, P = .528; Group B, P = .221; Group C, P = .097). Group A had significant increases in BUN (P = .008) and cholesterol (P = .021), while Group B had significant increases in BUN (P = .008), cholesterol (P = .007), and triglycerides (P = .005), and significant decreases in NT-proBNP (P = .013) and hs-troponin I (P = .043). Group C had significant decreases in body weight (P = .021), left atrial dimension (P = .035), interventricular septal thickness in systole (P = .038), and liver enzymes (P = .034–.038). CONCLUSIONS AND CLINICAL IMPORTANCE: These data suggest that diet might influence some clinical, biochemical, and echocardiographic variables in cats with HCM.

Acute dacryocystitis: another clinical manifestation of sporotrichosis.
Sporotrichosis associated with exposure to domestic cats is hyperendemic in Rio de Janeiro, Brazil. A review of the clinical records at our institute revealed four patients with clinical signs of dacryocystitis and a positive conjunctival culture for Sporothrix who were diagnosed with Sporothrix dacryocystitis. Three patients were children (< 13 years of age) and one patient was an adult. Two patients reported contact with a cat that had sporotrichosis. Dacryocystitis was associated with nodular, ulcerated lesions on the face of one patient and with granulomatous conjunctivitis in two patients; however, this condition manifested as an isolated disease in another patient. All of the patients were cured of the fungal infections, but three patients had chronic dacryocystitis and one patient developed a cutaneous fistula. Sporotrichosis is usually a benign disease, but may cause severe complications when the eye and the adnexa are affected. Physicians, especially ophthalmologists in endemic areas, should be aware of the ophthalmological manifestations and complications of sporotrichosis.

Survey to investigate pet ownership and attitudes to pet care in metropolitan Chicago dog and/or cat owners.
Freitvald, A., A. Litster, and H. Y. Weng
The aims of this descriptive cross-sectional study were to investigate dog and cat acquisition and attitudes toward pet care among residents of the Chicago area (zip codes 60600-60660); to compare data obtained from owners of shelter-acquired pets with those of residents who acquired their pets from other sources; to compare data from dog owners with cat owners; and to compare pet health practices among the respondents of different zip code income groups. In-person surveys administered at five pet store locations collected data from 529 respondents, representing 582 dogs and 402 cats owned or continuously cared for in the past 3 years. Median household income data for represented zip codes was also obtained. Shelters were the most common source of cats (p<0.01) and were the second most common source of dogs. Cats were more likely to have been acquired as strays, while dogs were more likely to have been acquired from friends/family/neighbors, pet stores, breeders or rescue organizations and to be kept as outdoor-only pets (p<0.01). More cats were kept per household than dogs (dogs mean=1.32/household; cats mean=1.78/household; p<0.01). Pet owners were most commonly ‘very likely’ (5 on a 1-5/5 Likert scale) to administer all hypothetical treatments discussed, although cat owners were less likely to spend time training their pet (p=0.05). Cat owners were less likely to have taken their pet to a veterinarian for vaccinations or annual physical exams (p<0.01). Shelter-acquired cats were significantly more likely to have been taken by their owners to the veterinarian for annual exams (p=0.05) than cats obtained as strays. Owners of shelter-acquired pets were at least as willing as other respondents to administer hypothetical treatments and pay >=$1000 for veterinary treatment. Respondents from site #3 lived in zip codes that had relatively lower median household incomes (p<0.01) and were less likely to spend >=$1000 on their pets than those at the four other sites (p<0.01). Over 90% of pet owners from all acquisition categories expressed very high levels of attachment (>=8/10/10 on a Likert scale), except for owners of cats acquired as strays (84.9%) or from the ‘other’ category (75.0%). Survey respondents commonly acquired their pets from shelters and those who did were at least as willing to pay for and provide veterinary care as respondents who owned pets acquired from other
sources. The data collected provides a snapshot of the attitudes of survey respondents in the Chicago area toward pet acquisition and care.

Microsporidia detection and genotyping study of human pathogenic E. bieneusi in animals from Spain.
Microsporidia are ubiquitous parasites infecting all animal phyla and we present evidence that supports their zoonotic potential. Fecal samples taken from domestic (cats and dogs), farm (pigs, rabbits and ostriches) and wild animals (foxes) from different provinces of Spain were evaluated for microsporidia infection by light microscopy and PCR. After Microsporidia species identification, E. bieneusi genotypes were additionally studied by sequence analysis of the ITS region. Eighty-five samples out of 159 exhibited structures that were compatible with microsporidia spores by Webers stain with 37 of them being confirmed by PCR. Microsporidia species identified included E. bieneusi, E. intestinalis and A. algerae. We report the first diagnosis of E. intestinalis and E. bieneusi in ostriches and A. algerae in pigs. We also provide new information on the molecular characterization of E. bieneusi isolates both in rabbits and ostriches. All of the E. bieneusi genotypes identified belonged to the zoonotic group of genotypes (Group I) including genotypes A (dogs), I (pigs), D (rabbits and foxes) and type IV (ostriches). Our results demonstrate that microsporidia are present in domestic, farm and wild animals in Spain, corroborating their potential role as a source of human infection and environmental contamination.

Emergent presentation of a cat with dystrophin-deficient muscular dystrophy.
Gambino, A. N., P. J. Mouser, G. D. Shelton, and N. J. Winand
This report describes a case of feline dystrophin-deficient muscular dystrophy (DDMD) with an atypical clinical presentation. A novel gene mutation is reported to be responsible for dystrophin-deficient hypertrophic muscular dystrophy. In an emergency setting, clinicians should be aware of muscular dystrophy in young cats and the importance of elevated creatine kinase (CK) activity. Muscular dystrophy is rare but can present both a diagnostic and therapeutic challenge in an emergency setting. Patients with muscular dystrophy have a progressive disease with no specific treatment and have an increased risk for death during their hospital stay.

Ghys, L., D. Paepe, P. Smets, H. Lefebvre, J. Delanghe, and S. Daminet
The occurrence of chronic kidney disease is underestimated in both human and veterinary medicine. Glomerular filtration rate (GFR) is considered the gold standard for evaluating kidney function. However, GFR assessment is time-consuming and labor-intensive and therefore not routinely used in practice. The commonly used indirect GFR markers, serum creatinine (sCr) and urea, are not sufficiently sensitive or specific to detect early renal dysfunction. Serum cystatin C (sCysC), a proteinase inhibitor, has most of the properties required for an endogenous GFR marker. In human medicine, numerous studies have evaluated its potential use as a GFR marker in several populations. In veterinary medicine, this marker is gaining interest. The measurement is easy, which makes it an interesting parameter for clinical use. This review summarizes current knowledge about cystatin C (CysC) in humans, dogs, and cats, including its history, assays, relationship with GFR, and biological and clinical variations in both human and veterinary medicine.

Analytical validation of a human particle-enhanced nephelometric assay for cystatin C measurement in feline serum and urine.
Vet Clin Pathol (2014)
BACKGROUND: In people and dogs, Cystatin C (CysC), a renal glomerular and tubular marker, seems superior to serum creatinine to estimate the glomerular filtration rate (GFR). A particle-enhanced nephelometric immunoassay is available to
measure human CysC, but there are no reports in cats. OBJECTIVE: The goal of this study was the validation of the human CysC nephelometric assay with feline serum and urine, and to perform a pilot study comparing serum and urine CysC between healthy cats and cats with chronic kidney disease (CKD). METHODS: Western blot analysis was used to assess cross-reactivity between the polyclonal rabbit anti-human CysC antibody and feline CysC. Imprecision and linearity were determined for feline serum and urine CysC. Serum and urine CysC were measured in 10 healthy and 10 CKD cats.

RESULTS: Cross-reactivity between the polyclonal rabbit anti-human CysC antibody and feline CysC was demonstrated. Intra- and inter-assay coefficients of variation in feline serum and urine were 1.3% and 0.4%, and 12.5%, and 4.1%, respectively. Cats with CKD had a significantly higher serum CysC concentration (1.24 [0.63-2.99] vs 0.79 [0.43-1.05] mg/L; P =.02) and urine CysC/urinary Creatinine (uCr) ratio (565.6 [0-1311] vs < 0.049/uCr mg/mol; P =.005) compared with healthy cats.

CONCLUSIONS: The human nephelometric assay showed satisfactory validation results for feline CysC. Cats with CKD had a significantly higher sCysC concentration and uCysC/uCr ratio compared with healthy cats. Additional studies are necessary to evaluate CysC as an early marker of renal damage in cats.

Development of the feline lungworms Aelurostrongylus abstrusus and Troglostrongylus brevior in Helix aspersa snails.
Parasitology (2014) 141:563-569.
Aelurostrongylus abstrusus (Strongylida, Angiostrongylidae) and Troglostrongylus brevior (Strongylida, Crenosomatidae) are regarded as important lungworm species of domestic felids, with the latter considered an emerging threat in the Mediterranean region. The present study aimed to assess their concurrent development in the mollusc Helix aspersa (Pulmonata, Helicidae). Thirty snails were infested with 100 first-stage larvae (L1) of A. abstrusus and T. brevior, isolated from a naturally infected kitten. Larval development was checked by digesting five specimens at 2, 6 and 11 days post infestation. Larvae retrieved were morphologically described and their identification was confirmed by specific PCR and sequencing. All H. aspersa snails were positive for A. abstrusus and T. brevior, whose larval stages were simultaneously detected at each time point. In addition, snails were exposed to outdoor conditions and examined after overwintering, testing positive up to 120 days post infestation. Data herein presented suggest that A. abstrusus and T. brevior develop in H. aspersa snails and may eventually co-infest cats. Data on the morphology of both parasitic species in H. aspersa provide additional information on their development and identification, to better understand the population dynamics of these lungworms in receptive snails and paratenic hosts.

Mycobacterium bovis infection in cats.
Gibbens, N.

A comparison of anaesthetic recoveries in cats following induction with either alfaxalone or ketamine and diazepam.
Gieseg, M., H. Hon, J. Bridges, and V. Walsh
AIM: To determine if cats anaesthetised with alfaxalone have different recoveries to cats anaesthetised with a combination of ketamine and diazepam. METHODS: Anaesthesia for ovariohysterectomy was induced in cats with either alfaxalone (n=23) or a combination of ketamine and diazepam (n=22). All cats were premedicated with combinations of acepromazine and morphine. Recoveries were scored using a categorical grading scheme applied to 18 parameters over 60 minutes following extubation. The parameters scored covered movement, sensitivity to touch, sound and light, body position, sneezing and vocalisation. One person scored all recoveries and they were blinded to the induction drug used. Scores were compared between drugs at different times using the Kruskal-Wallis rank sum test. RESULTS: Recovery scores were not normally distributed. Analysis of the data using the Kruskal-Wallis rank sum test revealed that cats induced with alfaxalone showed an increase in recovery scores at 5 minutes for pawing at the head (p=0.001). No parameters differed significantly at 10 and 20 minutes. For cats anaesthetised with ketamine and diazepam there was an increase at 30 minutes in pacing, jerky
Comparison of rectal and axillary temperatures in dogs and cats.

Corneal anesthesia following application of 0.4% oxybuprocaine hydrochloride ophthalmic solution to normal feline eyes.
Giudici, V., S. Baeza, J. Y. Douet, and A. Regnier
OBJECTIVE: To evaluate the loss and recovery of corneal sensitivity after instillation of 0.4% oxybuprocaine hydrochloride solution in the normal feline eye. ANIMAL STUDIED: Eighteen European shorthair cats free of ocular disease PROCEDURES: Baseline corneal touch threshold (CTT) readings were obtained bilaterally with a Cochet-Bonnet aesthesiometer prior to treatment. Subsequently, each cat received a single drop of 0.4% oxybuprocaine ophthalmic solution in the right eye and one drop of sterile 0.9% NaCl in the left eye to serve as control. The corneal touch threshold (CTT) of both eyes was then measured 1 min after drug administration and every 5 min for 60 min. The potential for ocular irritation following oxybuprocaine application was also evaluated. RESULTS: Baseline CTT readings were not significantly different (P > 0.05) between the control and oxybuprocaine-treated eyes with values of 1.75 +/- 0.31 cm and 1.75 +/- 0.30 cm, respectively. In control eyes, mean CTT did not significantly change (P > 0.05) during the study period. By contrast, after oxybuprocaine application mean CTT was significantly reduced from baseline (P < 0.05) for 45 min. Maximal corneal anesthesia, with a CTT value of 0, was achieved at 1 and 5 min in all treated eyes. A markedly reduced mean CTT of 0.14 +/- 0.23 cm was still present at 20 min. Age and gender did not significantly affect corneal anesthesia. No clinically relevant ocular side effects occurred during the observation period. CONCLUSION: This is the first study that provides objective information on the depth and duration of corneal anesthesia following instillation of oxybuprocaine in healthy feline eyes.

Reversibility of germinative and endocrine testicular function after long-term contraception with a GnRH-agonist implant in the tom-a follow-up study.
Goericke-Pesch, S., P. Georgiev, A. Antonov, A. Vodenicharov, C. Navarro, and A. Wehrend
A significantly reduced gonadotropin and testosterone secretion is a well-described result of long-term administration of GnRH agonists in the male dog and cat. To date, no data are available about the duration of efficacy and the reversibility of treatment-induced effects after long-term treatment with a 4.7 mg deslorelin implant. Seven healthy male European Shorthair cats (3.2 +/- 0.5 kg, 1-6 years) were treated with a 4.7 mg deslorelin implant. Blood samples (testosterone, T), testicular volume, penile spines, and mating behavior were recorded once weekly. Considering T > 0.5 ng/mL as the biological endpoint, mean duration of efficacy was 78.8 +/- 12.9 weeks (range: 61.7-100.7 weeks) with T concentrations increasing rapidly after the last T less than 0.1 ng/mL (basal) (P < 0.0001), and pretreatment T concentrations being reached after 3 weeks. Testicular volume rapidly increased after the first increase of T (P < 0.001) with pretreatment testicular volume being reached after 6.9 +/- 3.4 weeks (5-11 weeks). “Normal” libido reoccurred 88.7 +/- 12.4 weeks after treatment, and “normal” mating behavior was observed even later. Fertile matings occurred 7 to 42 weeks after the last T less than 0.1 ng/mL with a mean of 4.0 +/- 0.0 kittens, and 13.6 to 47.6 weeks afterwards testicular histology revealed normal spermatogenesis. The present data confirm that the use of slow-release GnRH-agonist implants containing deslorelin in tomcats represents an effective and safe reversible alternative for long-term contraception; however, as number of animals is low, further fertility trials are recommended.

Comparison of rectal and axillary temperatures in dogs and cats.
Goic, J. B., E. L. Reineke, and K. J. Drobatz

Objective—To compare rectal versus axillary temperatures in dogs and cats. Design—Prospective observational study. Animals—94 dogs and 31 cats. Procedures—Paired axillary and rectal temperatures were measured in random order with a standardized method. Animal signalment, initial complaint, blood pressure, blood lactate concentration, and variables associated with vascular perfusion and coat were evaluated for associations with axillary and rectal temperatures. Results—Axillary temperature was positively correlated with rectal temperature (rho = 0.75 in both species). Median axillary temperature (38.4 degrees C [101.1 degrees F] in dogs, and 38.4 degrees C [101.2 degrees F] in cats) was significantly different from median rectal temperature in dogs (38.9 degrees C [102.0 degrees F]) but not in cats (38.6 degrees C [101.5 degrees F]). Median rectal-axillary gradient (difference) was 0.4 degrees C (0.7 degrees F; range, -1.3 degrees to 2.3 degrees C [-2.4 degrees to 4.1 degrees F]) in dogs and 0.17 degrees C (0.3 degrees F; range -1.1 degrees to 1.6 degrees C [-1.9 degrees to 3 degrees F]) in cats. Sensitivity and specificity for detection of hyperthermia with axillary temperature were 57% and 100%, respectively, in dogs and 33% and 100%, respectively, in cats; sensitivity and specificity for detection of hypothermia were 86% and 87%, respectively, in dogs and 80% and 96%, respectively, in cats. Body weight (rho = 0.514) and body condition score (rho = 0.431) were correlated with rectal-axillary gradient in cats. Conclusions and Clinical Relevance—Although axillary and rectal temperatures were correlated in dogs and cats, a large gradient was present between rectal temperature and axillary temperature, suggesting that axillary temperature should not be used as a substitute for rectal temperature.

Effects of high-fat and high-carbohydrate diets on fat and carbohydrate oxidation and plasma metabolites in healthy cats.

High-fat (HF) or high-carbohydrate (HC) diets (30% fat, 18.9% carbohydrate; HF and 10% fat, 46.3% carbohydrate; HC) and lengths of adaptation were investigated in cats (Felis catus; 10 +/- 2 months, 3.6 +/- 0.3 kg). Cats randomly received each treatment for 14 days in a crossover design with a 14-day washout period between each diet. Three 22-h indirect calorimetry studies were conducted after acute (day 0), semichronic (day 4) and chronic (day 13) dietary exposure. Blood samples were collected after a 24-h fast on days 1, 5 and 14. When cats consumed the HC and HF diet, oxidation of the restricted nutrient exceeded intake while oxidation of the nutrient in excess matched intake. Mean max energy expenditure (EE) of cats consuming the HF and HC diet were 107 and 102 kcal/kg(0.67) /day and occurred at a mean of 4 and 12 h post-feeding respectively. Maximal fat (0.90 g/h) and carbohydrate (carbohydrate; 1.42 g/h) oxidation were attained at 26 min and 10.4 h post-feeding respectively. The changes observed in macronutrient oxidation and EE suggest that cats adapt whole-body nutrient metabolism in response to changes in dietary macronutrient content, but may require longer than 14 day to adapt to a macronutrient that is present at a lower concentration in the diet.

Short-term outcome following partial or complete liver lobectomy with a commercially prepared self-ligating loop in companion animals: 29 cases (2009-2012).
Goodman, A. R., and S. A. Casale

OBJECTIVE: To evaluate the clinical use of a self-ligating loop (SLL) for partial or complete liver lobectomy in a variety of companion animal species. DESIGN: Retrospective case series. ANIMALS: 22 dogs, 2 cats, 4 rabbits, and 1 ferret with partial or complete liver lobectomy performed with an SLL. PROCEDURES: Medical records of companion animal patients that underwent partial or complete liver lobectomy with an SLL between 2009 and 2012 at the Angell Animal Medical Center were reviewed, and signalment, intraoperative and postoperative complications, histologic diagnosis, hospital discharge (yes or no), time to hospital discharge, and short-term survival rate were recorded. Follow-up information was obtained through evaluation of medical records. RESULTS: 28 of 29 (97%) patients were discharged from the hospital and survived at least 5 days after discharge. Of the 29 patients, 3 underwent 2 liver lobectomies. During 4 of 32 (12.5%) lobectomies, mild intraoperative bleeding occurred on the cut surface of the liver after transection. No transection performed with >/= 2 SLLs resulted in notable intraoperative bleeding. One of 29 (3.4%) patients had evidence of postoperative hemoabdomen, which was successfully treated with a single packed RBC transfusion. Expansion of the SLL diameter from 8 to 15 cm was accomplished to allow for resection of larger masses. CONCLUSIONS AND CLINICAL RELEVANCE: Use of an SLL for partial or complete liver lobectomy in a variety of companion animal species was a safe technique and was associated with low morbidity and mortality rates. Expansion of the ligature loop diameter and use of
Influence of the observer’s level of experience on systolic and diastolic arterial blood pressure measurements using Doppler ultrasonography in healthy, conscious cats.
Gouni, V., R. Tissier, C. Misbach, D. Balouka, H. Bueno, J. L. Pouchelon, H. P. Lefebvre, and V. Chetboul
The objective of this study was to determine the influence of the observer’s level of experience on within- and between-day variability, and the percentage of successful systolic (SAP) and diastolic arterial blood pressure (DAP) measurements obtained by Doppler ultrasonography (DU) in awake cats. For this purpose, six healthy, conscious cats were used and four observers with different levels of training performed 144 SAP and DAP measurements on 4 days using DU. Measurements were recorded five consecutive times, and mean values were used for statistical analysis. Only the two most skilled observers—a PhD student in cardiology and a Dipl. ECVIM-CA (cardiology)—had within- and between-day coefficients of variation (CVs) for SAP <16% (13-16%). Conversely, the two less experienced observers—a fifth-year student and an assistant—had high between-day CVs (61% and 73%). For DAP, only the most experienced observer (Dipl. ECVIM-CA) succeeded in 100% of the attempts, with within- and between-day CVs of 11% and 4%, respectively. Conversely, DAP could not be measured by the other three observers in 8%, 19% and 56% of attempts (from the highest to the lowest level of experience); therefore, the corresponding CV values could not be calculated. In conclusion, SAP may be assessed using DU in healthy awake cats with good repeatability and reproducibility by a well-trained observer. Measurement of DAP is more difficult than that of SAP, and needs a longer training period, which represents one of the limitations of DU in felines cats.

Detection of clinically relevant pain relief in cats with degenerative joint disease associated pain.
BACKGROUND: Detection of clinically relevant pain relief in cats with degenerative joint disease (DJD) is complicated by a lack of validated outcome measures and a placebo effect. HYPOTHESIS/OBJECTIVES: To evaluate a novel approach for detection of pain relief in cats with DJD. ANIMALS: Fifty-eight client-owned cats. METHODS: Prospective, double-masked, placebo-controlled, stratified, randomized, clinical study. Enrolled cats were 6-21 years of age, with owner-observed mobility impairment, evidence of pain in at least 2 joints during orthopedic examination, and overlapping radiographic evidence of DJD, and underwent a 2-week baseline period, 3-week treatment period with placebo or meloxicam, and 3-week masked washout period. Outcome measures were evaluated at days 0, 15, 36, and 57. RESULTS: Both groups significantly improved after the treatment period (day 36) on client-specific outcome measures (CSOM) and feline musculoskeletal pain index (FMPI) (P <.0001 for both); there was no difference between the groups on CSOM or FMPI score improvement. After the masked washout period, more cats that received meloxicam during the treatment period had a clinically relevant decrease in CSOM score (P = .048) and FMPI score (P = .021) than cats that received placebo. CONCLUSIONS AND CLINICAL IMPORTANCE: Using both a client-specific and a general clinical metrology instrument, owners of cats with DJD were able to detect evident recurrence of clinical signs after withdrawal of active medication than after withdrawal of placebo, and that this study design might be a novel and useful way to circumvent the placebo effect and detect the efficacy of pain-relieving medications.

Hypervitaminosis A-induced hepatic fibrosis in a cat.
RATIONALE: The excessive intake of vitamin A in the form of vitamin concentrate, supplement or vitamin-rich liver can result in hypervitaminosis A in man and animals. Although osteopathologies resulting from chronic vitamin A intoxication in cats are well characterized, no information is available concerning feline hypervitaminosis A-induced liver disease. CLINICAL SUMMARY: We report the first case of hepatic stellate cell lipidosis and hepatic fibrosis in a domestic cat that had been fed a diet based on raw beef liver. Radiographic examination revealed exostoses and ankylosis between vertebrae C1 and T7, compatible with deforming cervical spondylitis. Necropsy showed a slightly enlarged and light yellow to bronze liver. Microscopic and ultrastructural analyses of liver tissues revealed diffuse and severe liver fibrosis associated with multiple SLLs may be necessary for larger lobectomies.
Evoked Temporal Summation in Cats to Highlight Central Sensitization Related to Osteoarthritis-Associated Chronic Pain: A Preliminary Study.


In cats, osteoarthritis causes significant chronic pain. Chronicity of pain is associated with changes in the central nervous system related to central sensitization, which have to be quantified. Our objectives were 1) to develop a quantitative sensory testing device in cats for applying repetitive mechanical stimuli that would evoke temporal summation; 2) to determine the sensitivity of this test to osteoarthritis-associated pain, and 3) to examine the possible correlation between the quantitative sensory testing and assessment using other pain evaluation methods. We hypothesized that mechanical sub-threshold repetitive stimuli would evoke temporal summation, and that cats with osteoarthritis would show a faster response. A blinded longitudinal study was performed in 4 non-osteoarthritis cats and 10 cats with naturally occurring osteoarthritis. Quantification of chronic osteoarthritis pain-related disability was performed over a two week period using peak vertical force kinetic measurement, motor activity intensity assessment and von Frey anesthesiometer-induced paw withdrawal threshold testing. The cats afflicted with osteoarthritis demonstrated characteristic findings consistent with osteoarthritis-associated chronic pain. After a 14-day acclimation period, repetitive mechanical sub-threshold stimuli were applied using a purpose-developed device. Four stimulation profiles of predetermined intensity, duration and time interval were applied randomly four times during a four-day period. The stimulation profiles were different (P<0.001): the higher the intensity of the stimulus, the sooner it produced a consistent painful response. The cats afflicted with osteoarthritis responded more rapidly than cats osteoarthritis free (P = 0.019). There was a positive correlation between the von Frey anesthesiometer-induced paw withdrawal threshold and the response to stimulation profiles #2 (2N/0.4 Hz) and #4 (2N/0.4 Hz): Rhos = 0.64 (P = 0.01) and 0.63 (P = 0.02) respectively. This study is the first report of mechanical temporal summation in awake cats. Our results suggest that central sensitization develops in cats with naturally occurring osteoarthritis, providing an opportunity to improve translational research in osteoarthritis-associated chronic pain.

Feline excretion in domestic cat breeds: a preliminary investigation.

Hagen-Plantinga, E. A., G. Bosch, and W. H. Hendriks

The aim of this study was to determine possible differences in felinine excretion between domesticated cat breeds. For this purpose, urine was collected from a total of 83 privately owned entire male cats from eight different breeds in the Netherlands during the period of November 2010 till November 2011. In the collected samples, free felinine and creatinine concentrations were measured. Free felinine concentrations were expressed relative to the urinary creatinine concentration to compensate for possible variations in renal output. The mean (+/-SD) felinine:creatinine (Fel:Cr) ratio as measured over all cats was 0.702 (+/-0.265). Both the Abyssinian and Sphynx breeds showed the highest Fel:Cr ratio (0.878 +/- 0.162 and 0.878 +/- 0.341 respectively) which significantly differed from the ratios of the British Shorthairs (0.584 +/- 0.220), Birmans (0.614 +/- 0.266), Norwegian Forest cats (0.566 +/- 0.296) and Siberian cats (0.627 +/- 0.124). The Fel:Cr ratios of the Persians (0.792 +/- 0.284) and Ragdolls (0.673 +/- 0.256) showed no statistical difference with either of the other breeds. A significant proportion of the observed variation between the different feline breeds could be explained by hair growth, as both hair growth and felinine production compete for available cysteine. Shorthaired and hairless cat breeds generally showed a higher Fel:Cr ratio compared to longhaired cat breeds, with the exception of Persian cats. Further research is warranted to more closely study the effect of hair growth on felinine production.

Incidence of pyometra in Swedish insured cats.

Theriogenology (2014)
Hagman, R., B. Strom Holst, L. Moller, and A. Egenvall

Pyometra is a clinically relevant problem in intact female cats and dogs. The etiology is similar in both animal species, with the disease caused by bacterial infection of a progesterone-sensitized uterus. Here, we studied pyometra in cats with the aim to describe the incidence and probability of developing pyometra based on age and breed. The data used were reimbursed claims for veterinary care insurance or life insurance claims or both in cats insured in a Swedish insurance database from 1999 to 2006. The mean incidence rate (IR) for pyometra was about 17 cats per 10,000 cat years at risk (CYAR). Cats with pyometra were diagnosed at a median age of 4 years and a significant breed effect was observed. The breed with the highest IR (433 cats per 10,000 CYAR) was the Sphynx, and other breeds with IR over 60 cats per 10,000 CYAR were Siberian cat, Ocicat, Korat, Siamese, Ragdoll, Maine coon, and Bengal. Pyometra was more commonly diagnosed with increasing age, with a marked increase in cats older than 7 years. The mean case fatality rate in all cats was 5.7%, which is slightly higher than corresponding reports in dogs of 3% to 4%. Geographical location (urban or rural) did not affect the risk of developing the disease. The present study provides information of incidence and probability of developing pyometra based on age, breed, and urban or rural geographical location. These data may be useful for designing cat breeding programs in high-risk breeds and for future studies of the genetic background of the disease.

Interspecies transmission of canine influenza virus H5N2 to cats and chickens by close contact with experimentally infected dogs.

The novel H5N2 influenza virus, CA/SD/JT01/09, was isolated from the dog exhibiting respiratory signs in China in 2009. Dog to dog transmission of the novel H5N2 was previously confirmed. But interspecies transmission of the virus between dogs and the other animals has still remained unclear. To determine whether the virus can be transmitted directly from dogs to cats and chickens, we conducted contact exposure experiments. Susceptible cats and chickens were housed in the room which the novel H5N2 infected dogs were housed in, respectively. As a result, only one cat showed clear manifestations of H5N2 infection, but susceptibility of the other cats to H5N2 was confirmed by seroconversion. Eight of the exposure chickens showed clear manifestations of illness and 2 chickens died, and it demonstrates that chickens are susceptible to the recombinant H5N2. It implied that close contact between the H5N2-infected dogs and the cats and chickens resulted in spread of the virus to the sentinel animals.

Feline spinal cord gliomas: Clinicopathologic and diagnostic features of seven cases.
Hammond, J. J., A. Delahunta, E. N. Glass, M. Kent, B. A. Summers, and A. D. Miller

Intraparenchymal spinal cord tumors in the cat are rarely reported and often as single case reports. In the current study, the clinical, magnetic resonance imaging (MRI), histologic, and immunohistochemical features of 7 cases of intraparenchymal spinal cord tumors in the cat are described. All cats were domestic breed, ranged from 4 to 12 years of age (median 8 years), and included spayed females (5/7) and neutered males (2/7). The duration of clinical signs ranged from 2 weeks to 3 months. MRI revealed lesions that were hyperintense on T2-weighted images with variable contrast enhancement. All 7 tumors had histologic features consistent with glial origin: 3 were astrocytic (gemistocytic or fibrous), and 2 were oligoastrocytic. Single cases of oligodendroglioma and gliomatosis cerebri were also present in the study. Glial fibrillary acidic protein immunoreactivity was robust in the tumors that were predominately astrocytic, and the gliomatosis cerebri case had extensive BLA.36 and Iba1 immunoreactivity. Ki-67 immunoreactivity was variable and most abundant in the case of malignant oligoastrocytoma. The majority of peritumoral lymphocytes were CD3 positive. The current study expands upon the known reports of spinal cord neoplasia in the cat, confirms a caudal cervical segment predilection, and includes a report of gliomatosis cerebri in the spinal cord of a cat.

The Effect of Chinese Rhubarb, Rheum officinale, with and without Benazepril on the Progression of Naturally Occurring Chronic Kidney Disease in Cats.
Hanzlicek, A. S., C. J. Roof, M. W. Sanderson, and G. F. Grauer
Histopathological and immunohistochemical studies of apocrine sweat gland adenocarcinomas in cats.


Haziroglu, R., M. Haligur, and H. Keles

Seven adenocarcinomas of apocrine sweat glands among the 67 cutaneous tumours of cats were evaluated between 1980 and 2005. Histopathologically, three tumours were solid, tubular, tubular-ductal, tubular-cystic and papillar-cystic types were also diagnosed each one. Cuboidal and squamous epithelial cells surrounding the cystic lumina and their papillar extensions into the cyst lumens were evident in almost all tumour types. Besides, fibrovascular stroma which surrounding neoplastic foci showed proliferation and stromal invasion. Immunohistochemical features of these tumours were examined with pan-cytokeratin, vimentin and carcinoembryonic antigen.


Heath, S., and C. Wilson

As general veterinary practitioners, we have a duty of care that applies not only to the physical health needs of our patients but also to their mental well-being. Advising clients about how to enrich their home and kennel environments is an important part of fulfilling that duty of care and will also enrich the relationship between the veterinary practitioner and client. This article discusses how to optimize welfare for dogs and cats in the home and kennel environments through appropriate environmental enrichment and understanding of species-typical behavioral requirements.

Impact of the blood sampling site on time-concentration drug profiles following intravenous or buccal drug administration.


Hedges, A. R., B. H. Pypendop, Y. Shilo, S. D. Stanley, and J. E. Ilkiw

The aim of this study was to examine the effect of the sampling site on the drug concentration-time profile, following intravenous or buccal (often called ‘oral transmucosal’) drug administration. Buprenorphine (20 µg/kg) was administered IV or buccally to six cats. Blood samples were collected from the carotid artery and the jugular and medial saphenous veins for 24 h following buprenorphine administration. Buprenorphine concentration-time data were examined using noncompartmental analysis. Pharmacokinetic parameters were compared using the Wilcoxon signed rank test, applying the Bonferroni correction. Significance was set at P < 0.05. Following IV administration, no difference among the sampling sites was found. Following buccal administration, maximum concentration [jugular: 6.3 (2.9-9.8), carotid: 3.4 (1.9-4.9), medial saphenous: 2.5 (1.7-4.1) ng/mL], area under the curve [jugular: 395 (335-747), carotid: 278 (214-693), medial saphenous: 255 (188-608) ng.min/mL], and bioavailability [jugular: 47 (34-67), carotid: 32 (20-52), medial saphenous: 23 (16-55)%] were higher in the jugular vein than in the carotid artery and medial saphenous vein. Jugular venous blood
Effect of syringe and aggregate filter administration on survival of transfused autologous fresh feline red blood cells.
Heikes, B. W., and C. G. Ruaux
Objective: To assess the effect of transfusion using a syringe and microaggregate filter on short-term survival and circulating half-life of autologous feline RBCs. Design: Prospective, internally controlled, observational study.
Results: Anticoagulated whole blood (35 mL/cat) was collected in 2 equal aliquots. RBCs were washed and labeled at 2 different densities, before suspension in autologous plasma. Labeled RBCs were then transfused using 2 methods, gravity flow and pump delivery using a 20 mL syringe and 18 mum microaggregate filter. Whole blood samples were collected from each cat at 2-hour intervals for 12 hours following completion of the transfusions. Additional samples were collected at weekly intervals up to 6 weeks to assess circulating half-life of the transfused cells. Cell survival was assessed via flow cytometry. The proportion of transfused cells remaining in each of the 2 populations was measured. Biotinylated RBCs were readily detected in all cats over the 6-week sampling period. There was a significant decrease in both populations of labeled cells over the 6-week period (P < 0.01), as expected. There was no difference in probability that the RBCs would survive up to 12 hours immediately following transfusion, and no significant difference in survival between the 2 groups over 6 weeks. The average half-life of all labeled cells was approximately 23 days. Conclusions: We conclude that, in contrast to findings from dogs, transfusion of autologous feline RBCs using a syringe + aggregate filter method does not significantly impact short- or long-term survival of the transfused cells.

Neonatal aerosol exposure to Bermuda grass allergen prevents subsequent induction of experimental allergic feline asthma: Evidence for establishing early immunologic tolerance.
Vet Immunol Immunopathol (2014)
Heller, M. C., T. M. Lee-Fowler, H. Liu, L. A. Cohn, and C. R. Reinero
Allergic asthma is increasing in industrialized countries, especially in children. Rodent and human studies suggest an opportunity to “prevent” asthma in the perinatal period. The aims of this study were to create a more “natural” model of feline asthma by exposing offspring of asthmatic queens to Bermuda grass allergen (BGA) by inhalation only, and to investigate maternal-fetal-infant interactions in the development of asthma. Kittens from asthmatic queens were divided into four groups: maternal exposure to aerosolized BGA during the third trimester, neonatal exposure to aerosolized BGA in the first three months of life, both maternal and neonatal exposure, or saline control. Kittens failing to achieve an asthmatic phenotype based on bronchoalveolar lavage fluid (BALF) analysis by 6 months underwent traditional sensitization: adjuvanted allergen injection, intranasal allergen, and aerosol challenges. BALF was collected at 3, 4 and 6 months, and after sensitization at 8 months, and analyzed for eosinophil counts and BGA-specific IgG and IgA. Intradermal testing (IDT) was performed at 6 and 7 months. At six months none of the kittens had airway eosinophilia, BGA-specific IgG or IgA, and were non-responsive to IDT. After sensitization, kittens receiving neonatal aerosolization failed to develop airway eosinophilia as seen in the controls. Kittens exposed to BGA aerosols, either in-utero or neonatally, continued to lack IDT response. Chronic exposure to BGA aerosols failed to induce asthma in kittens, and instead tolerized the kittens to BGA. This is the first evidence that neonatal intervention could potentially “prevent” allergic asthma in cats.

Tail vaccination in cats: a pilot study.
Feline injection site sarcomas affect 1-10 cats per every 10,000 vaccinated and are associated with high mortality. Radical resection may be curative, but is often associated with prolonged recovery, disfigurement and loss of function when tumors occur at currently recommended injection sites. The objective of this study was to assess alternatives to currently recommended vaccination sites in terms of preference by oncology practitioners, ease of injection and serological responses. Surgical, radiation and medical oncology practitioners were surveyed regarding their preference for vaccination sites based on their experience with feline injection site sarcomas.
on the ease of tumor resection. A six-point Likert scale was used to measure each cat’s behavioral reaction to vaccination when injected subcutaneously in the distal hind limb or the distal tail. Serum collected before and 1-2 months after vaccination was tested for antibody titers against feline panleukopenia virus (FPV) and rabies virus (RV). The preferred sites for vaccination by 94 oncology practitioners were below the stifle (41%) and the tail (30%). There were no significant differences in the cats’ behavioral reaction to vaccination below the stifle (n = 31) and in the distal tail (n = 29). Of the cats seronegative for FPV at the time of vaccination, 100% developed protective antibody titers (>=40) against FPV 1-2 months following vaccination. For cats seronegative for RV, all but one cat (tail vaccine) developed acceptable antibody titers (>=0.5 IU/ml) against RV. Tail vaccination was well tolerated and elicited similar serological responses to vaccination in the distal limbs.

**Concurrent diseases and conditions in cats with renal infarcts.**


Hickey, M. C., K. Jandrey, K. S. Farrell, and D. Carlson-Bremer

BACKGROUND: Renal infarcts identified without definitive association with any specific disease process. OBJECTIVE: Determine diseases associated with diagnosis of renal infarcts in cats diagnosed by sonography or necropsy. ANIMALS: 600 cats underwent abdominal ultrasonography, necropsy, or both at a veterinary medical teaching hospital. METHODS: Information obtained from electronic medical records. Cats classified as having renal infarct present based on results of sonographic evaluation or necropsy. Time-matched case-controls selected from cats that underwent the next scheduled diagnostic procedure. RESULTS: 309 of 600 cats having diagnosis of renal infarct and 291 time-matched controls. Cats 7-14 years old were 1.6 times (odds ratio, 95% CI: 1.03-2.05, P = .03) more likely to have renal infarct than younger cats but no more likely to have renal infarct than older cats (1.4, 0.89-2.25, P = .14). All P = .14 are statistically significant. Cats with renal infarcts were 4.4 times (odds ratio, 95% CI: 2.63-7.68, P < .001) more likely to have HCM compared to cats without renal infarcts. Cats with renal infarcts were 0.7 times (odds ratio, 95% CI: 0.51-0.99, P = .046) less likely to have diagnosis of neoplasia compared to cats without renal infarcts. Cats with diagnosis of hyperthyroidism did not have significant association with having renal infarct. Cats with renal infarcts were 8 times (odds ratio, 95% CI: 2.55-25.40, P <=.001) more likely to have diagnosis of distal aortic thromboembolism than cats without renal infarcts. CONCLUSIONS AND CLINICAL IMPORTANCE: Cats with renal infarcts identified on antemortem examination should be screened for occult cardiomyopathy.

**Measurement of thyroxine and cortisol in canine and feline blood samples using two immunoassay analysers.**


Higgs, P., M. Costa, A. Freke, and K. Papasouliotis

OBJECTIVES: The AIA-360 (Tosoh Corporation) is an automated immunoassay analyser. The aims of this study were to estimate the precision of thyroxine and cortisol AIA-360 immunoassays in canine and feline samples and to compare the results produced with those obtained by a chemiluminescence analyser (Immulite(R) 1000, Siemens). METHODS: Blood samples from 240 clinical cases (60 dogs and 60 cats for both thyroxine and cortisol) were analysed using both instruments. RESULTS: Deming regression calculations showed excellent correlation (thyroxine, canine rs = 0.94, feline rs = 0.97; cortisol, canine rs = 0.97, feline rs = 0.9). Agreement between the two instruments was examined by Bland-Altman difference plots, which identified wide confidence intervals and outliers for thyroxine (canine n = 6, feline n = 4) and cortisol (canine n = 3, feline n = 4) results. Inter/intra-run precision of the AIA-360 was excellent for both cortisol and thyroxine (coefficients of variation <7%). CLINICAL SIGNIFICANCE: The instrument showed excellent correlation for cortisol and thyroxine in canine and feline samples demonstrating that the AIA-360 can be used in clinical practice. The agreement studies suggest that the results from the AIA-360 cannot be used interchangeably with those generated by the Immulite 1000 and should be interpreted using reference intervals that have been established specific to the AIA-360.

**The pharmacokinetics of methimazole in a novel lipophilic formulation administered transdermally to healthy cats.**


Hill, K., M. Gieseg, J. Bridges, and J. Chambers

AIM: To determine the pharmacokinetics of a novel lipophilic formulation of transdermal methimazole compared to oral
carbimazole. METHODS: Healthy cats received 5 mg carbimazole orally every 12 hours for 13 treatments (n=6), then received transdermal methimazole (n=5) at a dose of 5 mg, then 10 mg, once daily on the pinna for 7 days, with 21 days between treatments. Concentrations of methimazole in serum over 24 hours and at 148 hours were determined by high performance liquid chromatography. RESULTS: Concentrations of methimazole in serum for the first 24 hours were not reliably detected in all cats treated with 5 mg methimazole transdermally, while for those receiving 5 mg carbimazole orally and 10 mg methimazole transdermally all cats had detectable concentrations of methimazole in serum. The maximum concentration and area under the curve were lower in cats receiving 10 mg methimazole transdermally (108 (SD 25) ng/mL and 2544 (SD 216) mg-hour/mL, respectively) than those receiving 5 mg oral carbimazole (355 (SD 113) ng/mL and 31,866 (SD 439) ng-hour/mL, respectively) (p<0.05). The time at maximal concentration and elimination half-life were longer for 10 mg transdermal methimazole (5.2 (SD 1.1) hours and 13 (SD 3) hours, respectively) compared to 5 mg oral carbimazole (2.1 (SD 1.6) hours and 5.1 (SD 1.2) hours, respectively). At 148 hours, mean concentrations of methimazole in serum were higher in cats receiving 10 mg methimazole transdermally (506 (SD 165) ng/mL) than for 5 mg oral carbimazole (255 (SD 28) ng/mL) or 5 mg transdermally (204 (SD 76) ng/mL). The mean relative bioavailability of 10 mg transdermal methimazole compared to oral carbimazole was 48 (min 43, max 55%). CONCLUSION: Transdermal methimazole at a dose of 10 mg administered to the pinna of healthy cats once daily in a novel lipophilic formulation has half the relative bioavailability compared to 5 mg oral carbimazole. CLINICAL RELEVANCE: Transdermal methimazole can be absorbed from the skin of healthy cats.

A Retrospective Histopathological Survey on Canine and Feline Liver Diseases at The University of Tokyo between 2006 and 2012.

Hirose, N., K. Uchida, H. Kanemoto, K. Ohno, J. K. Chambers, and H. Nakayama
To determine the incidence of hepatic diseases in dogs and cats in Japan, a retrospective study was performed using data of 463 canine and 71 feline liver biopsies at the Veterinary Medical Center of the University of Tokyo. The most common canine hepatic disease was microvascular dysplasia (MVD) and occupied 29.4% of all diagnoses. This terminology might contain “real” MVD and primary portal vein hypoplasia, because these two conditions were difficult to be clearly distinguished histopathologically. Parenchymal and interstitial hepatitis and primary hepatic tumors accounted for 23.5% and 21.0% of the diagnoses, respectively. Parenchymal and interstitial hepatitis occupied 34.1% of non-proliferative canine hepatic diseases, while hepatocellular adenoma and carcinoma were 26.6% and 24.5% of proliferative hepatic diseases, respectively. Breed-specificity was seen in MVD for Yorkshire terrier, Papillon and Toy poodle, in hepatitis for Doberman Pinscher and Labrador retriever, in cholangiohepatitis for American cocker spaniel, Miniature Schnauzer and Pomeranian, in hepatocellular adenoma for Golden retriever and Shiba and in hepatocellular carcinoma for Shih Tzu. The most common feline liver disease was parenchymal and interstitial hepatitis (45.1% of all diagnoses). Among feline hepatitis, neutrophilic cholangiohepatitis (23.9%), lymphocytic cholangiohepatitis (14.1%) and chronic hepatitis (5.6%) were recorded. Adult polycystic liver disease was 5.6%. Among proliferative diseases in the feline liver (11.3% of the all), lymphoma (4.2%) and primary epithelial tumors (4.2%) including hepatocellular carcinoma, cholangiocellular adenoma and cholangiocellular carcinoma were observed. Hepatic degeneration was 14.1%, and MVD was 12.7%, respectively.

USE OF THE T2*-WEIGHTED GRADIENT RECALLED ECHO SEQUENCE FOR MAGNETIC RESONANCE IMAGING OF THE CANINE AND FELINE BRAIN.

Vet Radiol Ultrasound (2014)
Hodshon, A. W., S. Hecht, and W. B. Thomas
T2*-weighted magnetic resonance imaging (MRI) has been reported to help improve detection of intracranial hemorrhage and is widely used in human neuroimaging. To assess the utility of this technique in small animals, interpretations based on this sequence were compared with those based on paired T2-weighted and fluid-attenuated inversion recovery (FLAIR) sequences in 200 dogs and cats that underwent brain MRI for suspected intracranial disease. Two sets of images (T2 + FLAIR and T2*) were reviewed separately in random order unaccompanied by patient information and were interpreted as normal or abnormal based on whether intracranial abnormalities were seen. The number and location of intracranial lesions were recorded. Eighty-five female studies were considered normal and 88 were considered abnormal based on both sets of images, with good agreement (kappa = 0.731) between the two. Susceptibility artifact was present in 33 cases (16.5%) on T2*-weighted images. In 12 cases (6%) a total of 69 lesions were seen on T2*-weighted images that were not seen on T2/FLAIR, all of which were associated with susceptibility artifact caused by presumed intracranial hemorrhage.
Pseudolesions were seen on T2*-weighted images in five cases, none of which were associated with susceptibility artifact. Abnormalities were seen on T2/FLAIR images that were not seen on T2*-weighted images in 35 cases, confirming that T2* does not replace standard spin echo sequences. These results support inclusion of T2*-weighted sequences in small animal brain MRI studies and indicate that that a large number of abnormalities (especially hemorrhagic lesions) can go undetected if it is not performed.

Development, implementation and impact of simple patient safety interventions in a university teaching hospital.
Hofmeister, E. H., J. Quandt, C. Braun, and M. Shepard
OBJECTIVE: To determine the incidence of anesthesia patient safety incidents at a university teaching hospital, develop interventions to address the most common incidents, and determine the effectiveness of these interventions. STUDY DESIGN: Pre-post intervention observational. ANIMALS: Four thousand, one hundred forty dogs and cats anesthetized by the anesthesia service. METHODS: The study was divided into two 11.5 month periods. During each period, incidents were logged (e.g. closed adjustable pressure limiting (APL) valve, esophageal intubation, and medication error). At the end of the first period, four countermeasures were incorporated into the service’s protocols: 1) prior to any drug injection, the individual would read out aloud the drug name, patient name, and route of administration; 2) use of a uniquely colored occlusive wrap over arterial catheters; 3) a check box on the anesthesia record labeled “Technician Confirmed Intubation”; 4) a check box on the anesthesia record labeled “Technician Checked OR (operating room)”. The number of patient safety incidents during period 1 and period 2 were compared using Fisher’s Exact Test. RESULTS: During Period 1, there were 74 incidents documented in 2028 patients (3.6%) including 25 medication errors, 20 closed APL valves, and 16 of esophageal intubation. During Period 2, there were 30 incidents documented in 2112 patients (1.4%) including 14 medication errors, 5 closed APL valves, and 4 of esophageal intubation. The proportion of events during Period 2 was significantly smaller than during Period 1 (p < 0.0001). CONCLUSIONS AND CLINICAL RELEVANCE: Implementation of four simple interventions was associated with a significant decrease in the number of incidents.

Acid base, electrolyte, glucose, and lactate values during cardiopulmonary resuscitation in dogs and cats.
Hopper, K., A. Borchers, and S. E. Epstein
OBJECTIVE: To report acid base, electrolyte, glucose, and lactate values collected during or immediately after cardiopulmonary resuscitation (CPR) in dogs and cats. DESIGN: Retrospective study. SETTING: University Teaching Hospital. ANIMALS: Thirty-two dogs and 10 cats. INTERVENTIONS: None. MEASUREMENTS AND MAIN RESULTS: Blood gas, electrolyte, glucose, and lactate values measured during CPR or within 5 minutes of return of spontaneous circulation (ROSC) were retrospectively evaluated. The time of blood collection with respect to the occurrence of cardiopulmonary arrest (CPA), the initiation of CPR or ROSC was noted. Forty-two venous blood samples were analyzed, 24 collected during CPR and 18 samples were collected within 5 minutes of ROSC. Metabolic acidosis and hyperlactatemia were evident in all samples in the study while an increased PvCO2 occurred in 88% of samples collected during CPR and in 61% of samples collected following ROSC. Hyperkalemia occurred in 65% of all cases, decreased ionized calcium was evident in 18%, hypoglycemia was evident in 21% while hyperglycemia was evident in 62%. There was no significant difference in any parameter evaluated between dogs and cats during CPR. There was no significant difference of any variable measured during the first 15 minutes of CPA versus those measured more than 15 minutes following CPA. When the values measured during the first 5 minutes of ROSC were compared to those measured during CPR, the pH and PvO2 were significantly lower in the CPR group. CONCLUSIONS: Biochemical abnormalities including metabolic acidosis, hyperkalemia, ionized hypocalcemia, hypoglycemia, and hyperglycemia can be identified during CPR and immediately following ROSC. The therapeutic and prognostic relevance of these changes are yet to be defined and may prove to be useful to guide patient management in the future.

Nutritional management of acute pancreatitis in dogs and cats.
Jensen, K. B., and D. L. Chan
Alfaxalone or ketamine-medetomidine in cats undergoing ovariohysterectomy: a comparison of intra-operative parameters and post-operative pain.


OBJECTIVE: To compare post-operative pain in cats after alfaxalone or ketamine-medetomidine anaesthesia for ovariohysterectomy (OHE) and physiologic parameters during and after surgery. STUDY DESIGN: Prospective ‘blinded’ randomized clinical study. ANIMALS: Twenty-one healthy cats. METHODS: Cats were assigned randomly into two groups: Group A, anaesthesia was induced and maintained with alfaxalone [5 mg kg^{-1} intravenously (IV) followed by boli (2 mg kg^{-1} IV)]; Group MK, induction with ketamine (5 mg kg^{-1} IV) after medetomidine (30 mg kg^{-1} intramuscularly (IM)], and maintenance with ketamine (2 mg kg^{-1} IV). Meloxicam (0.2 mg kg^{-1} IV) was administered after surgery. Basic physiological data were collected. At time T = \{-2, 0, 0.5, 1, 2, 4, 6, 8, 12, 16, 20, 24\} hours post-operatively pain was assessed by three methods, a composite pain scale (CPS; 0-24 points), a visual analogue scale (VAS 0-100 mm), and a mechanical wound threshold (MWT) device. Butorphanol (0.2 mg kg^{-1} IM) was administered if CPS was scored \geq 13. Data were analyzed using a general linear model, Kruskal-Wallis analyses, Bonferroni-Dunn test, unpaired t-test and Fisher’s exact test as relevant. Significance was set at p < 0.05. RESULTS: VASs were significantly higher at 0.5, 1, 2, 4, and 20 hours in group A; MWT values were significantly higher at 8 and 12 hours in group MK. Post-operative MWT decreased significantly compared to baseline in both groups. There was no difference in CPS at any time point. Five cats required rescue analgesia (four in A; one in MK). CONCLUSION AND CLINICAL RELEVANCE: Anaesthesia with ketamine-medetomidine was found to provide better post-surgical analgesia than alfaxalone in cats undergoing OHE; however, primary hyperalgesia developed in both groups. Alfaxalone is suitable for induction and maintenance of anaesthesia in cats undergoing OHE, but administration of additional sedative and analgesic drugs is highly recommended.

Vaginal cytology after induction of ovulation in the queen: comparison of postoestrus and dioestrus.

Kanca, H., K. Karakas, M. A. Dalgic, S. Salar, and H. Izgur

OBJECTIVE: To compare the vaginal cytology of ovulating and non-ovulating queens. PROCEDURE: The study group comprised 15 queens showing behavioural oestrus. Ovulation was induced in 7 (dioestrus group) and 8 were left untreated (postoestrus group). Vaginal smears were collected from all animals prior to ovariohysterectomy on day 7. Epithelial cells were classified as basal-parabasal, intermediate, superficial, or anucleated superficial cells and counted using computer-assisted image analysis. From each smear, 50 representative vaginal epithelial cells were chosen. Digital images of cells were taken and cell area, cytoplasm area, nucleus area, cell diameter, cell perimeter, nucleus/cytoplasm ratio and red-green-blue (RGB) values were measured using image analysis software. Measurement data were compared between groups. RESULTS: Ovulation induction was successful in all animals. The swabbing procedure in oestrus did not induce ovulation in any postoestrus queens. Mean duration of oestrus was 6.65 +/- 0.44 and 4.71 +/- 0.32 days (P > 0.05) in the postoestrus and dioestrus queens, respectively. Intermediate cell count averaged 21.43% in postoestrus cats and 10.76% in postoestrus cats (P < 0.05). Epithelial cells in the postoestrus group had higher cell area, cytoplasm area, cell diameter and cell...
perimeter measurements (P < 0.01). Red (90.9 +/− 1.6), green (76.1 +/− 1.3) and blue (83.6 +/− 1.4) channel values in postoestrus were higher than the values (81.3 +/− 0.8, 65.8 +/− 0.9 and 74.0 +/− 0.7, respectively) in dioestrus (P < 0.01).

CONCLUSION: Induction of ovulation in oestrus queens results in a significant increase in the number of intermediate cells and a significant decrease in both the dimensions and RGB values of vaginal epithelial cells on day 7.

**Exploration of paclitaxel (Taxol) as a treatment for malignant tumors in cats: a descriptive case series.**
Kim, J., M. Doerr, and B. E. Kitchell

Paclitaxel, an effective chemotherapeutic agent in human oncology, has received little evaluation in feline patients. The diluent used to solubilize paclitaxel, polyoxyethylated castor oil (Cremophor EL), causes anaphylactoid reactions in human and dogs, which limits enthusiasm for use of this agent in veterinary oncology. Nine feline patients with measurable malignant tumors were treated with paclitaxel at a dosage of 80 mg/m2 intravenously every 21 days for up to two doses. Adverse effects, including evidence of toxicity and anaphylactoid reactions, were assessed. Tumor response, progression and patient time to progression (TTP) were also recorded. Adverse effects included grade III and IV thrombocytopenia, grade III gastrointestinal signs (vomiting and constipation) and hypersensitivity reactions, seen in a total of five patients. Anaphylactoid reactions resolved with appropriate management. Stable disease and partial response were observed in 56% of feline patients. Median TTP was 28 days (range 15-45 days). Intravenous paclitaxel is a safe treatment option for feline malignant tumor patients. Future investigation is warranted to explore the effectiveness and appropriate application of this agent for specific tumor types.

**Feline infectious peritonitis: still an enigma?**
Kipar, A., and M. L. Meli

Feline infectious peritonitis (FIP) is one of the most important fatal infectious diseases of cats, the pathogenesis of which has not yet been fully revealed. The present review focuses on the biology of feline coronavirus (FCoV) infection and the pathogenesis and pathological features of FIP. Recent studies have revealed functions of many viral proteins, differing receptor specificity for type I and type II FCoV, and genomic differences between feline enteric coronaviruses (FECVs) and FIP viruses (FIPVs). FECV and FIP also exhibit functional differences, since FECVs replicate mainly in intestinal epithelium and are shed in feces, and FIPVs replicate efficiently in monocytes and induce systemic disease. Thus, key events in the pathogenesis of FIP are systemic infection with FIPV, effective and sustainable viral replication in monocytes, and activation of infected monocytes. The host’s genetics and immune system also play important roles. It is the activation of monocytes and macrophages that directly leads to the pathologic features of FIP, including vasculitis, body cavity effusions, and fibrinous and granulomatous inflammatory lesions. Advances have been made in the clinical diagnosis of FIP, based on the clinical pathologic findings, serologic testing, and detection of virus using molecular (polymerase chain reaction) or antibody-based methods. Nevertheless, the clinical diagnosis remains challenging in particular in the dry form of FIP, which is partly due to the incomplete understanding of infection biology and pathogenesis in FIP. So, while much progress has been made, many aspects of FIP pathogenesis still remain an enigma.

**Canine and feline blood transfusions: controversies and recent advances in administration practices.**
Kisielewicz, C., and I. A. Self

OBJECTIVES: To discuss and review blood transfusion practices in dogs and cats including collection and storage of blood and administration of products. To report new developments, controversial practices, less conventional blood product administration techniques and where applicable, describe the relevance to anaesthetists and anaesthesia. DATABASES USED: PubMed and Google Scholar using dog, cat, blood transfusion, packed red blood cells and whole blood as keywords. CONCLUSIONS: Blood transfusions improve oxygen carrying capacity and the clinical signs of anaemia. However there are numerous potential risks and complications possible with transfusions, which may outweigh their benefits. Storage of blood products has improved considerably over time but whilst extended storage times may improve their availability, a phenomenon known as the storage lesion has been identified which affects erythrocyte viability and
survival. Leukoreduction involves removing leukocytes and platelets thereby preventing their release of cytokines and bioactive compounds which also contribute to storage lesions and certain transfusion reactions. Newer transfusion techniques are being explored such as cell salvage in surgical patients and subsequent autologous transfusion. Xenotransfusions, using blood and blood products between different species, provide an alternative to conventional blood products.

Detection of serum antibodies against Bartonella species in cats with sporotrichosis from Rio de Janeiro, Brazil.


Cat scratch disease is a zoonosis caused by Bartonella species, transmitted to humans through scratches or bites from infected cats and via direct contact with infected feces. Sporotrichosis, caused by the fungal complex Sporothrix, is transmitted by traumatic inoculation of the fungus. Cats are important in zoonotic transmission. Serum samples from 112 domestic cats with sporotrichosis and 77 samples from healthy cats were analyzed by indirect immunofluorescence assay (IFA), using the commercial kit Bartonella henselae IFA IgG (Bion). The presence of antibodies against feline leukemia virus (FeLV) and of feline immunodeficiency virus (FIV) core antigens was detected using the commercial kit Snap Combo FIV-FeLV (Idexx). The group of animals with sporotrichosis contained 93 males with a median age of 22 months, eight (7.1%) of which were positive for FIV and 15 (13.4%) for FeLV. The group of animals without sporotrichosis contained 36 males with a median age of 48 months, 10 (13.0%) of which were positive for FIV and eight (10.4%) for FeLV. Of the 112 cats with sporotrichosis and 77 cats without mycosis, 72 (64.3%) and 35 (45.5%), respectively, were IFA reactive. No association was found between age, sex, FIV/FeLV and the presence of antibodies to Bartonella species. The results suggest that the study population can be considered a potential source of zoonotic infection for both diseases.

Efficacy of a novel topical combination of fipronil, (S)-methoprene, eprinomectin and praziquantel against adult and larval stages of Toxocara cati in cats.


The efficacy of a novel topical combination of fipronil 8.3% (w/v), (S)-methoprene 10% (w/v), eprinomectin 0.4% (w/v), and praziquantel 8.3% (w/v) (BROADLINE(R), Merial) was evaluated against adult and larval Toxocara cati in four controlled studies. All studies included experimentally infected, purpose-bred, short-haired cats. In two studies, 22 or 20 cats harbouring patent infections as confirmed by pre-treatment faecal examination, were included. Within each study, cats were allocated to one of two groups: control or treated. In a further two studies, 30 cats were included in each; cats were allocated to one of three groups: control, treated when T. cati were expected to be either migrating third and/or fourth-stage larvae, or treated when T. cati were expected to be fourth-stage larvae. Cats allocated to the treated groups received a single topical application of the combination product at 0.12 mL/kg bodyweight (10mg fipronil+12 mg (S)-methoprene+0.5mg eprinomectin+10mg praziquantel per kg). For parasite recovery and count, cats were euthanized humanely at different intervals after treatment. In the studies targeting adult T. cati, ascarids were recovered from all controls (range 1-150) while only two worms were isolated from one treated cat. Thus, the efficacy of the novel combination was 99.4% and 100% against adult T. cati. For studies targeting larval T. cati, up to 21 worms were recovered from each of seven or eight of the control cats per study. No T. cati were recovered from the treated cats in two studies, corresponding to 100% efficacy against both, migrating third and/or fourth-stage larvae and luminal fourth-stage larvae. All cats accepted the treatment well and no adverse experiences or other health problems were observed throughout the studies.

Efficacy of a novel topical combination of fipronil, (S)-methoprene, eprinomectin and praziquantel against experimental infections of Toxascaris leonina in cats.


Knaus, M., S. Theodore Chester, J. Rosentel, M. Visser, and S. Rehblein

The efficacy of a novel topical fipronil, (S)-methoprene, eprinomectin and praziquantel combination product (BROADLINE(R), Merial) was evaluated against adult Toxascaris leonina ascarids in experimentally infected cats in two
controlled studies under an identical protocol. For each study, 30 nematode-naive, purpose-bred European Short Hair cats were inoculated orally with approximately 300 larvated T. leonina eggs. Twenty-two and 24 cats, respectively, that were shown to be positive for Toxascaris eggs by pre-treatment faecal examination were subsequently included in the two studies. In each study, the animals were allocated randomly to an untreated (control) group or to a treatment group. The treatment was a novel topical combination: fipronil (8.3%, w/v), (S)-methoprene (10%, w/v), eprinomectin (0.4% w/v) and praziquantel (8.3% w/v). Treatment was applied on Day 0 at 0.12 mL/kg bodyweight. For parasite recovery and count, cats were euthanized humanely seven days after treatment and necropsied. All untreated cats harboured adult T. leonina (range, 1-31 nematodes). The treatment provided a high level of efficacy against adult T. leonina in both studies (95.8% and 98.1%, respectively p<0.001). All cats accepted the treatment well based on hourly post-treatment observations for 4h and daily observations thereafter. No adverse events or other health problems were observed throughout the studies. Thus the data indicate that this novel combination product will provide a safe and effective treatment against T. leonina in cats.

**Efficacy of a novel topical combination of fipronil, (S)-methoprene, eprinomectin and praziquantel against feline urinary bladder worm (Capillaria plica) infection.**


Knaus, M., E. Shukullari, J. Rosentel, and S. Rehbein

Infection with urinary capillarid bladder worms has been observed in cats worldwide. Although considered as generally causing no or little harm, infection with urinary capillarids may be associated with clinical disease which requires an appropriate treatment including the use of anthelmintics. Therefore, the efficacy of a novel topical combination formulation of fipronil 8.3% (w/v), (S)-methoprene 10% (w/v), eprinomectin 0.4% (w/v), and praziquantel 8.3% (w/v) (BROADLINE(R), Merial) was evaluated against urinary capillarids in naturally infected cats. Sixteen European Short Hair cats (5 male, 11 female) with capillarid eggs in their urine pre-treatment were included in the study. At the time of treatment, the cats were approximately ten months to eight years old and weighed 1.6-3.6 kg. Cats were ranked based on decreasing bodyweight and then randomly allocated within replicates of two animals to one of the treatment groups. Each cat in the treated group received one topical application of the combination product at the minimum therapeutic dose of 0.12 mL/kg body weight delivering 10mg fipronil+12 mg (S)-methoprene+0.5mg eprinomectin+10mg praziquantel per kilogram of body weight while the cats allocated to the control group remained untreated. For parasite recovery, identification and count, cats were euthanized humanely 14 days after treatment. All untreated cats harboured Capillaria plica in their urinary bladders (range 4-12), while no capillarids were recovered from the eight treated cats. Thus, the efficacy of the novel topical combination against C. plica was 100%. All cats accepted the treatment well based on post-treatment observations and daily observations thereafter. No adverse events or other health problems were observed during the study.

**Efficacy of a novel topical combination of fipronil, (S)-methoprene, eprinomectin and praziquantel against larval and adult stages of the cat lungworm, Aelurostrongylus abstrusus.**


The efficacy of a novel topical combination of fipronil 8.3% w/v, (S)-methoprene 10% w/v, eprinomectin 0.4% w/v, and praziquantel 8.3% w/v (BROADLINE(R), Merial) against larval and adult Aelurostrongylus abstrusus lungworms in cats was assessed in a controlled laboratory study. The study included 48 purpose-bred, short-haired cats which were each inoculated with 225 infective A. abstrusus larvae. The cats were formed into eight blocks based on pre-treatment bodyweight and were then, within each block, randomly allocated to one of six treatment groups: untreated control; treated once when A. abstrusus were expected to be third-stage larvae (4 days post inoculation [dpi]), fourth-stage larvae (7 dpi), immature adults (14 dpi) or adult nematodes (32 dpi), or treated twice, once when A. abstrusus were expected to be third-stage larval and once again when A. abstrusus were expected to be adult nematodes (4 dpi+32 dpi). Cats weighing >/= 0.8-2.5 kg received one 0.3 mL applicator and cats weighing >2.5-7.5 kg received one 0.9 mL applicator. For determination of the efficacy of treatments, lungworm larval counts were established on faecal samples collected from all cats 32, 39, 46, 53 and 60 dpi. At each occasion from 46 dpi on, cats treated with fipronil, (S)-methoprene, eprinomectin and praziquantel had significantly lower A. abstrusus larval counts than the untreated controls with percentage reductions of 91.6% (cats treated 14dpi; P=0.012), >/= 98.9% (cats treated either 4 dpi, 7 dpi or 32 dpi; P<0.001) or >99.9% (cats treated 4 dpi+32 dpi; P<0.001) at 60 dpi. Thus, the novel topical combination of fipronil, (S)-methoprene, eprinomectin and praziquantel was highly effective in the prevention and treatment of A. abstrusus lungworm infection in cats.
Efficacy of a novel topical fipronil, (S)-methoprene, eprinomectin and praziquantel combination against naturally acquired intestinal nematode and cestode infections in cats.
The efficacy of a novel topical combination formulation of fipronil, (S)-methoprene, eprinomectin and praziquantel against naturally acquired intestinal nematode and cestode infections in cats was evaluated in seven negative control, blinded studies. Cats were selected based on a pre-treatment faecal examination indicating a patent infection with at least hookworms (two studies), Toxocara ascarids (one study), taeniid cestodes (two studies) or Dipylidium cestodes (two studies). In each study, cats were assigned randomly to blocks of two animals each, based on decreasing pre-treatment body weight and were randomly allocated to one of two groups of six to 12 cats: untreated (control) or treated with topical fipronil (8.3%, w/v), (S)-methoprene (10%, w/v), eprinomectin (0.4%, w/v) and praziquantel (8.3%, w/v) (BROADLINE(R), Merial) at 0.12 mL/kg body weight (providing a minimum of 10mg fipronil+12 mg S-methoprene+0.5mg eprinomectin+10mg praziquantel per kg body weight). The topical treatment was administered directly on the skin in the midline of the neck in a single spot once on Day 0. For parasite recovery and count, cats were euthanized humanely and necropsied seven or ten days after treatment. A single treatment with the novel topical combination product provided 91% efficacy against Ancylostoma braziliense, >/= 99% efficacy against Ancylostoma tubaeforme, and >97% efficacy against Toxocara cati. Similarly, excellent efficacy was established against Taenia taeniaeformis, Dipylidium caninum and Diplopylidium spp. as demonstrated by >97% and up to 100% reductions of cestode counts in the treated cats when compared to the untreated controls (P<0.01). All cats accepted the treatment well based on health observations post-treatment and daily health observations. No adverse experiences or other health problems were observed throughout the studies. The results of this series of controlled studies demonstrated high efficacy and excellent acceptability of the novel topical combination formulation of fipronil, (S)-methoprene, eprinomectin and praziquantel against a broad range of feline intestinal nematode and cestode infections.

Kroemer, S., F. El Garch, D. Galland, J. L. Petit, F. Woehrle, and H. J. Boulouis
A monitoring program of the pre-treatment susceptibility of clinical isolates of bacteria from diseased dogs and cats was active between the years 2002 and 2009. Susceptibility of each isolated strain to a panel of nine antibiotics (amoxicillin/clavulanic acid, ampicillin, penicillin, clindamycin, doxycycline, enrofloxacin, marbofloxacin, trimethoprim and trimethoprim/sulfamethoxazole) was assessed. The Minimum Inhibitory Concentration (MIC) of marbofloxacin was also determined by a standardized microdilution technique following CLSI recommendations. In total, 1857 bacterial strains were collected throughout Europe from cases of otitis, respiratory, urinary and dermatological infections. Although bacterial susceptibility varied for each of the antibiotics within the panel, patterns of susceptibility were similar to those described in the literature for comparable time periods and geographical areas. With a clinical resistance varying from 0 to 14.48% against the isolated strains, marbofloxacin susceptibility was very high and remains an effective antibiotic for the treatment of otitis, urinary, respiratory and dermatological infections in companion animals.

Feline double pigtail ureteric stents for management of ureteric obstruction: short- and long-term follow-up of 26 cats.
Kulendra, N. J., H. Syme, L. Benigni, and Z. Halfacree
The objective of this study was to determine the outcome of cats with ureteric obstruction managed with double pigtail ureteric stents and to document the incidence of lower urinary tract signs at long-term follow-up. Data were obtained retrospectively from the medical records (2009-2012) of 26 cats that underwent ureteric stent placement. Owners were contacted for follow-up, and a quality of life questionnaire completed. Survival to discharge after stent placement was 85% (22/26). Prevalence of postoperative uroabdomen necessitating further surgery was 15% (4/26). Stents were replaced 4-28
months after the initial surgery in four cats because of migration, fracture, encrustation causing luminal obstruction or sterile cystitis, respectively. Nine cats were alive at follow-up, which was 3-28 months after the original surgery. Nine cats had azotaemic chronic kidney disease and nine had signs related to sterile cystitis; three of these cats were euthanased as a result of the severity of the signs. Preoperative serum creatinine of the survivors (9.4 mg/dl, n = 9) was not significantly different from that of the non-survivors (6.5 mg/dl, n = 13; P = 0.295). Quality of life was assigned a mean score of 8/10. Median survival of cats following discharge was 419 days (range 44-994 days). Signs consistent with sterile cystitis affected 35% of cats. It was concluded that ureteric stent placement in cats was associated with a 15% mortality rate before hospital discharge. Long-term management of ureteric stents is associated with a high rate of lower urinary tract signs.

Molecular detection of Rickettsia felis and Bartonella henselae in dog and cat fleas in Central Oromia, Ethiopia.
Kumsa, B., P. Parola, D. Raoult, and C. Socolovschi
Fleas are important vectors of several Rickettsia and Bartonella spp. that cause emerging zoonotic diseases worldwide. In this study, 303 fleas collected from domestic dogs and cats in Ethiopia and identified morphologically as Ctenocephalides felis felis, C. canis, Pulex irritans, and Echidnophaga gallinacea were tested for Rickettsia and Bartonella DNA by using molecular methods. Rickettsia felis was detected in 21% of fleas, primarily C. felis, with a similar prevalence in fleas from dogs and cats. A larger proportion of flea-infested dogs (69%) than cats (37%) harbored at least one C. felis infected with R. felis. Rickettsia typhi was not detected. Bartonella henselae DNA was detected in 6% (2 of 34) of C. felis collected from cats. Our study highlights the likelihood of human exposure to R. felis, an emerging agent of spotted fever, and B. henselae, the agent of cat-scratch disease, in urban areas in Ethiopia.

Pharmacokinetics and metabolism of eprinomectin in cats when administered in a novel topical combination of fipronil, (S)-methoprene, eprinomectin and praziquantel.
Kvaternick, V., M. Kellermann, M. Knaus, S. Rehbein, and J. Rosentel
Four studies were conducted to determine the pharmacokinetic characteristics and in vitro metabolism of eprinomectin, a semi-synthetic avermectin, in cats. Pharmacokinetic parameters including bioavailability of eprinomectin were determined in a parallel study design comprised of one group of eight cats which were treated once topically at 0.12 mL/kg bodyweight with BROADLINE((R)), a novel combination product (fipronil 8.3% (w/v), (S)-methoprene 10% (w/v), eprinomectin 0.4% (w/v) and praziquantel 8.3% (w/v)), delivering a dose of 0.5mg eprinomectin per kg body weight, and a group of six cats which received 0.4% (w/v) eprinomectin at 0.4 mg/kg bodyweight once by intravenous injection. For cats treated by topical application, the average eprinomectin (B1a component) maximum plasma concentration (Cmax) was 20 ng/mL. The maximum concentrations were reached 24h after dosing in the majority of the animals (six of eight cats). The average terminal half-life was 114 h due to slow absorption (‘flip-flop’ kinetics). Following intravenous administration the average Cmax was 503 ng/mL at 5 min post-dose, and the mean elimination half-life was 23 h. Eprinomectin was widely distributed with a mean volume of distribution of 2,390 mL/kg, and the clearance rate was 81 mL/h/kg. Mean areas under the plasma concentration versus time curves extrapolated to infinity were 2,100 ngh/mL and 5,160 ngh/mL for the topical and intravenous doses, respectively. Topical eprinomectin was absorbed with an average absolute bioavailability of 31%. In a second parallel design study, the dose proportionality of eprinomectin after single topical administration of BROADLINE((R)) was studied. Four groups of eight cats each were treated once topically with 0.5, 1, 2 or 5 times the minimum recommended dose of the combination, 0.12 mL/kg bodyweight. Based on comparison of areas under the plasma concentration versus time curves from the time of dosing to the last time point at which eprinomectin B1a was quantified, and Cmax, dose proportionality was established. In addition, the metabolic pathway of eprinomectin using cat liver microsomes, and plasma protein binding using cat, rat, and dog plasma were studied in vitro. Results of the analyses of eprinomectin B1a described here showed that it is metabolically stable and highly protein bound (>99%), and thus likely to be, as with other species, excreted mainly as unchanged parent drug in the feces of cats.

Cats with inflammatory bowel disease and intestinal small cell lymphoma have low serum concentrations of 25-hydroxyvitamin D.
BACKGROUND: Inflammatory bowel disease (IBD) and intestinal small cell lymphoma (ISCL) are common diseases in cats. The prevalence of alterations in the serum concentrations of fat soluble vitamins, such as vitamin D, in cats with IBD and ISCL is unknown.

HYPOTHESIS/OBJECTIVES: The objective of this study was to measure serum 25 hydroxyvitamin D (25[OH]D) concentrations in cats with IBD or ISCL. Serum 25(OH)D also was measured in healthy cats, and in hospitalized ill cats with nongastrointestinal diseases.

ANIMALS: Eighty-four cats were included in the study: 23 in the healthy group, 41 in the hospitalized ill group, and 20 in the IBD/ISCL group.

METHODS: Retrospective study. Serum samples for vitamin D analysis were frozen at -20 degrees C until serum 25(OH)D was measured by high-performance liquid chromatography (HPLC).

RESULTS: Although there was overlap in serum 25(OH)D concentrations among the 3 groups, serum 25(OH)D concentrations were significantly lower in the cats with IBD or ISCL compared to healthy cats (P <.0001) and hospitalized ill cats (P =.014). In the IBD/ISCL group, there was a significant moderate positive correlation between serum albumin and 25(OH)D concentrations (r = 0.58, P =.018).

CONCLUSION AND CLINICAL IMPORTANCE: The median serum concentration of 25(OH)D was significantly lower in cats with IBD/ISCL than in healthy cats and in hospitalized ill cats. Additional studies are required to elucidate the mechanism of hypovitaminosis D in cats with gastrointestinal diseases, to define the best management strategy to treat this complication, and to investigate its potential prognostic implications.

X-ray attenuation of the liver and kidney in cats considered at varying risk of hepatic lipidosis.


Lam, R., S. J. Niessen, and C. R. Lamb

X-ray attenuation of the liver has been measured using computed tomography (CT) and reported to decrease in cats with experimentally induced hepatic lipidosis. To assess the clinical utility of this technique, medical records and noncontrast CT scans of a series of cats were retrospectively reviewed. A total of 112 cats met inclusion criteria and were stratified into three hepatic lipidosis risk groups. Group 1 cats were considered low-risk based on no history of inappetence or weight loss, and normal serum chemistry values; Group 2 cats were considered intermediate risk based on weight loss, serum hepatic enzymes above normal limits, or reasonably controlled diabetes mellitus; and Group 3 cats were considered high risk based on poorly controlled diabetes mellitus due to hypersomatotropism. Mean CT attenuation values (Hounsfield units, HU) were measured using regions of interest placed within the liver and cranial pole of the right kidney. Hepatic and renal attenuation were weakly positively correlated with each other (r = 0.2, P = 0.03) and weakly negatively correlated with body weight (r = -0.21, P = 0.05, and r = -0.34, P = 0.001, respectively). Mean (SD) hepatic and renal cortical attenuation values were 70.7 (8.7) HU and 49.6 (9.2) HU for Group 1 cats, 71.4 (7.9) HU and 48.6 (9.1) HU for Group 2, and 68.9 (7.6) HU and 47.6 (7.2) HU for Group 3. There were no significant differences in hepatic or renal attenuation among groups. Findings indicated that CT measures of X-ray attenuation in the liver and kidney may not be accurate predictors of naturally occurring hepatic lipidosis in cats.

Pediatric seizure disorders in dogs and cats.


Lavely, J. A.

Seizure disorders in young animals pose different considerations as to cause and therapeutic decisions compared with adult animals. Infectious diseases of the nervous system are more likely in puppies and kittens compared with adults. The diagnosis of canine distemper is often based on clinical signs. Idiopathic epilepsy typically occurs in dogs between 1 and 5 years of age; however, inflammatory brain diseases such as necrotizing encephalitis and granulomatous meningoencephalomyelitis also commonly occur in young to middle-aged small-breed dogs. The choice of which anticonvulsant to administer for maintenance therapy is tailored to each individual patient.

A case of atypical diffuse feline fibrotic lung disease.


Le Boedec, K., P. J. Roady, and R. T. O’Brien
An 11-year-old cat presented for respiratory distress and weight loss. Thoracic radiographs were interpreted as a diffuse bronchiointerstitial pattern with bronchiecstasy and a mild ventral alveolar pattern on the lateral views. Computed tomography revealed a severe diffuse reticular pattern, relatively hyperattenuating in subpleural regions, with diffuse traction bronchiecstasy and some degree of honeycombing. Despite the absence of basal predominance, this pattern was considered to be suggestive of usual interstitial pneumonia (UIP). Other differentials (other types of interstitial lung disease, infectious pneumonitis, neoplasia, or early edema or hemorrhage) were considered less likely based on history and other test results. The cat was discharged without any treatment, and euthanased 5 months later. Post-mortem histological analysis of the lung revealed end-stage lung, with extensive fibrosis that was more severe in subpleural regions, fibroblastic foci and honeycombing, suggestive of UIP. A probable diagnosis of idiopathic pulmonary fibrosis (IPF) was made. The diffuse distribution of the lesions was atypical compared with previous tomographic and histologic descriptions of IPF in cats. This case report suggests a heterogeneity of the pulmonary fibrotic disorders in cats that warrants further investigation for better characterization and classification.

**Left atrial size, atrial function and left ventricular diastolic function in cats with hypertrophic cardiomyopathy.**

**OBJECTIVES:** To describe left atrial size, left atrial volume, left atrial function and left ventricular diastolic function in healthy cats and those with hypertrophic cardiomyopathy without and with congestive heart failure. **METHODS:** A retrospective study of 61 client-owned, 21 healthy, 21 asymptomatic hypertrophic cardiomyopathy and 19 with hypertrophic cardiomyopathy and congestive heart failure cats. Data were retrieved from clinical records and echocardiography archives. Left atrial diameter and volumes were measured. Left atrial function was investigated using changes in diameter (fractional shortening) and volume (Simpson’s method; left atrial ejection fraction). Conventional echocardiographic indices of left ventricular diastolic function were recorded. **RESULTS:** Left atrial diameter and left atrial volume measurements were significantly higher in hypertrophic cardiomyopathy with congestive heart failure cats compared with asymptomatic hypertrophic cardiomyopathy and healthy cats (P < 0.001). Left atrial passive, active and complete ejection fraction distinguished between hypertrophic cardiomyopathy with congestive heart failure and asymptomatic hypertrophic cardiomyopathy (P < 0.001). Hypertrophic cardiomyopathy with congestive heart failure cats had significantly lower mitral A wave velocity (P = 0.016) and atrial complete emptying based on diameter and volume measurements (P = 0.008 and P < 0.001, respectively) compared with asymptomatic hypertrophic cardiomyopathy cats. **CLINICAL SIGNIFICANCE:** Left atrial volume is obtainable by echocardiography in cats. Left atrial volume and atrial function may indicate chronicity and severity of diastolic dysfunction associated with hypertrophic cardiomyopathy and congestive heart failure. Left atrial function was reduced in cats with hypertrophic cardiomyopathy and congestive heart failure compared with healthy and asymptomatic hypertrophic cardiomyopathy groups.

**Case series of feline panleukopenia virus in an animal shelter.**
Litster, A., and C. Benjanirut

The aim of this study was to describe a series of confirmed and suspected cases of feline panleukopenia virus (FPV) and in-contact cats in an adoption-guarantee shelter in an FPV-endemic area by reviewing shelter records over a 10-month period (January-October 2010). Cats were divided into three groups: in-contact group - asymptomatic cats that were housed with a FPV fecal antigen (Ag)-positive cat/kitten as part of a litter group (n = 66); FPV-survivors group (FPV-infected survivors) - tested FPV fecal Ag-positive and showed clinical signs of FPV, but survived (n = 27); FPV-non-survivors group (FPV-infected non-survivors) - showed clinical signs of FPV and either tested FPV fecal Ag-positive or were housed with an Ag-positive family member, but did not survive (n = 52). Ages ranged from 3 weeks to 3 years, but most were <6 months old (in-contact group: 79%; FPV-survivors group: 70%; FPV-non-survivors group: 85%). A seasonal peak occurred over summer, but cases occurred year-round. Anorexia, dehydration, fever and diarrhea predominated in the FPV-survivors group, and death was preceded by clinical signs of circulatory shock in the FPV-non-survivors group. Housing litters of kittens with their mother was not associated with improved outcome, perhaps because in this population clinical FPV infection was relatively common in queens arriving at the shelter with susceptible litters.
Diagnostic utility of CD4%:CD8 low% T-lymphocyte ratio to differentiate feline immunodeficiency virus (FIV)-infected from FIV-vaccinated cats.
Antibody testing based on individual risk assessments is recommended to determine feline immunodeficiency virus (FIV) status, but ELISA and Western blot tests cannot distinguish between anti-FIV antibodies produced in response to natural infection and those produced in response to FIV vaccination. The aim of this cross-sectional study was to test the hypothesis that FIV-infected cats could be differentiated from FIV-vaccinated uninfected cats using lymphocyte subset results, specifically the CD4%:CD8(low)% T-lymphocyte ratio. Comparisons of the CD4%:CD8(low)% T-lymphocyte ratio were made among the following four groups: Group 1 - FIV-infected cats (n=61; FIV-antibody positive by ELISA and FIV PCR positive); Group 2 - FIV-uninfected cats (n=96; FIV-antibody negative by ELISA); Group 3 - FIV-vaccinated uninfected cats (n=31; FIV-antibody negative by ELISA before being vaccinated against FIV, after which they tested FIV ELISA positive); and Group 4 - FIV-uninfected but under chronic/active antigenic stimulation (n=16; FIV-antibody negative by ELISA; all had active clinical signs of either upper respiratory tract disease or gingival disease for >/= 21 days). The median CD4%:CD8(low)% T-lymphocyte ratio was lower in Group 1 (1.39) than in each of the other three groups (Group 2 - 9.77, Group 3 - 9.72, Group 4 - 5.64; P<0.05). The CD4%:CD8(low)% T-lymphocyte ratio was also the most effective discriminator between FIV-infected cats and the other three groups, and areas under ROC curves ranged from 0.91 (compared with Group 4) to 0.96 (compared with Group 3). CD4%:CD8(low)% shows promise as an effective test to differentiate between FIV-infected cats and FIV-vaccinated uninfected cats.

Transmission of feline immunodeficiency virus (FIV) among cohabiting cats in two cat rescue shelters.
Vet J (2014)
Litster, A. L.
Conflicting accounts have been published in the veterinary literature regarding transmission of feline immunodeficiency virus (FIV) between cohabiting cats in mixed households, and the mechanics of possible casual transmission, if it occurs, are poorly understood. Similarly, there are conflicting reports of vertical transmission of FIV. The aim of the present study was to document the FIV serological status of cats taken into two rescue shelters. At rescue shelter 1 (Rescue 1), cats cohabited in a multi-cat household of FIV-negative and naturally-infected, FIV-positive cats. A study was performed that combined a retrospective review of records of FIV serological status at intake (Test 1) and prospective FIV serological testing (Tests 2 and 3). Retrospective records were analyzed at rescue shelter 2 (Rescue 2), where FIV-positive queens with litters of nursing kittens were taken into the shelter, before being rehomed. FIV serology was performed on all kittens after weaning. Initial test results (Test 1) for 138 cohabiting cats from Rescue 1 showed that there were 130 FIV-negative cats and eight FIV-positive cats (six male neutered and two female spayed). A second test (Test 2), performed in 45 of the FIV-negative and five of the FIV-positive cats at median 28 months after Test 1 (range, 1 month to 8.8 years) showed that results were unchanged. Similarly, a third test (Test 3), performed in four of the original FeLV-negative cats and one remaining FIV-positive cat at median 38 months after Test 1 (range, 4 months to 4 years), also showed that results were unchanged. These results show a lack of evidence of FIV transmission, despite years of exposure to naturally-infected, FIV-positive cats in a mixed household. At Rescue 2, records were available from five FIV-positive queens with 19 kittens. All 19 kittens tested FIV-negative, suggesting that vertical transmission had not occurred.

Use of ponazuril paste to treat coccidiosis in shelter-housed cats and dogs.
Cystoisospora (synonym Isospora) spp. infections are common in dogs and cats worldwide, especially in crowded or unsanitary environments. Ponazuril (toltrazuril sulfone) is a widely used oral treatment, but protocols that will produce oocyst excretion below the detection limit in shelter-housed animals have not been determined. The aim of this study was to determine the efficacy of ponazuril paste at each of three dosages (dosage 1, 50mg/kg q24h for 3 days, dogs n=14, cats n=16; dosage 2, 50mg/kg as a single dose, dogs n=13, cats n=25; or dosage 3, 20mg/kg as a single dose, dogs n=16, cats n=23) in shelter-housed dogs (n=43) and cats (n=64) with confirmed coccidiosis. Fecal oocyst counts and identification and fecal consistency scoring was performed pre-treatment (Day 1) and again at Day 3-4 and Day 8. There were higher proportions of animals with oocyst excretion below the detection limit at both Day 3-4 and Day 8 in the dosage 1 group.


Liu, A., F. Yang, Y. Shen, W. Zhang, R. Wang, W. Zhao, L. Zhang, H. Ling, and J. Cao

BACKGROUND: Giardia duodenalis is a common intestinal parasite that infects humans and many other mammals, mainly distributing in some areas with poor sanitation. The proportion of the human giardiasis burden attributable to G. duodenalis of animal origin differs in different geographical areas. In Mainland China, genetic data of the gdh and bg genes of G. duodenalis from animals are only limited in dogs and cats. The aim of the study was to provide information on the genetic characterizations of animal-derived G. duodenalis isolates (from rabbits, sheep and cattle) at both loci in Heilongjiang Province, Northeastern China, and to assess the potential for zoonotic transmission. METHODOLOGY/PRINCIPAL FINDINGS: 61 G. duodenalis isolates from animal feces (dairy and beef cattle, sheep and rabbits) in Heilongjiang Province were characterized at the gdh and bg loci in the present study. The gdh and bg gene sequences of sheep-derived G. duodenalis assemblage AI, and the gdh sequences of rabbit-derived G. duodenalis assemblage B had 100% similarity with those from humans, respectively. Novel subtypes of G. duodenalis were identified, with one and seven subtypes for assemblages A and E at the gdh locus, and two and three subtypes for assemblages B and E at the bg locus, respectively. Three pairs of the same bg sequences of assemblage E were observed in sheep and cattle.

CONCLUSIONS/SIGNIFICANCE: This is the first description of genetic characterizations of the gdh and bg genes of G. duodenalis from rabbits, sheep and cattle in Mainland China. Homology analysis of assemblages AI and B implied the possibility of zoonotic transmission. The novel subtypes of assemblages of G. duodenalis may represent the endemic genetic characteristics of G. duodenalis in Heilongjiang Province, China.


Liu, D. T., and D. C. Silverstein

OBJECTIVE: To describe the demographics, clinical characteristics, diagnostic findings, underlying etiologies, treatment, and outcome associated with secondary spontaneous pneumothorax (SSP) in cats; and to identify clinical feature differences among cats with asthma associated secondary spontaneous pneumothorax (AASSP) versus nonasthma-associated secondary spontaneous pneumothorax (NAASSP). DESIGN: Retrospective case series. SETTING: University teaching hospital. ANIMALS: Sixteen client-owned cats with secondary spontaneous pneumothorax. INTERVENTIONS: None. MEASUREMENTS AND MAIN RESULTS: Domestic short hair was the predominant breed in this study (n = 15). The median age was 8 years old (range: 7 weeks to 17 years) with no sex predilection. Fourteen cats were affected by multilobar pulmonary pathology of infectious, inflammatory, or neoplastic causes. Asthma was the most common cause of spontaneous pneumothorax (25%). Ten of 12 treated cats survived the initial episode of spontaneous pneumothorax to discharge with medical management, including all 4 cats with AASSP. Recurrence was documented in 4 cats. Pulmonary lobectomy was curative for 1 cat with congenital accessory lung lobe emphysema. No difference in clinical presentation was identified between cats with AASSP and cats with NAASSP. CONCLUSIONS: Feline SSP is frequently associated with extensive pulmonary pathology. Supportive medical management is most appropriate, except in rare cases with focal congenital abnormalities that may benefit from surgical intervention. AASSP appears to carry a good prognosis for short-term outcome (survival to discharge). Clinical assessment, imaging, and invasive diagnostics were required to differentiate between AASSP and NAASSP.

Sleeping and resting respiratory rates in healthy adult cats and cats with subclinical heart disease.
Sleeping and resting respiratory rates are commonly measured variables in patients with cardiac disease. However, little information is available on these variables in healthy client-owned cats or cats with subclinical heart disease (SHD). Therefore, we examined and characterized the sleeping respiratory rate (SRR) and resting respiratory rate (RRR) in 59 echocardiographically normal (EN) and 28 apparently healthy (AH) cats, and 54 SHD cats acquired by the cat owners in the home environment on eight to 10 separate occasions. The within-cat mean sleeping respiratory rate (SRRmean) in EN cats, AH cats and SHD cats with mild or moderate left atrial (LA) enlargement (as defined by quantiles of the ratio of the LA to the aorta [LA:AO]) was consistently <30 breaths/min; median SRRmean approximated 21 breaths/min. The SRRmean of SHD cats with severe LA enlargement sometimes exceeded 30 breaths/min, and was higher than SRRmean of other SHD cats (P <0.05). The within-cat mean resting respiratory rate was consistently higher than SRRmean (P <0.05). Age and geographic location, but not bodyweight, affected SRRmean in EN and AH cats. Within-cat SRR and within-cat RRR did not vary markedly from day-to-day, as evidenced by a low within-cat coefficient of variation. Data acquisition was considered easy or non-problematic by most participants. Our data provide useful guidelines for SRR and RRR, obtained in the home environment, in healthy cats and cats with SHD, and might prove useful in managing cats with clinical heart disease. Cats with SRRmean >30 breaths/min and cats with multiple SRR measurements >30 breaths/min likely warrant additional evaluation.

**Serum Cardiac Troponin I concentrations in cats with anaemia - a preliminary, single-centre observational study.**


OBJECTIVES: A range of cardiovascular abnormalities have been associated with anaemia. However, it remains unclear whether anaemia is associated with cardiac myocyte damage in cats. The aim of this study was to assess if cats with anaemia have an increased prevalence of cardiac myocyte damage, as assessed by serum concentrations of cardiac troponin I, compared to non-anaemic, ill cats. METHODS: Serum cardiac troponin I concentrations were measured in 18 anaemic cats and in 31 non-anaemic, ill cats with non-primary cardiac, non-renal and non-primary haematological disorders. RESULTS: The serum cardiac troponin I concentrations in the anaemic group (0.43 ng/mL) were significantly higher (P=0.0002) than in the non-anaemic ill group (0.04 ng/mL). Using a cut-off of less than 0.16 ng/mL, 12 of the 18 anaemic cats had an increased serum cardiac troponin I concentration, which was significantly higher (P=0.005) than the non-anaemic ill cats (7 of 31 cats). CLINICAL SIGNIFICANCE: Serum cardiac troponin I concentrations were higher in cats with anaemia in this study. Further studies are required to establish whether the anaemia or other confounding factors is the cause of the increased serum cardiac troponin I concentrations.

**Bacterial and protozoal agents of feline vector-borne diseases in domestic and stray cats from southern Portugal.**


BACKGROUND: Feline vector-borne diseases (FVBD) have emerged in recent years, showing a wider geographic distribution and increased global prevalence. In addition to their veterinary importance, domestic cats play a central role in the transmission cycles of some FVBD agents by acting as reservoirs and sentinels, a circumstance that requires a One Health approach. The aim of the present work was to molecularly detect feline vector-borne bacteria and protozoa with veterinary and zoonotic importance, and to assess associated risk factors in cats from southern Portugal. METHODS: Six hundred and forty-nine cats (320 domestic and 329 stray), from veterinary medical centres and animal shelters in southern Portugal, were studied. Anaplasma spp./Ehrlichia spp., Babesia spp., Bartonella spp., Borrelia burgdorferi sensu lato, Hepatozoon spp. and Leishmania spp. infections were evaluated by polymerase chain reaction (PCR) in blood samples. RESULTS: One hundred and ninety-four (29.9%) cats were PCR-positive to at least one of the tested genera or complex of FVBD agents. Sixty-four (9.9%) cats were positive to Leishmania spp., 56 (8.6%) to Hepatozoon spp., 43 (6.6%) to Babesia spp., 35 (5.4%) to Anaplasma spp./Ehrlichia spp., 19 (2.9%) to Bartonella spp. and 14 (2.2%) to B. burgdorferi s.l. Thirty-three (5.1%) cats were positive to two (n = 29) or three (n = 4) genera/complex. Babesia vogeli, Bartonella clarridgeiae, Bartonella henselae, Ehrlichia canis, Hepatozoon felis and Leishmania infantum were identified by DNA sequencing. CONCLUSIONS: The occurrence of FVBD agents in southern Portugal, some of them with zoonotic character, emphasizes the need to alert the veterinary community, owners and public health authorities for the risk of infection. Control measures should be implemented to prevent the infection of cats, other vertebrate hosts and people.
Molecular detection of bacterial and parasitic pathogens in hard ticks from Portugal.
Ticks Tick Borne Dis (2014)
Ticks are important vector arthropods of human and animal pathogens. As information about agents of disease circulating in vectors in Portugal is limited, the aim of the present study was to detect bacteria and parasites with veterinary and zoonotic importance in ticks collected from dogs, cats, and field vegetation. A total of 925 ticks, comprising 888 (96.0%) adults, 8 (0.9%) nymphs, and 29 (3.1%) larvae, were collected in 4 geographic areas (districts) of Portugal. Among those, 620 (67.0%) were removed from naturally infested dogs, 42 (4.5%) from cats, and 263 (28.4%) were questing ticks obtained from field vegetation. Rhipicephalus sanguineus was the predominant tick species, and the only one collected from dogs and vegetation, while all Ixodes ricinus specimens (n=6) were recovered from cats. Rickettsia massiliae and Rickettsia conorii were identified in 35 ticks collected from cats and dogs and in 3 ticks collected from dogs. Among ticks collected from cats or dogs, 4 Rh. sanguineus specimens were detected with Hepatozoon felis, 3 with Anaplasma platys, 2 with Hepatozoon canis, one with Anaplasma phagocytophilum, one with Babesia vogeli, one with Borrelia burgdorferi sensu lato and one with Cercopithifilaria spp. Rickettsia helvetica was detected in one I. ricinus tick collected from a cat. To the best of our knowledge, this was the first time that Cercopithifilaria spp., Ba. vogeli, H. canis, and H. felis have been detected in ticks from Portugal. The wide range of tick-borne pathogens identified, some of zoonotic concern, suggests a risk for the emergence of tick-borne diseases in domestic animals and humans in Portugal. Further studies on these and other tick-borne agents should be performed to better understand their epidemiological and clinical importance, and to support the implementation of effective control measures.

A retrospective molecular study of select intestinal protozoa in healthy pet cats from Italy.
The feline gut can harbour a number of protozoan parasites. Recent genetic studies have highlighted new epidemiological findings about species of Cryptosporidium, assemblages of Giardia duodenalis and Toxoplasma gondii. Furthermore, epidemiological studies suggest the occurrence of Tritrichomonas foetus in cats is on the increase worldwide. The prevalence of selected intestinal protozoa was determined by PCR using DNA previously extracted from the faeces of 146 privately owned healthy cats from Italy. Molecular genotyping on T. gondii, G duodenalis and Cryptosporidium DNA was achieved. PCR assays were positive in 32 (22.9%) samples. Three animals (2.0%) were positive for T. foetus and Cryptosporidium DNA, 15 specimens (10.3%) were positive for T. gondii and 11 (7.5%) for G duodenalis. Co-infections were never observed. Results of the typing analysis allowed the identification of Cryptosporidium felis in all cases. The specimens positive for T. gondii hinted at clonal genotype I (n = 7), genotype II (n = 1) and genotype III (n = 7). The G duodenalis isolates were referable to assemblages F (n = 9) and C (n = 2). In conclusion, the results obtained in this study add to the literature regarding the epidemiology of these parasites by confirming their presence in the faeces of healthy pet cats.

Outcome and prognostic indicators in 20 cats with surgically treated primary lung tumors.
The purpose of this retrospective study of 20 client-owned cats was to describe the clinical signs, surgical interventions, histological features, stage and treatments of primary lung tumors removed by surgical excision, and to determine which factors significantly influence survival. Any cat that underwent surgical resection of a primary lung tumor between 2000 and 2007 was included in the study. Patient records were reviewed and signalment, clinical signs, preoperative diagnostics, surgical findings and histopathological results recorded. Histological reports were reviewed and scored using World Health Organization criteria. The Kaplan-Meier test was used to evaluate each potential prognostic factor with survival. Twenty cats met the inclusion criteria. The presence of clinical signs (such as dyspnea) at the time of diagnosis (P = 0.032), pleural effusion (P = 0.046), stage M1 (P = 0.015), and moderately and poorly differentiated tumors on histopathology (P = 0.011) were factors that were significantly correlated with reduced survival times. The median survival time of the 20 cats was 11
days. Cats presenting with no clinical signs had a median survival time of 578 days post-surgery vs 4 days post-surgery when presented with clinical signs. Cats staged T1N0M0 lived longer than cats at other stages (P = 0.044). Of the cats that survived to the time of suture removal, median survival time was 64 days. The results indicate that the presence of clinical signs, pleural effusion, moderately and poorly differentiated tumors on histopathology, evidence of metastasis and any stage beyond T1N0M0 are negative prognostic indicators for cats with primary lung tumors. The findings demonstrate that cats that presented with clinical signs, pleural effusion, any stage other than T1N0M0, or moderately and poorly differentiated tumors on histopathology had a poor prognosis. Therefore, extensive preoperative diagnostics, including computed tomography scans, should be performed before considering surgical intervention in these cats. These findings may be used to guide therapeutic decision-making in cats diagnosed with primary lung tumors.

Immunohistochemical and Morphometric Analysis of Intestinal Full-thickness Biopsy Samples from Cats with Lymphoplasmacytic Inflammatory Bowel Disease.
Marsilio, S., S. Kleinschmidt, I. Nolte, and M. Hewicker-Trautwein
The distribution and numbers of CD3(+) T lymphocytes, immunoglobulin(+) plasma cells and calprotectin (L1)(+) macrophages was analyzed in full-thickness, formalin-fixed biopsy samples from the small intestine (duodenum, jejunum and ileum) and from the colon from nine cats with clinical signs of inflammatory bowel disease (IBD). All animals had lymphoplasmacytic enteritis or lymphoplasmacytic enterocolitis. Equivalent samples from the same intestinal regions from 12 healthy pet cats served as controls. Labelled cells in the lamina propria were counted by computer-aided morphometry. The different cell types were similarly distributed in both groups, but there were differences in their numbers. There were more CD3(+) T cells in the duodenum and jejunum of cats with IBD; however, the difference was only significant for the duodenum. There were significantly more IgA(+) cells in the duodenal crypt region. There were significantly more IgG(+) cells in the lower jejunal crypt region. Plasma cells expressing IgM were decreased in cats with IBD, but the difference was not significant. L1(+) macrophages were significantly decreased in the lower crypt area of the colon in cats with IBD and there was a trend to decreased L1(+) cells in the upper crypt area of the duodenum and jejunum. Comparison of the results of this study with previous findings on endoscopically-obtained duodenal biopsy samples from cats with IBD revealed some differences. These discrepancies might relate to differences between control cat populations, types of biopsy samples, methodological factors such as different counting techniques and the activity of the disease at the time of sampling.

Maximal and submaximal mouth opening with mouth gags in cats: implications for maxillary artery blood flow.
Martin-Flores, M., P. V. Scrivani, E. Loew, C. A. Gleed, and J. W. Ludders
The use of spring-loaded mouth gags in cats can be associated with the development of central neurological deficits, including blindness. In this species, the maxillary arteries are the main source of blood supply to the retinae and brain. Spring-loaded gags generate constant force after placement that could contribute to bulging of the soft tissues between the mandible and the tympanic bulla. Under these circumstances, the maxillary arteries can become compressed as they course between these osseous structures. Smaller gags that might apply less force to the mouth were investigated to determine if they preserved maxillary artery blood flow. Six healthy adult cats were anesthetized. Electroretinography (ERG) and magnetic resonance angiography (MRA) were performed without the use of a mouth gag and during submaximal (plastic mouth gags of 20, 30 and 42 mm in length between canine teeth) and maximal mouth opening. Maximal mouth opening produced alterations in ERG waveforms consistent with circulatory compromise in 1/6 cats and reductions in signal intensity during MRA in 4/6 cats. Placement of a 42 mm plastic gag produced a reduction in MRA signal in 1/6 cats. No changes were observed with smaller gags. The force applied against the mouth was significantly higher with the spring-loaded gag than with any other gags. The use of a smaller mouth gag was associated with fewer alterations of indicators of maxillary artery blood flow. Nevertheless, a 42 mm plastic gag, equivalent to the size of a needle cap, resulted in an abnormal MRA in one cat.

Idiopathic generalised tremor syndrome in two cats.
Mauler, D. A., I. Van Soens, S. F. Bhatti, I. Cornelis, V. A. Martle, and L. M. Van Ham

Two male neutered domestic shorthair cats were evaluated for generalised tremors. On neurological examination both cats showed whole-body tremors, worsening with stress. A mainly cerebellar disorder was suspected. Blood examination, cerebrospinal fluid analysis and electrophysiological examination of both cats and magnetic resonance imaging of the brain in one cat were normal. Idiopathic generalised tremor syndrome (IGTS) was suspected owing to the exclusion of underlying causes and the clinical similarities with the syndrome in dogs. Treatment as recommended for dogs was initiated and resulted in improvement. This report describes the first cases of IGTS in cats.

Pharmacokinetics and pharmacodynamics of suberoylanilide hydroxamic acid in cats.
McDonnell, S. J., L. A. Tell, and B. G. Murphy

Suberoylanilide hydroxamic acid (SAHA), or vorinostat, is a histone deacetylase inhibitor approved for use as chemotherapy for lymphoma in humans. The goal of this study was to establish pharmacological parameters of SAHA in cats. Our interest in treating cats with SAHA is twofold: as an anticancer chemotherapeutic and as antilatency therapy for feline retroviral infections. Relying solely on data from studies in other animals would be inappropriate as SAHA is partially metabolized by glucuronidation, which is absent in feline metabolism. SAHA was administered to cats intravenously (2 mg/kg) or orally (250 mg/m², ~17 mg/kg) in a cross-over study design. Clinically, SAHA was well tolerated at these dosages as no abnormalities were noted following administration. The pharmacokinetics of SAHA in cats was found to be similar to that of dogs, but the overall serum drug exposure was much less than that of humans at an equivalent dose. The pharmacodynamic effect of an increase in acetylated histone proteins in blood was detected after both routes of administration. An increased oral dose of 60 mg SAHA/kg administered to one animal resulted in a surprisingly modest increase in peak drug concentration, suggesting possible saturation of absorption kinetics. This study provides a foundation for future studies of the clinical efficacy of SAHA in treating feline disease.

Relationship among Serum Creatinine, Serum Gastrin, Calcium-phosphorus Product, and Uremic Gastropathy in Cats with Chronic Kidney Disease.
McLeland, S. M., K. F. Lunn, C. G. Duncan, K. R. Refsal, and J. M. Quimby

BACKGROUND: Chronic kidney disease (CKD) in cats is associated with gastrointestinal signs commonly attributed to uremic gastropathy. Consequently, patients often are treated with antacids and gastrointestinal protectants. This therapeutic regimen is based on documented gastric lesions in uremic humans and dogs, but the nature and incidence of uremic gastropathy in cats are unknown. HYPOTHESIS/OBJECTIVES: Evaluate uremic gastropathy in CKD cats to facilitate refinement of medical management for gastrointestinal signs. ANIMALS: Thirty-seven CKD cats; 12 nonazotemic cats
METHODS: Stomachs were evaluated for the presence of classic uremic gastropathy lesions. Histopathologic lesions were compared with serum creatinine concentrations, calcium-phosphorus product (CPP), and serum gastrin concentrations. RESULTS: Gastric ulceration, edema, and vascular fibrinoid change were not observed. The most important gastric lesions in CKD cats were fibrosis and mineralization. Sixteen CKD cats (43%) had evidence of gastric fibrosis of varying severity and 14 CKD cats (38%) had gastric mineralization. CKD cats were more likely to have gastric fibrosis and mineralization than nonazotemic controls (P =.005 and P =.021, respectively). Only cats with moderate and severe azotemia had gastric mineralization. CPP was correlated with disease severity; severely azotemic CKD cats had significantly higher CPP when compared with nonazotemic controls, and to mildly and moderately azotemic cats (P <.05). Gastrin concentrations were significantly higher in CKD cats when compared with nonazotemic controls (P =.003), but increased concentrations were not associated with gastric ulceration. CONCLUSIONS AND CLINICAL IMPORTANCE: Uremic gastropathy in CKD cats differs from that described in other species and this difference should be considered when devising medical management.

Prevalence of antibodies against feline panleukopenia virus in client-owned cats in Southern Germany.
Mende, K., B. Stuetzer, C. Sauter-Louis, T. Homeier, U. Truyen, and K. Hartmann
Feline panleukopenia is a frequent and commonly fatal disease of cats. Recent published studies have raised suspicions that some cats fail to develop antibodies after vaccination. The purpose of this study was to assess the prevalence of antibodies against feline panleukopenia virus (FPV) in cats in Southern Germany, and to identify factors that are associated with a lack of antibodies. In total, 350 cats presented to the Clinic of Small Animal Medicine, Ludwig-Maximilians-Universitaet were randomly included in the study. Information regarding signalment, origin, environment, lifestyle, housing conditions, health status, chronic diseases, glucocorticoid therapy, and vaccination status were collected. Antibodies were detected by haemagglutination inhibition test. Asymptomatic chi-squared tests and univariable logistic regression were used to investigate associations between a lack of antibodies and the different variables. Associations determined to be statistically significant at $P<0.1$ were verified by a multivariable logistic regression analysis. Of the 350 cats, 103 (29.4%) had no antibodies against FPV. Chronic kidney disease, neoplasia, glucocorticoid therapy, and vaccination status were significantly associated with a lack of antibodies. The cats with no antibodies were likely to have inadequate immunity against panleukopenia and those with chronic diseases or receiving glucocorticoids were less likely to be protected.

**Evaluation of the effect of formalin fixation on skin specimens in dogs and cats.**
Miller, J. L., and M. J. Dark
Skin and subcutaneous tissues are the origin of most common neoplasms affecting dogs, accounting for approximately one third of all tumors encountered in the species. Surgical excision is frequently the best chance for a cure; determining factors influencing the success of excision are vital for surgical management of cases. This work examined the shrinkage of skin of various lengths from three sites in formalin for both dogs and cats. Tissues were measured on the animal (initial measurement), at the time of excision (post-removal), and after formalin fixation (post-fixation). While shrinkage after tissue removal was found in samples from the thorax, abdomen, and rear leg in dogs and from the rear leg in cats, no significant shrinkage due to formalin fixation was detected in any sample except for the thoracic samples from the dog. Therefore, when determining where to make incisions to effect a surgical cure, initial measurements should take into account tissue shrinkage effects.

**Canine parvovirus 2c infection in a cat with severe clinical disease.**
Miranda, C., C. R. Parrish, and G. Thompson
Canine parvovirus 2 (CPV-2) is considered the main pathogen responsible for acute gastroenteritis in dogs, causing vomiting and hemorrhagic enteritis mainly. However, infection in cats by CPV variants causes clinical signs similar to Feline panleukopenia virus. The current study reports a case of CPV-2c in a domestic cat, in Portugal. The findings suggest that more surveys are needed to know the true prevalence and significance of cats in CPV epidemiology worldwide.

**Enoxaparin: Pharmacokinetics and treatment schedule for cats.**
Mischke, R., J. Schonig, E. Doderlein, S. Wolken, C. Bohm, and M. Kietzmann
Detailed pharmacokinetic data are not available for subcutaneously (SC) administered enoxaparin in cats and this causes difficulties in establishing treatment protocols. The aims of this study were (1) to establish pharmacokinetic data of SC administered enoxaparin and (2) to establish a treatment schedule. Six healthy cats received a single SC injection of 1 mg enoxaparin/kg and blood samples were collected before and 1, 2, 3, 4, 6, 8, 10 and 12 h after the injection. Six further healthy cats received 0.75 mg/kg every 6 h for four consecutive days and blood samples were collected before and 2 h after the first and second injection on day 1, and the first injection on days 2 and 4. Anti-factor Xa (FXa) activity, coagulation tests and thromboelastometry assays were performed. Enoxaparin injection was well tolerated. Following the single SC injection Cmax was 0.83 +/- 0.08 anti-Xa IU/mL and in 5/6 cats was detected after 2 h (Tmax = 110 +/- 25 min). The total clearance was 23.4 +/- 4.8 mL/h/kg and the terminal half-life was 2.27 +/- 0.4 h. All cats receiving repeated injections reached the defined target peak range of 0.5-1.0 IU/mL by 2 h after the second injection (0.54 [0.50-0.61]; median, [minimum - maximum]) and there was no considerable accumulation subsequently. With the exception of thromboelastometry (especially non-activated), ratio values of coagulation times increased significantly although only
slightly (e.g., the maximal value of median activated partial thromboplastin time ratio was 1.27). Significant, although only moderately close relationships with Spearman rank correlation coefficients between 0.424 and 0.558 were calculated between anti-FXa activities and ratios of different coagulation times. A dosage schedule of 0.75 mg/kg four times a day seems suitable for therapeutic use of enoxaparin in cats as it leads to reproducible peak anti-FXa activities within the target range for the treatment of thrombosis in humans. The low inter-individual variation may indicate that monitoring based on anti-FXa activities is not necessary.

**Alveolar macrophages are the main target cells in feline calicivirus-associated pneumonia.**

Vet J (2014)


Feline calicivirus (FCV) is a pathogen of felids and one of the most common causative agents of feline upper respiratory disease (URD). Reports of natural FCV pneumonia in the course of respiratory tract infections are sparse. Therefore, knowledge on the pathogenesis of FCV-induced lung lesions comes only from experimental studies. The aim of the present study was to assess the type and extent of pulmonary involvement in natural respiratory FCV infections of domestic cats and to identify the viral target cells in the lung. For this purpose, histology, immunohistochemistry and RNA-in situ hybridisation for FCV and relevant cell markers were performed on diagnostic post-mortem specimens collected after fatal URD, virulent systemic FCV or other conditions. All groups of cats exhibited similar acute pathological changes, dominated by multifocal desquamation of activated alveolar macrophages (AM) and occasional type II pneumocytes with fibrin exudation, consistent with diffuse alveolar damage (DAD). In fatal cases, this was generally seen without evidence of epithelial regeneration. In cats without clinical respiratory signs, type II pneumocyte hyperplasia was present alongside the other changes, consistent with the post-damage proliferative phase of DAD. FCV infected and replicated in AM and, to a lesser extent, type II pneumocytes. This study shows that lung involvement is an infrequent but important feature of FCV-induced URD. AM are the main viral target cell and pulmonary replication site, and their infection is associated with desquamation and activation, as well as death via apoptosis.

**Feline dermatophytosis: Aspects pertinent to disease management in single and multiple cat situations.**


Moriello, K.

Practical relevance: Dermatophytosis (ringworm) is a superficial fungal skin disease of cats that, depending on the geographic region and practice caseload, may be encountered uncommonly through to commonly. This is a self-curing disease in an immunocompetent cat. Global importance: Dermatophytosis is prevalent worldwide and is one of a number of zoonotic skin diseases that cat owners are at risk of contracting. Clinical challenges: Dermatophytosis causes non-specific signs of hair loss, erythema and scaling, making it a differential diagnosis for many skin diseases of cats. The fact that this disease is infectious and contagious, and does not have any one classic clinical presentation, makes knowledge of diagnostic tools important in detection. The veterinarian’s role is in early disease recognition and institution of appropriate therapy to hasten resolution of the disease. Aim: The focus of this article is to provide an update and review of the most pertinent aspects that may be helpful in the management of dermatophytosis in any single or multiple cat situation. Evidence base: Where appropriate, evidence from the literature is used to supplement a summary of the author’s clinical experience and research in feline dermatophytosis.

**Epidemiology of the eye worm Thelazia callipaeda in cats from southern Switzerland.**

Vet Parasitol (2014)

Motta, B., F. Nageli, C. Nageli, F. Solari-Basano, B. Schiessl, P. Deplazes, and M. Schnyder

Thelazia callipaeda is a spiruroid nematode of dogs, cats and wild carnivores transmitted by zoophilic drosophilid Phortica flies and found in an increasing number of European countries. In cats the disease is diagnosed sporadically. This study presents an epidemiological investigation of feline thelaziosis, performed in southern Ticino, Switzerland, an endemic area for T. callipaeda. Between January 2009 and July 2011 2171 cats, having outdoor access and presenting for various reasons, were examined by in-depth eye examinations, and clinical and anamnestic data were collected. The overall prevalence of T. callipaeda in the study area was 0.8% (17/2171 cats, 95% confidence interval: 0.5-1.3%). Among cats showing ocular
illness, the prevalence was 9.2% (11/120, CI: 4.7-15.8%). Cats with eye worms had no international travel history and were significantly more often diagnosed between June and December than during other months. With one exception, one single eye per cat was infested, each harboring between 1 and 10 eye worms (arithmetic mean: 2.8 per cat). One cat presented with conjunctivitis and ulcers, seven with conjunctivitis only and 3 with a mildly increased lacrimation, while 6 cats were asymptomatic. Significantly more male than female cats had eye worms and cats older than one year were overrepresented. No pure-bred cats were infested. This study confirms the establishment of this potentially zoonotic parasite in cats from the study area. Due to the clinical relevance and pain caused by the infestations, increased disease awareness and in depth eye examination for the detection of T. callipaeda in cats are recommended, even in absence of obvious clinical signs, in order to initiate appropriate anthelmintic treatment.

Lack of association between p53 SNP and FISS in a cat population from Germany.
Mucha, D., S. Laberke, S. Meyer, and J. Hirschberger
One recent study indicates a significant association between certain single nucleotide polymorphisms (SNPs) in the genomic sequence of feline p53 and feline injection-site sarcoma (FISS). The aim of this study was to investigate the correlation between a specific nucleotide insertion in p53 gene and FISS in a German cat population. Blood samples from 150 German cats were allocated to a control group consisting of 100 healthy cats and a FISS-group consisting of 50 cats with FISS. All blood samples were examined for the presence of the SNP in the p53 gene. Results found the T-insertion at SNP 3 in 20.0% of the cats in the FISS-group and 19.2% of cats in the control-group. No statistically significant difference was observed in allelic distribution between the two groups. Further investigations are necessary to determine the association of SNPs in the feline p53 gene and the occurrence of FISS.

Mulherin, B. L., C. J. Snyder, J. W. Soukup, and S. Hetzel
Objectives: To determine differences in signalment between maxillomandibular (MM) and non-maxillomandibular (non-MM) trauma patients to help predict the type of injury sustained. Methods: A medical records database was searched from December 2003 to September 2012 to identify all MM trauma patients. A random sample of non-MM trauma patients was generated for comparison. Patient species, age, sex, weight, and injury aetiology were recorded for both populations. Results: Sixty-seven MM trauma patients and 129 non-MM trauma patients were identified. Feline patients were almost twice as likely to be presented for MM trauma compared with non-MM trauma. The median weight of canine patients suffering MM injury was significantly less than that of non-MM patients (p = 0.025). A significant association existed between the causes of injuries associated with MM and non-MM trauma populations (p = 0.000023). The MM trauma patients were more likely to sustain injury as a result of an animal altercation (Bonferroni p = 0.001) while non-MM injuries were more likely to result from motor vehicle accidents (Bonferroni p = 0.001). Overall, animals that were less than one year of age with traumatic injuries were overrepresented (65/196) in comparison to the entire patient population. Clinical significance: The results of this study may help guide clinicians in the evaluation and screening of trauma patients that are presented as an emergency. Cats, small dogs and animals suffering from animal altercations should all be closely evaluated for MM injury.

Papillomaviruses in felids.
Munday, J. S.
The ability of papillomaviruses (PVs) to cause disease in human beings and most domestic animals has long been recognised. However, disease due to PVs in cats was not reported until 1990. Since this first description of feline cutaneous viral plaques, additional feline diseases have been causally linked to PVs, and PV-induced disease has been reported in a wide range of felids. In this review, the PV replication cycle and the subsequent immune response are discussed, along with diagnostic methods to confirm intralesional infection. In domestic cats, viral plaques, Bowenoid in situ carcinomas and
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Feline sarcoids are thought to be caused by PV infection; the appearance, clinical behaviour and causative PVs of these diseases are discussed. Recent evidence that PVs could also be a significant cause of feline cutaneous squamous cell carcinomas is reviewed. Lastly, PV-associated diseases of exotic felids are presented.

Seroprevalence of feline immunodeficiency virus (FIV) and feline leukemia virus (FeLV) in shelter cats on the island of Newfoundland, Canada.
Munro, H. J., L. Berghuis, A. S. Lang, L. Rogers, and H. Whitney
Feline immunodeficiency virus (FIV) and feline leukemia virus (FeLV) are retroviruses found within domestic and wild cat populations. These viruses cause severe illnesses that eventually lead to death. Housing cats communally for long periods of time makes shelters at high risk for virus transmission among cats. We tested 548 cats from 5 different sites across the island of Newfoundland for FIV and FeLV. The overall seroprevalence was 2.2% and 6.2% for FIV and FeLV, respectively. Two sites had significantly higher seroprevalence of FeLV infection than the other 3 sites. Analysis of sequences from the FeLV env gene (envelope gene) from 6 positive cats showed that 4 fell within the FeLV subtype-A, while 2 sequences were most closely related to FeLV subtype-B and endogenous feline leukemia virus (en FeLV). Varying seroprevalence and the variation in sequences at different sites demonstrate that some shelters are at greater risk of FeLV infections and recombination can occur at sites of high seroprevalence.

Antagonistic effects of atipamezole, yohimbine and prazosin on medetomidine-induced diuresis in healthy cats.
Murahata, Y., A. Yamamoto, Y. Miki, and Y. Hikasa
This study aimed to investigate and compare the antagonistic effects of atipamezole, yohimbine and prazosin on medetomidine-induced diuresis in healthy cats. Five cats were repeatedly used in each of the 9 groups. One group was not medicated. Cats in the other groups received 40 microg/kg medetomidine intramuscularly and saline (as the control), 160 microg/kg prazosin, or 40, 160 or 480 microg/kg atipamezole or yohimbine intravenously 0.5 hr later. Volume, pH and specific gravity of urine; plasma arginine vasopressin (AVP) level; and creatinine, osmolality and electrolyte levels in both urine and plasma were measured. Both atipamezole and yohimbine, but not prazosin, antagonized medetomidine-induced diuresis. The antidiuretic effect of atipamezole was more potent than that of yohimbine, but was not dose dependent, in contrast to the effect of yohimbine at the tested doses. Both atipamezole and yohimbine reversed medetomidine-induced decreases in both urine specific gravity and osmolality and increases in plasma osmolality and free-water clearance. Antidiuresis of either atipamezole or yohimbine was not related to the area under the curve for AVP level, although the highest dose of both atipamezole and yohimbine initially and temporarily increased plasma AVP levels, suggesting that this may partly influence the antidiuretic effects of both agents. The diuretic effect of medetomidine in cats may be mediated by alpha2-adrenoceptors, but not alpha1-adrenoceptors. Atipamezole and yohimbine can be used as antagonistic agents against medetomidine-induced diuresis in healthy cats.

Investigation of parenchymal abdominal organ disease in cats: aiming for the ideal biopsy.
Murgia, D.
PRACTICAL RELEVANCE: Definitive diagnosis of disease involving the parenchymal abdominal viscera often requires a representative specimen of affected tissue. Methods used to obtain tissue samples range from those that are minimally invasive, such as fine-needle aspiration (FNA), to more invasive techniques such as surgical biopsy. CLINICAL CHALLENGES: FNA and cytological examination can be a useful diagnostic tool and is commonly used for hepatic, splenic and lymph node specimens. FNA is an easy and cheap procedure that is best suited to diffuse disease and can be performed at low risk to the patient. However, its accuracy and agreement with the histopathological findings vary depending on the underlying disease and it often fails to provide information on parenchymal architecture. Importantly, FNA for cytological examination of the liver has serious limitations when used to identify the primary disease process due to the small sample size obtained. AUDIENCE: This review is aimed at veterinarians undertaking more detailed and specialist investigation of diseases of feline parenchymal abdominal organs and provides practical guidance on the different methods
Nosocomial spread of Mycobacterium bovis in domestic cats.

*J Feline Med Surg (2014)*


Five domestic cats were euthanased owing to confirmed or suspected *Mycobacterium bovis* infection. The initial source of infection remains unclear. Cat A was presented to a veterinary clinic in County Kildare, Ireland, with a discharging submandibular lesion. The infection appears to have been transmitted to four other cats through direct (cats B and C living in the same household as cat A) and non-direct (nosocomial spread during routine operations; cats D and E) contact over a 13.5-week period. Of the five cases, two (B and D) had post-mortem examinations in which gross changes consistent with tuberculosis were seen, moderate numbers of acid-fast bacteria (AFB) were seen on microscopy and *M bovis* (spoligotype SB0978) was confirmed on culture. Of the remaining three cats, one had a swab taken from its draining ovariohysterectomy wound, which revealed large numbers of AFB with morphology consistent with *M bovis* (cat E). Two cases were euthanased without diagnostic tests; however, their history and clinical presentations were highly suggestive of tuberculosis (cats A and C). To our knowledge, this is the first documented case of nosocomial spread of *M bovis* in cats.

The usefulness of immunohistochemistry to differentiate between nasal carcinoma and lymphoma in cats: 140 cases (1986–2000).


*Nagata, K., M. Lamb, M. H. Goldschmidt, L. Duda, and R. M. Walton*

A retrospective evaluation of 232 feline nasal biopsies initially diagnosed as either carcinoma or lymphoma was performed by two pathologists. One or both pathologists disagreed with the original diagnosis in 15 cases (7%), 14 of which had original diagnoses of carcinoma. Out of the 232 cases, 140, including the disputed ones, were subjected to immunohistochemical staining with epithelial and lymphoid markers. Immunohistochemical staining of the 15 disputed cases showed that the original diagnoses were incorrect in 67% (10/15), unverified in 13% (2/15) and correct in 20% (3/15). Among the consensual diagnoses, immunohistochemistry revealed that 3% (4/125) of diagnoses were unverified because they did not stain for any of the markers evaluated. This report demonstrates the importance of immunohistochemistry in establishing a correct histologic diagnosis for nasal neoplasms in cats.

Genetic and phenotypic characterisation of *Escherichia coli* producing cefotaximase-type extended-spectrum betalactamases: first evidence of the ST131 clone in cats with urinary infections in Italy.

*J Feline Med Surg (2014)*

*Nebbia, P., C. Tramuta, R. Odore, D. Nucera, R. Zanatta, and P. Robino*

The incidence of cefotaximase (CTX-M)-type extended-spectrum beta-lactamase (ESBL)-producing *Escherichia coli* has increased dramatically in humans and animals since the middle of the last century. *Escherichia coli* that produce CTX-M beta-lactamase represent a major cause of urinary tract infections, and pose a significant therapeutic challenge to both human and veterinary medicine. As data on uropathogenic CTX-M-producing strains in cats are limited, the aim of this study was to describe the genetic character and antibiotic resistance phenotypes of CTX-M-producing *E coli* isolated from cats with cystitis. Seven of 15 *E coli* bacteria isolated from 138 urine samples had the CTX-M gene and were therefore included in this study. These isolates were screened by polymerase chain reaction for the presence of 14 extra-intestinal virulence factors, class 1 and class 2 integrons, and to identify their phylogenetic groups. Multi-locus sequence typing (MLST) of the strains and susceptibility testing (disc diffusion method) were also performed. Virulence factor *iutA* was the most frequent determinant identified (86.7%), and the majority of CTX-M-producing strains (n = 5) carried class 1 integrons. MLST allowed us to discriminate four known sequence types (ST131, ST555, ST602, ST155) and three novel sequence types (ST3847, ST3848, ST4181). To the best of our knowledge, this is the first study to report uropathogenic CTX-M-producing *E coli* ST131 in cats in Italy. Accurate diagnostics and prudent use of antimicrobials are recommended to avoid the spread of multidrug-resistant pathogens in veterinary medicine and to prevent their transmission to humans.
Feline Abstracts: Steps for investigation of a suspected shelter outbreak.
Newbury, S., and K. A. Moriello
Practical relevance: Dermatophytosis (ringworm) is the most important infectious and contagious skin disease of cats in shelters. Its importance relates to the fact that it can affect all cats, but tends to affect those which would otherwise have good chances for adoption. Although many diseases in shelters fit this description, dermatophytosis is of particular significance because of associated public health concerns. Clinical challenges: Disease management in animal shelters is challenging because new animals are frequently entering the population, numerous animals are often housed together, and resources are almost always limited. Global relevance: Outbreaks of dermatophytosis occur worldwide and no animal shelter is completely shielded from possible introduction of the disease into the population. Audience: This article offers a flexible stepwise approach to dealing with a known or suspected outbreak of dermatophytosis in an animal shelter. It is based on the authors’ experiences spanning more than a decade of responses and/or consultations. While primarily aimed at veterinarians involved in shelter medicine, the principles largely apply to other group-housing situations, such as catteries and breeding establishments. Aims: The goals in dealing with a potential dermatophytosis outbreak are to ascertain if the ‘outbreak’ is actually an outbreak, to develop a shelter-specific outbreak management plan and to implement a long-term plan to prevent recurrences.

Feline fecal virome reveals novel and prevalent enteric viruses.
Humans keep more than 80 million cats worldwide, ensuring frequent exposure to their viruses. Despite such interactions the enteric virome of cats remains poorly understood. We analyzed a fecal sample from a single healthy cat from Portugal using viral metagenomics and detected five eukaryotic viral genomes. These viruses included a novel picornavirus (proposed genus “Sakobuvirus”) and bocavirus (feline bocavirus 2), a variant of feline astrovirus 2 and sequence fragments of a highly divergent feline rotavirus and picobirnavirus. Feline sakobuvirus A represents the prototype species of a proposed new genus in the Picornaviridae family, distantly related to human salivirus and kobuvirus. Feline astroviruses (mamastrovirus 2) are the closest known relatives of the classic human astroviruses (mamastrovirus 1), suggestive of past cross-species transmission. Presence of these viruses by PCR among Portuguese cats was detected in 13% (rotavirus), 7% (astrovirus), 6% (bocavirus), 4% (sakobuvirus), and 4% (picobirnavirus) of 55 feline fecal samples. Co-infections were frequent with 40% (4/10) of infected cats shedding more than one of these five viruses. Our study provides an initial description of the feline fecal virome indicating a high level of asymptomatic infections. Availability of the genome sequences of these viruses will facilitate future tropism and feline disease association studies.

Survey of the UK veterinary profession: common species and conditions nominated by veterinarians in practice.
Nielsen, T. D., R. S. Dean, N. J. Robinson, A. Massey, and M. L. Brennan
The practice of evidence-based veterinary medicine involves the utilisation of scientific evidence for clinical decision making. To enable this, research topics pertinent to clinical practice need to be identified, and veterinary clinicians are best placed to do this. The main aim of this study was to describe the veterinary population, the common species and conditions veterinary clinicians nominated they saw in practice and how much information clinicians perceived was available in the literature for these. A questionnaire was distributed to all Royal College of Veterinary Surgeons registered veterinarians agreeing to be contacted for research purposes (n=14,532). A useable response rate of 33 per cent (4842/14,532) was achieved. The most commonly seen species reported by vets were dogs, cats and rabbits followed by equines and cattle. Overall, skin conditions were most commonly mentioned for small animals, musculoskeletal conditions for equines and reproduction conditions for production animals. Veterinary clinicians perceived there was a higher level of information available in the literature for conditions in dogs, cattle and equines and lower levels for rabbits and guinea pigs. The results from this study can be used to help define the research needs of the profession to aid the incorporation of evidence in veterinary practice.

Oppliger, S., S. Hartnack, C. E. Reusch, and P. H. Kook

OBJECTIVE: To investigate agreement of a feline pancreas-specific lipase assay and a colorimetric lipase assay with a 1,2-o-dilauryl-rac-glycero-3-glutaric acid-(6'-methylresorufin) ester (DGGR) substrate with results of pancreatic ultrasonography in cats with suspicion of pancreatitis. DESIGN: Retrospective case series. ANIMALS: 161 client-owned cats with suspicion of pancreatitis. PROCEDURES: Feline pancreas-specific lipase concentration and DGGR lipase activity were measured from the same blood sample in cats undergoing investigation for pancreatitis, with < 24 hours between ultrasonography and lipase determinations. Ultrasonographic variables evaluated were ultrasonographic diagnosis of pancreatitis, enlargement, margins, echogenicity, mesenteric echogenicity, peripancreatic free fluid, cysts, masses, and common bile and pancreatic duct dilation. Agreement was assessed by use of the Cohen kappa coefficient. RESULTS: Agreement between the lipase assays was substantial (kappa = 0.703). An ultrasonographic diagnosis of pancreatitis had fair agreement with feline pancreas-specific lipase concentration > 5.4 µg/L (kappa = 0.264) and DGGR lipase activity > 26 U/L (kappa = 0.221). The greatest agreement between feline pancreas-specific lipase concentration > 5.4 µg/L and DGGR lipase activity > 26 U/L was found for a hypoechoic and mixed-echoic (kappa = 0.270 and 0.266, respectively), hypoechoic (kappa = 0.261 and 0.181, respectively), and enlarged (kappa = 0.218 and 0.223, respectively) pancreas. CONCLUSIONS AND CLINICAL RELEVANCE: Agreement between pancreatic ultrasonography and lipase assay results was only fair. It remains unknown whether lipase results or pancreatic ultrasonography constitutes the more accurate test for diagnosing pancreatitis; therefore, results of both tests need to be interpreted with caution.

Virulence genotypes, antibiotic resistance and the phylogenetic background of extraintestinal pathogenic Escherichia coli isolated from urinary tract infections of dogs and cats in Brazil.

Osugui, L., A. F. Pestana de Castro, R. Iovine, K. Irino, and V. M. Carvalho

Urinary tract infection (UTI) is a frequent disease of humans and pets and has extra-intestinal pathogenic Escherichia coli (ExPEC) strains as one of the main etiologic agent. ExPEC are characterized by specific virulence factors and are related to a heterogeneous group of human and animal disorders, besides to be a relevant participant in the dissemination of antimicrobial resistance. The purpose of this study was to characterize E. coli strains isolated from UTI of dogs and cats for serotypes, virulence markers, phylogenetic groups and sensitivity to antimicrobial drugs. E. coli was identified as the etiologic agent of UTI in urine samples of 43 pets (7 cats and 36 dogs). Serogroups O2, O4 and O6 corresponded to more than one third of the isolates, being 62% of the total strains classified as B2, 18% as D, 16% as B1 and 4% as A. The iucD (22%), fyuA (80%), traT (51%) and cvaC (20%) genes were distributed among the four phylogenetic groups, whereas the papC/papEF (47%) and malX (67%) genes were found only in groups B2 and D. There were a high number of resistant strains, with 76% of the strains belonging to groups A, B1 and D characterized as multidrug resistant (MDR), whereas only 21% had this phenotype in the group B2. The ExPEC strains isolated in this study displayed pathotypic and phylogenetic similarities with human isolates and high percentages of drug resistance. The finding of MDR ExPEC strains suggests implications for animal and public health and deserves more investigations.


Pachel, C. L.

Intercat aggression is a common problem within multicat households. Diagnosis and treatment requires an understanding of the social structure of free-living cats and of how those interactions are impacted by confinement and household management practices. There are multiple causes of aggression between cats within a home, and treatment plans should be customized to account for the diagnosis and behavior pattern identified. Some cases of intercat aggression can be treated successfully without requiring full separation of the involved cats. In cases where separation is required, treatment includes steps for successful reintroduction and reintegration. Several situational and maintenance medication options can be used to
Epilepsy in cats: theory and practice.  
Pakozdy, A., P. Halasz, and A. Klang

The veterinary literature on epilepsy in cats is less extensive than that for dogs. The present review summarizes the most important human definitions related to epilepsy and discusses the difficulties in applying them in daily veterinary practice. Epileptic seizures can have a wide range of clinical signs and are not necessarily typical in all cases. Whether a seizure event is epileptic can only be suspected based on clinical, laboratory, and neuroimaging findings as electroencephalography diagnostic techniques have not yet been developed to a sufficiently accurate level in veterinary medicine. In addition, the present review aims to describe other diagnoses and nonepileptic conditions that might be mistaken for epileptic seizures. Seizures associated with hippocampal lesions are described and discussed extensively, as they seem to be a special entity only recognized in the past few years. Furthermore, we focus on clinical work-up and on treatment that can be recommended based on the literature and summarize the limited data available relating to the outcome. Critical commentary is provided as most studies are based on very weak evidence.

Effects of potassium chloride and potassium bicarbonate in the diet on urinary pH and mineral excretion of adult cats.  
Passlack, N., T. Brenten, K. Neumann, and J. Zentek

Low dietary K levels have been associated with increasing renal Ca excretion in humans, indicating a higher risk of calcium oxalate (CaOx) urolith formation. Therefore, the present study aimed to investigate whether dietary K also affects the urine composition of cats. A total of eight adult cats were fed diets containing 0.31 % native K and 0.50, 0.75 and 1.00 % K from KCl or KHCO(3) and were evaluated for the effects of dietary K. High dietary K levels were found to elevate urinary K concentrations (P<0.001). Renal Ca excretion was higher in cats fed the KCl diets than in those fed the KHCO(3) diets (P=0.026), while urinary oxalate concentrations were generally lower in cats fed the KCl diets and only dependent on dietary K levels in cats fed the KHCO(3) diets (P<0.05). Fasting urine pH increased with higher dietary K levels (P=0.022), reaching values of 6.38 (1.00 % KCl) and 7.65 (1.00 % KHCO(3)). K retention was markedly negative after feeding the cats with the basal diet (-197 mg/d) and the 0.50 % KCl diet (-131 mg/d), while the cats tended to maintain their balance on being fed the highest-KCl diet (-23.3 mg/d). In contrast, K from KHCO(3) was more efficiently retained (P=0.018), with K retention being between -82.5 and 52.5 mg/d. In conclusion, the dietary inclusion of KHCO(3) instead of KCl as K source could be beneficial for the prevention of CaOx urolith formation in cats, since there is an association between a lower renal Ca excretion and a generally higher urine pH. The utilisation of K is distinctly influenced by the K salt, which may be especially practically relevant when using diets with low K levels.

An update on feline infectious peritonitis: virology and immunopathogenesis.  
Vet J (2014)  
Pedersen, N. C.

Feline infectious peritonitis (FIP) continues to be one of the most researched infectious diseases of cats. The relatively high mortality of FIP, especially for younger cats from catteries and shelters, should be reason enough to stimulate such intense interest. However, it is the complexity of the disease and the grudging manner in which it yields its secrets that most fascinate researchers. Feline leukemia virus infection was conquered in less than two decades and the mysteries of feline immunodeficiency virus were largely unraveled in several years. After a half century, FIP remains one of the last important infections of cats for which we have no single diagnostic test, no vaccine and no definitive explanations for how virus and host interact to cause disease. How can a ubiquitous and largely non-pathogenic enteric coronavirus transform into a highly lethal pathogen? What are the interactions between host and virus that determine both disease form (wet or dry) and outcome (death or resistance)? Why is it so difficult, and perhaps impossible, to develop a vaccine for FIP? What role do genetics play in disease susceptibility? This review will explore research conducted over the last 5 years that attempts to answer these and other questions. Although much has been learned about FIP in the last 5 years, the ultimate answers...
Differential pharmacokinetics and pharmacokinetic/pharmacodynamic modelling of robenacoxib and ketoprofen in a feline model of inflammation.
J Vet Pharmacol Ther (2014)
Pelligand, L., J. N. King, V. Hormazabal, P. L. Toutain, J. Elliott, and P. Lees
Robenacoxib and ketoprofen are acidic nonsteroidal anti-inflammatory drugs (NSAIDs). Both are licensed for once daily administration in the cat, despite having short blood half-lives. This study reports the pharmacokinetic/pharmacodynamic (PK/PD) modelling of each drug in a feline model of inflammation. Eight cats were enrolled in a randomized, controlled, three-period cross-over study. In each period, sterile inflammation was induced by the injection of carrageenan into a subcutaneously implanted tissue cage, immediately before the subcutaneous injection of robenacoxib (2 mg/kg), ketoprofen (2 mg/kg) or placebo. Blood samples were taken for the determination of drug and serum thromboxane (Tx)B2 concentrations (measuring COX-1 activity). Tissue cage exudate samples were obtained for drug and prostaglandin (PG)E2 concentrations (measuring COX-2 activity). Individual animal pharmacokinetic and pharmacodynamic parameters for COX-1 and COX-2 inhibition were generated by PK/PD modelling. S(+) ketoprofen clearance scaled by bioavailability (CL/F) was 0.114 L/kg/h (elimination half-life = 1.62 h). For robenacoxib, blood CL/F was 0.684 L/kg/h (elimination half-life = 1.13 h). Exudate elimination half-lives were 25.9 and 41.5 h for S(+) ketoprofen and robenacoxib, respectively. Both drugs reduced exudate PGE2 concentration significantly between 6 and 36 h. Ketoprofen significantly suppressed (>97%) serum TxB2 between 4 min and 24 h, whereas suppression was mild and transient with robenacoxib. In vivo IC50 COX-1/IC50 COX-2 ratios were 66.9:1 for robenacoxib and 1:107 for S(+) ketoprofen. The carboxylic acid nature of both drugs may contribute to the prolonged COX-2 inhibition in exudate, despite short half-lives in blood.

Attitudes of Swiss veterinarians towards pain and analgesia in dogs and cats.
Perret-Gentil, F., M. G. Doherr, C. Spadavecchia, and O. L. Levionnois
A survey was performed to evaluate the use of perioperative analgesia in dogs and cats by veterinary practitioners. Questions were grouped in seven sections recording personal data, education in veterinary analgesia, general ideology regarding treatment of perioperative pain, personal experience, assessment, and use of main analgesics to treat perioperative pain. A total of 258 received forms were analyzed. Based on 5 questions, 88% showed excellent motivation to use perioperative pain therapy. The main reason declared for the use of analgesics was to relieve the patient from pain (64.1%). Most veterinarians reported to routinely administer analgesics before (71-96%) or after (2-23%) surgery. The most used analgesics were non-steroidal anti-inflammatory drugs (carprofen, meloxicam) and opioids (butorphanol, buprenorphine). Animals were routinely evaluated for pain after recovery. Only 43.8% of veterinarians declared to use loco-regional anaesthesia. Swiss veterinarians appear to recognize well the need for perioperative pain treatment. However, weakness was shown in evaluating pain severity, distinguishing between opioid classes, and using loco-regional anaesthesia.

Common and emerging infectious diseases in the animal shelter.
Pesavento, P. A., and B. G. Murphy
The beneficial role that animal shelters play is unquestionable. An estimated 3 to 4 million animals are cared for or placed in homes each year, and most shelters promote public health and support responsible pet ownership. It is, nonetheless, inevitable that shelters are prime examples of anthropogenic biological instability: even well-run shelters often house transient, displaced, and mixed populations of animals. Many of these animals have received minimal to no prior health care, and some have a history of scavenging or predation to survive. Overcrowding and poor shelter conditions further magnify these inherent risks to create individual, intraspecies, and interspecies stress and provide an environment conducive to exposure to numerous potentially collaborative pathogens. All of these factors can contribute to the evolution and emergence of new pathogens or to alterations in virulence of endemic pathogens. While it is not possible to effectively anticipate the timing or the pathogen type in emergence events, their sites of origin are less enigmatic, and pathologists and diagnosticians who work with sheltered animal populations have recognized several such events in the past decade. This

remain for yet more studies.
article first considers the contribution of the shelter environment to canine and feline disease. This is followed by summaries of recent research on the pathogenesis of common shelter pathogens, as well as research that has led to the discovery of novel or emerging diseases and the methods that are used for their diagnosis and discovery. For the infectious agents that commonly affect sheltered dogs and cats, including canine distemper virus, canine influenza virus, Streptococcus spp, paroviruses, feline herpesvirus, feline caliciviruses, and feline infectious peritonitis virus, we present familiar as well as newly recognized lesions associated with infection. Preliminary studies on recently discovered viruses like canine circovirus, canine bocavirus, and feline norovirus indicate that these pathogens can cause or contribute to canine and feline disease.

**THYROID SCINTIGRAPHY FINDINGS IN 2096 CATS WITH HYPERTHYROIDISM.**

*Vet Radiol Ultrasound* 2014
*Peterson, M. E., and M. R. Broome*

Thyroid scintigraphy is currently the reference standard for diagnosing and staging cats with hyperthyroidism, but few studies describing the scintigraphic characteristics in a large number of cats have been reported. The objective of this study was to better characterize thyroid scintigraphy findings by evaluating 2096 consecutive cats with hyperthyroidism that were referred over a 3.5-year period. Of these cats, 2068 (98.7%) had a high thyroid-to-salivary ratio (>1.5), whereas 2014 (96.1%) were found to have a high thyroid-to-background ratio (>6.1). When the patterns of the cats’ thyroid disease were recorded, 665 (31.7%) had unilateral disease, 1060 (50.6%) had bilateral-asymmetric disease (two thyroid lobes unequal in size), 257 (12.3%) had bilateral-symmetric disease (both lobes similar in size), and 81 (3.9%) had multifocal disease (>/>=3 areas of increased radionuclide uptake). The number of areas of 99m TcO−4 uptake in the 2096 cats ranged from 1 to 6 (median, 2), located in the cervical area in 2057 (98.1%), thoracic inlet in 282 (13.5%), and in the thoracic cavity in 115 (5.5%). Ectopic thyroid tissue (e.g. lingual or mediastinal) was diagnosed in 81 (3.9%) cats, whereas thyroid carcinoma was suspected in 35 (1.7%) of the cats. The results of this study support conclusions that most hyperthyroid cats have unilateral or bilateral thyroid nodules, but that multifocal disease will develop in a few cats that have ectopic thyroid disease or thyroid carcinoma. Both ectopic thyroid disease and thyroid carcinoma are relatively uncommon in hyperthyroid cats, with a respective prevalence of approximately 4% and approximately 2% in this study.

**Acute bronchointerstitial pneumonia in two indoor cats exposed to the H1N1 influenza virus.**

*J Vet Emerg Crit Care* (San Antonio) 2014
*Pigott, A. M., C. E. Haak, M. A. Breshears, and A. K. Linklater*

OBJECTIVE: To describe 2 cases of acute bronchointerstitial pneumonia in indoor domestic cats infected by anthroponotic transmission of pandemic 2009 influenza A H1N1 virus from their owners. CASE SERIES SUMMARY: Two indoor domestic shorthair cats from the same household were evaluated for acute onset of respiratory distress. The owners had been recovering from flu-like illness at the time of presentation. Venous blood gas showed increased pvCO2 while thoracic radiographs revealed severe bronchointerstitial to alveolar patterns in both cats. The cats were treated with oxygen supplementation, antimicrobials, analgesics, diuretics, corticosteroids, bronchodilators, mechanical ventilation (1 cat), and supportive care. Despite initial improvement in the clinical condition of each cat, respiratory function deteriorated and ultimately both cats were euthanized. Gross and histopathologic examination confirmed diffuse, severe bronchointerstitial pneumonia. Pandemic 2009 influenza A H1N1 viral testing by real time PCR was positive in 1 cat. NEW OR UNIQUE INFORMATION PROVIDED: These cases provide further evidence that domestic felids are susceptible to pandemic 2009 influenza A H1N1 virus, and the literature is briefly reviewed for treatment recommendations. H1N1 should be considered in the differential diagnosis for domestic cats presenting with peracute to acute onset of respiratory distress in the right context. While human-to-cat transmission of H1N1 seems probable in several reported cases, cat-to-human transmission has not been identified.

**Cytologic and immunocytochemical characterization of feline progressive histiocytosis.**

*Vet Clin Pathol* 2014
BACKGROUND: Feline Progressive Histiocytosis (FPH) is a cutaneous dendritic cell neoplasm characterized by slow progression and spread to internal organs in the terminal stage. FPH is often misdiagnosed as an inflammatory reaction and has not been fully characterized from a cytologic diagnostic perspective. OBJECTIVES: The purpose of the study was to characterize the cytologic and immunocytochemical aspects useful for FPH diagnosis. METHODS: Fine-needle aspiration cytologic samples of 5 cases of FPH confirmed by skin biopsy and necropsy were evaluated. Immunocytochemistry with antibodies recognizing CD1a, CD1c, CD3, CD11b, CD18, and MHCII was performed on air-dried, acetone-fixed smears. E-cadherin expression was assessed on paraffin-embedded skin biopsies. Transmission electron microscopy (TEM) was performed in one case. RESULTS: Main cytologic findings on variably cellular samples were characterized by single to cohesive large, round to polygonal cells with intermediate to low N/C ratio, abundant clear homogeneous cytoplasm, and round to oval nuclei with rare bi- to multinucleated atypical cells, associated with low numbers of small lymphocytes and/or neutrophils. Neoplastic cells expressed CD1a, CD1c, CD11b, CD18, and MHCII. Anti-CD3 antibodies identified reactive T cells admixed with the neoplastic cells. E-cadherin expression was observed in all but one case. TEM failed to identify Birbeck granules in one case. CONCLUSIONS: FPH is a distinctive neoplastic lesion composed of nonphagocytizing histiocytes variably admixed with neutrophils and small mature lymphocytes. Immunocytochemical analysis with CD1 is mandatory to confirm a dendritic cell origin. Immunocytochemistry and cytomorphology allowed the specific and rapid diagnosis of FPH on cytologic samples.

**Effectiveness of deslorelin acetate subcutaneous implantation in a domestic queen with after-spaying urinary incontinence.**


*Pisu, M. C., and M. C. Veronesi*

A 2-year-old female ovariectomised Norwegian Forest cat with a history of post-spaying urinary incontinence was diagnosed with acquired urinary sphincter mechanism incompetence (USMI) after complete clinical and laboratory examination. Although there is no literature regarding the treatment of post-spaying USMI in cats, deslorelin acetate is successful in the treatment of post-spaying USMI in dogs. Deslorelin acetate implants have been shown previously to be effective for contraception and oestrus suppression in queens, and suppression of reproductive function in tomcats. Therefore, deslorelin acetate implant treatment was chosen for treatment of post-spaying USMI in this queen. Follow-up examinations were performed on days 8, 15 and 30 after deslorelin implant insertion. Urinary continence was restored about 25 days after implantation and maintained for at least 15 months, without treatment-related negative effects. In the present case report, the post-spaying urinary incontinence related to the acquired USMI was successfully treated with a deslorelin acetate implant. In addition, safe implantation was easy in cats and the single injection resulted in long-lasting efficacy. Further studies are needed to confirm the usefulness of deslorelin acetate treatment for post-spaying USMI in queens and to better delineate the duration of efficacy.

**Animal shelters: Managing heartworms in resource-scarce environments.**

*Vet Parasitol (2014)*

*Polak, K. C., and M. Smith-Blackmore*

Animal shelters must frequently make difficult decisions regarding the allocation of limited resources to appropriately care for the millions of dogs and cats that enter their doors annually. Insufficient staffing, expertise, and guidance on heartworm management in animal shelters creates significant confusion on how these facilities should appropriately address heartworm infection in dogs and cats. The American Heartworm Society (AHS) issues comprehensive guidelines for the diagnosis, prevention, and management of heartworm infection in pets, but shelters are often unable to fully comply with these guidelines due to resource constraints. In response, shelter staff is forced to either ignore the disease or implement compromised management practices. Such compromises lead to suboptimal treatment of infected animals, adoption of infected animals to the public, and subsequent backlash from community veterinarians, as well as increased risk of disease transmission throughout the shelter and community. Unfortunately, when shelters lack the resources to address heartworm infection appropriately, this treatable condition may serve as grounds for automatic euthanasia in infected yet adoptable animals. The AHS guidelines must be tailored to the needs of sheltering agencies or additional resources created to appropriately address the dilemmas faced by shelter professionals when managing heartworm disease.
Feline eosinophilic dermatoses: a retrospective immunohistochemical and ultrastructural study of extracellular matrix remodelling.
Porcellato, I., A. Giontella, L. Mechelli, E. Del Rossi, and C. Brachelente
BACKGROUND: Feline eosinophilic dermatoses (FEDs) are common diseases of cats with an unknown pathogenesis. They are histologically characterized by an eosinophilic infiltration and often by the presence of flame figures (FFs) and/or areas of loss of tissue architecture, here termed necrotic foci (NF). It has been postulated that an alteration in the degradation of the extracellular matrix could be responsible for these histological features. Matrix metalloproteinases (MMPs) are a group of proteases that are fundamental in extracellular matrix remodelling. HYPOTHESIS/OBJECTIVES: The aim of the study was to investigate retrospectively the expression of a subgroup of MMPs, in particular MMP-2 and MMP-9 gelatinases, in FEDs. The expression of one of their inhibitors, TIMP-2, was also investigated in order to establish the role of these molecules in the pathogenesis of FEDs. The ultrastructural characteristics of extracellular matrix in FFs and NF were subsequently assessed. METHODS: Fifty-one formalin-fixed, paraffin-embedded specimens from cutaneous and mucosal biopsies diagnosed as FEDs were investigated immunohistochemically. Two selected samples were processed for electron microscopy. RESULTS: This study revealed an increased expression of MMP-2 in NF and a decreased expression of this gelatinase in FFs. An imbalance between MMP-2 and TIMP-2 was evident using immunohistochemistry. No significative results were observed for MMP-9 expression. Electron microscopy confirmed the lack of normal collagen fibres in NF, whereas in FFs only occasional, amorphous material was observed among normal collagen fibres. CONCLUSIONS AND CLINICAL IMPORTANCE: Our study suggests that an imbalance in the expression of matrix metalloproteinases could be responsible for different morphological findings in FEDs. Further studies are needed to assess the role of matrix metalloproteinases in the pathogenesis of FEDs.

Amino acid changes in the spike protein of feline coronavirus correlate with systemic spread of virus from the intestine and not with feline infectious peritonitis.
Recent evidence suggests that a mutation in the spike protein gene of feline coronavirus (FCoV), which results in an amino acid change from methionine to leucine at position 1058, may be associated with feline infectious peritonitis (FIP). Tissue and faecal samples collected post mortem from cats diagnosed with or without FIP were subjected to RNA extraction and quantitative reverse-transcriptase polymerase chain reaction (qRT-PCR) to detect FCoV RNA. In cats with FIP, 95% of tissue, and 81% of faecal samples were PCR-positive, as opposed to 22% of tissue, and 60% of faecal samples in cats without FIP. Relative FCoV copy numbers were significantly higher in the cats with FIP, both in tissues (P < 0.001) and faeces (P = 0.02). PCR-positive samples underwent pyrosequencing encompassing position 1058 of the FCoV spike protein. This identified a methionine codon at position 1058, consistent with the shedding of an enteric form of FCoV, in 77% of the faecal samples from cats with FIP, and in 100% of the samples from cats without FIP. In contrast, 91% of the tissue samples from cats with FIP and 89% from cats without FIP had a leucine codon at position 1058, consistent with a systemic form of FCoV. These results suggest that the methionine to leucine substitution at position 1058 in the FCoV spike protein is indicative of systemic spread of FCoV from the intestine, rather than a virus with the potential to cause FIP.

Prepubertal gonadectomy in cats: different surgical techniques and comparison with gonadectomy at traditional age.
Vet Rec (2014)
Porters, N., I. Polis, C. Moons, L. Duchateau, K. Goethals, S. Huyghe, and H. de Rooster
Feasibility, surgical time and complications of different surgical techniques for prepubertal gonadectomy (PPG; 8-12 weeks of age) in cats were studied and compared to gonadectomy at traditional age (TAG; 6-8 months of age). Kittens were randomly assigned to PPG or TAG. Ovarian pedicle haemostasis for PPG was achieved by ligatures (n=47), vascular clips (n=50), bipolar electrocoagulation (n=50), or pedicle tie (n=50); for TAG (n=34) ligatures were used. In male cats, PPG consisted of closed castration by spermatic cord knot (n=92) or ligature (n=91) while TAG (n=34) was an open castration by spermatic cord knot. A linear (surgical time) and a logistic regression (complications) model were designed. Significance was set at 0.05. For female PPG, clips and coagulation were the fastest procedures; placement of ligatures was most time-consuming. In male PPG, knot placement was significantly faster than ligation. In both sexes, very few intraoperative or wound complications were observed, irrespective of the surgical technique used. Surgical times in females (ligatures) as
well as in males (knot) were significantly shorter for PPG than for TAG. PPG was as safe as TAG, yet took less time to perform and did not result in a greater rate of postoperative complications.

Efficacy of a novel topical combination of fipronil, (S)-methoprene, eprinomectin and praziquantel against induced infections of Ancylostoma spp. nematodes of cats.
Four studies were conducted to examine the efficacy of a novel topical combination of fipronil, (S)-methoprene, eprinomectin, and praziquantel (BROADLINE(R), Merial) against Ancylostoma tubaeforme and Ancylostoma braziliense hookworms of cats. In each study, purpose-bred cats were randomly assigned to treatment groups of 10 or 12 cats per group. In three studies the cats were inoculated with A. tubaeforme and in one study with A. braziliense. The inoculations were undertaken on a schedule which resulted in the hookworms reaching the fourth larval stage in two of the studies, or the adult stage in four of the studies, by the day of treatment. In each study there was also an untreated control and 1 or 2 groups treated with the novel combination. In the two studies where efficacy against the fourth larval stage of A. tubaeforme was tested, the efficacy recorded was 100%. In the three studies where efficacy against the adult stage of A. tubaeforme was tested, efficacy of 100% was also confirmed. In the study where efficacy against the adult stage of A. braziliense was tested efficacy was 99.5%.

Bioavailability of morphine, methadone, hydromorphone, and oxymorphone following buccal administration in cats.
Pypendop, B. H., J. E. Ilkiw, and Y. Shilo-Benjamini
Buccal administration of buprenorphine is commonly used to treat pain in cats. It has been argued that absorption of buprenorphine through the buccal mucosa is high, in part due to its pKa of 8.24. Morphine, methadone, hydromorphone, and oxymorphone have a pKa between 8 and 9. This study characterized the bioavailability of these drugs following buccal administration to cats. Six healthy adult female spayed cats were used. Buccal pH was measured prior to drug administration. Morphine sulfate, 0.2 mg/kg IV or 0.5 mg/kg buccal; methadone hydrochloride, 0.3 mg/kg IV or 0.75 mg/kg buccal; hydromorphone hydrochloride, 0.1 mg/kg IV or 0.25 mg/kg buccal; or oxymorphone hydrochloride, 0.1 mg/kg IV or 0.25 mg/kg buccal were administered. All cats received all treatments. Arterial blood was sampled immediately prior to drug administration and at various times up to 8 h thereafter. Bioavailability was calculated as the ratio of the area under the time-concentration curve following buccal administration to that following IV administration, each indexed to the administered dose. Mean +/- SE (range) bioavailability was 36.6 +/- 5.2 (12.7-49.5), 44.2 +/- 7.9 (18.7-70.5), 22.4 +/- 6.9 (6.4-43.4), and 18.8 +/- 2.0 (12.9-23.5)% for buccal administration of morphine, methadone, hydromorphone, and oxymorphone, respectively. Bioavailability of methadone was significantly higher than that of oxymorphone.

Pharmacokinetics of dexmedetomidine after intravenous administration of a bolus to cats.
Pypendop, B. H., and J. E. Ilkiw
Objective-To characterize the pharmacokinetics of dexmedetomidine after IV administration of a bolus to conscious healthy cats. Animals-5 healthy adult spayed female cats. Procedures-Dexmedetomidine was administered IV as a bolus at 3 doses (5, 20, or 50 mug/kg) on separate days in a random order. Blood samples were collected immediately before and at various times for 8 hours after drug administration. Plasma dexmedetomidine concentrations were determined with liquid chromatography-mass spectrometry. Compartment models were fitted to the concentration-time data by means of nonlinear regression. Results-A 2-compartment model best fit the concentration-time data after administration of 5 mug/kg, whereas a 3-compartment model best fit the data after administration of 20 and 50 mug/kg. The median volume of distribution at steady-state and terminal half-life were 371 mL/kg (range, 266 to 435 mL/kg) and 31.8 minutes (range, 30.3 to 39.7 minutes), respectively, after administration of 5 mug/kg: 545 mL/kg (range, 445 to 998 mL/kg) and 56.3 minutes (range, 39.3 to 68.9 minutes), respectively, after administration of 20 mug/kg; and 750 mL/kg (range, 514 to 938 mL/kg) and 75.3 minutes (range, 52.2 to 223.3 minutes), respectively, after administration of 50 mug/kg. Conclusions and Clinical Relevance-The pharmacokinetics of dexmedetomidine was characterized by a small volume of distribution and moderate
clearance and had minimal dose dependence within the range of doses evaluated. These data will help clinicians design dosing regimens once effective plasma concentrations are established.

**Relationship between plasma dexmedetomidine concentration and sedation score and thermal threshold in cats.**
_Pypendop, B. H., and J. E. Ilkiw_

Objective-To characterize the relationship between plasma dexmedetomidine concentration and the temperature difference between the thermal threshold and skin temperature (DeltaT) and between plasma dexmedetomidine concentration and sedation score in healthy cats. Animals-5 healthy adult spayed female cats. Procedures-Cats received IV administrations of saline (0.9% NaCl) solution, dexmedetomidine (5, 20, or 50 mug/kg), or acepromazine (0.1 mg/kg). Blood samples were collected and thermal threshold and sedation score were determined before and at various times up to 8 hours after drug administration. In addition, cats received an IV infusion of dexmedetomidine that targeted a concentration achieving 99% of the maximum effect on DeltaT. Results-No change in DeltaT over time was found for the saline solution and acepromazine treatments; DeltaT increased for 45 minutes when cats received dexmedetomidine at 5 and 20 mug/kg and for 180 minutes when cats received dexmedetomidine at 50 mug/kg. No change in sedation score over time was found for saline solution. Sedation score increased for 120 minutes after cats received acepromazine and for 60, 120, and 180 minutes after cats received dexmedetomidine at 5, 20, and 50 mug/kg, respectively. The plasma dexmedetomidine concentration-effect relationships for the effect on DeltaT and sedation score were almost identical. The plasma dexmedetomidine concentration after infusion was lower than targeted, and DeltaT was not significantly affected. Conclusions and Clinical Relevance- Dexmedetomidine administration to cats resulted in thermal analgesia and also profound sedation. These data may be useful for predicting the course of thermal analgesia and sedation after dexmedetomidine administration to cats.

**Combined assessment of serum free and total T4 in a general clinical setting seemingly has limited potential in improving diagnostic accuracy of thyroid dysfunction in dogs and cats.**
_Rasmussen, S. H., H. H. Andersen, and M. Kjelgaard-Hansen_

**Feline atopic dermatitis: a retrospective study of 45 cases (2001-2012).**
_Ravens, P. A., B. J. Xu, and L. J. Vogelnest_

BACKGROUND: Atopic dermatitis (AD) is recognized as a common cause of pruritus in cats, but it remains incompletely characterized. HYPOTHESIS/OBJECTIVES: The aim of the study was to evaluate cases of confirmed feline AD. ANIMALS: Forty-five cats from a dermatology referral practice (2001-2012). METHODS: A retrospective case record review was carried out using strict diagnostic criteria, including exclusion of flea-bite hypersensitivity and adverse food reaction. RESULTS: Disease prevalence was 12.5%, with domestic mixed (n = 24), Abyssinian (n = 6) and Devon rex (n = 3) cat breeds predisposed. Median age of onset was 2 years (62% <3 years; 22% >7 years; range 3 months to 12 years). Common presentations were severe (82%), nonseasonal (82%), waxing/waning (36%) pruritus, with alopecia/crusting/excoriations and/or erosions/ulceration (73%). Miliary dermatitis (20%) and eosinophilic granuloma complex lesions (27%) occurred. The face/head (71%), ventral abdomen (51%), neck (51%), limbs (51%), pinnae (31%), dorsum/rump (31%) and feet (16%) were frequently affected sites; lesions were restricted to the head/neck in only five cats (11%). Concurrent otitis externa (16%), superficial bacterial pyoderma (49%), Malassezia dermatitis (7%), flea-bite hypersensitivity (24%) and adverse food reaction (13%) occurred. Strong reactions on intradermal allergen testing were common (68%; 19 of 30), most frequently to pollens (61%) and/or insects (46%). Good response to ciclosporin (100%; 10 of 10), systemic glucocorticoids (55%; 22 of 40) and allergen-specific immunotherapy (57%; 13 of 23) and good/partial response to antihistamines (67%; 22 of 33) were reported. CONCLUSIONS AND CLINICAL IMPORTANCE: The prevalence of feline AD was higher than previously suggested, and breed predispositions were confirmed. Severe nonseasonal pruritus was most common, with a varied spectrum of lesions affecting a range of body areas.
Efficacy against nematode and cestode infections and safety of a novel topical fipronil, (S)-methoprene, eprinomectin and praziquantel combination product in domestic cats under field conditions in Europe.
A novel topical combination product (BROADLINE®(R), Merial) composed of fipronil, (S)-methoprene, eprinomectin and praziquantel was evaluated for safety and efficacy against nematode and cestode infections in domestic cats. The study comprised a multi-centre, positive control, blinded, field study, using a randomized block design based on order of presentation for allocation. In total 196 client-owned cats, confirmed as positive for naturally acquired infections of nematodes and/or cestodes by pre-treatment faecal examination, were studied in seven countries in Europe. Pre-treatment faecal examination revealed the presence of Toxocara, hookworm, Capillaria and/or spirurid nematode infestations in 129, 73, 33 or 1 cat(s), respectively; infections with taenid and Dipylidium cestodes were demonstrated in 39 and 17 cats, respectively. Cats were allocated randomly to one of two treatments in a ratio of 2, topical fipronil (8.3%, w/v), (S)-methoprene (10%, w/v), eprinomectin (0.4%, w/v) and praziquantel (8.3%, w/v) (BROADLINE®(R), Merial; 130 cats); and 1, topical PROFENDER®(R) Spot-On (Bayer; 66 cats) and treated once on Day 0. For evaluation of efficacy, two faecal samples were collected, one prior to treatment (Day -4 +/- 4 days) and one at the end of the study (Day 14 +/- 5 days). These were examined for faecal forms of nematode and cestode parasites. For evaluation of safety, cats were examined by a veterinarian before treatment and at the end of the study, and cat owners recorded the health status of their cats daily until the end of the study. For cats treated with Broadline(R), the efficacy was >99.9%, 100%, and 99.6% for Toxocara, hookworms, and Capillaria, respectively; and the efficacy was >99.9%, >99.9%, and 98.5%, respectively, for the cats treated with Profender(R) (p<0.001 for all nematodes and both treatments). Efficacy was 100% for both cestodes for both treatments (p<0.001). No treatment related adverse experiences were observed throughout the study. For both treatments, every cat that completed the study was given a safety score of ‘excellent’ for both local and systemic evaluations. The topical combination product of fipronil, (S)-methoprene, eprinomectin and praziquantel was shown to have an excellent safety profile and demonstrated high levels of efficacy when administered once as topical solution to cats infected with nematodes and cestodes under field conditions.

Effect of high-dose ciclosporin on the immune response to primary and booster vaccination in immunocompetent cats.
Roberts, E. S., K. A. Vanlare, L. M. Roycroft, and S. King
Ciclosporin (Atopica oral solution for cats 100 mg/ml; Novartis Animal Health) was recently approved for use in cats with feline hypersensitivity dermatitis. The immunosuppressant effect of ciclosporin on the ability of cats to mount an immune response following vaccination was determined. Thirty-two healthy, immunocompetent adult cats (16 cats/group) were treated with either ciclosporin for 56 days at a dose of 24 mg/kg once daily or sham dosed. Prior to treatment, cats had an adequate antibody response to primary vaccination against feline calicivirus (FCV), feline herpesvirus-1 (FHV-1), feline panleukopenia virus (FPV), feline leukemia virus (FeLV) and rabies. Booster vaccination or novel vaccination with feline immunodeficiency virus (FIV) was administered 28 days after initiation of treatment with ciclosporin. There were no differences between the ciclosporin-treated and control cats for FCV and FPV antibody titers following booster vaccination. There were delays/reductions in antibody response to FHV-1, FeLV and rabies in treated cats; however, adequate protection was achieved in response to all booster vaccinations. Following primary vaccination with FIV, control cats showed a response, but treated cats showed no antibody production. Adverse events commonly associated with ciclosporin treatment, including diarrhea/loose stool, vomiting, salivation and regurgitation, were reported. In adult cats treated with 24 mg/kg/day of ciclosporin (more than three times the therapeutic dose), vaccine titer levels were adequate for protection following booster vaccination. In contrast, treated cats failed to mount a humoral response to a novel (FIV) vaccination, suggesting that memory B-cell immune responses remain intact during repeated high-dose ciclosporin administration in cats, but that primary immune responses are impaired.

Safety, tolerability, and pharmacokinetics of 6-month daily dosing of an oral formulation of cyclosporine (ATOPICA for cats(R)) in cats.

Unusual cluster of Mycobacterium bovis infection in cats.

Serologic and urinary PCR survey of leptospirosis in healthy cats and in cats with kidney disease.
Rodriguez, J., M. C. Blais, C. Lapointe, J. Arsenault, L. Carioto, and J. Harel
BACKGROUND: Although there is serologic evidence of exposure of cats to Leptospira spp., clinical disease is rarely reported in cats. OBJECTIVE: To compare the seropositivity and urinary polymerase chain reaction (PCR) status for Leptospira spp. between healthy (H) cats and cats with kidney disease (KD), to investigate the serovars potentially involved, and to evaluate potential risk factors. ANIMALS: Two hundred and forty client-owned cats. METHODS: Cats were prospectively recruited and classified based on physical examination, complete blood count, serum biochemistry profile, and urinalysis (125 H and 115 KD cats). Leptospira spp. serology (titers >/=1 : 100 considered positive) and urinary PCR were performed in all cats. Data assessing risk factors, obtained from a questionnaire, were evaluated using logistic regression models. RESULTS: Seropositivity for Leptospira spp. was statistically different between groups: 7.2% (9/125) and 14.9% (17/114) in the H and KD, respectively (P =.05). The proportion of PCR-positive cats was not. The most common serovars detected serologically were Pomona (n = 16) and Bratislava (n = 8). Risk factors for seropositivity included outdoor and hunting lifestyles (P =.03 and P <.001, respectively), the presence of another cat in the household (P <.01), and the sampling period, with the greatest number of cases identified between June and August (P =.02). CONCLUSIONS: Seropositivity was significantly greater in KD cats, suggesting that the role of Leptospira spp. in KD in cats should be further investigated. The detection of urinary shedding of leptospires in several cats identifies a potential role in the transmission of the organism.

Microdose computed tomographic cardiac angiography in normal cats.
OBJECTIVES: To determine if microdose contrast-enhanced multi-detector computed tomographic angiography (MDCTA) allows characterization of cardiac chambers in lightly sedated normal cats. ANIMALS: Seven healthy domestic cats. METHODS: Lightly sedated normal cats were imaged pre-contrast and with microdose (0.22 ml/kg of non-ionic iodinated contrast medium, 300 mg I/ml) triple-phase MDCTA in a motion restriction device. RESULTS: On pre-contrast images, the aorta (median: 52.43 Hounsfield units [HU], range 27.35-76.74 HU) was outlined by significantly (p = 0.015) lower attenuating periaortic fat (-66.16 HU, -42.62 to -92.77 HU). On post-contrast images, median peak contrast enhancement in
the right ventricle (111.77 HU, 36.09-141.60 HU) was achieved in 3.1 s (range 2.9-7.3 s), in the aorta (149.30 HU, 99.43-319.60 HU) and left atrium (180.83 HU, 88.53-266.84 HU) in 6.4 s (range 5.6-7.7 s) and in the left ventricle (147.89 HU, 57.23-245.77 HU) in 7.10 s (range 6.2-11.2 s). Significantly higher attenuation was measured between all chambers and walls, the right ventricular lumen and interventricular septum (median ratio 53.78 HU, range 0.21-83.20 HU), left ventricular lumen and left ventricular free wall (89.32 HU, 38.81-185.95 HU) and aorta and periaortic fat (190.43 HU, 143.22-425.44 HU) on post-contrast images. CONCLUSIONS: Sufficient biological contrast is available on survey CT to discriminate between the aorta and the left atrium, and microdose MDCTA provides sufficient contrast enhancement for adequate visualization of the heart chambers in normal cats.

Domestic cats are an important part of many Americans’ lives, but effective control of the 60-100 million feral cats living throughout the country remains problematic. Although trap-neuter-vaccinate-return (TNVR) programmes are growing in popularity as alternatives to euthanizing feral cats, their ability to adequately address disease threats and population growth within managed cat colonies is dubious. Rabies transmission via feral cats is a particular concern as demonstrated by the significant proportion of rabies post-exposure prophylaxis associated with exposures involving cats. Moreover, TNVR has not been shown to reliably reduce feral cat colony populations because of low implementation rates, inconsistent maintenance and immigration of unsterilized cats into colonies. For these reasons, TNVR programmes are not effective methods for reducing public health concerns or for controlling feral cat populations. Instead, responsible pet ownership, universal rabies vaccination of pets and removal of strays remain integral components to control rabies and other diseases.

Rong, S., D. Lowery, K. Floyd-Hawkins, and V. King
Highly virulent, systemic strains of Feline calicivirus (vs FCV) have been described in recent years. These vs FCV isolates cause severe edema, cutaneous ulcers, lameness and other upper respiratory and oral clinical signs typically associated with FCV infection in cats. Vs FCV isolates can cause high mortality even in cats vaccinated with currently available commercial vaccines. This study reports identification and characterization of an avirulent FCV strain (FCV 21). This strain offers a broader serum cross-neutralization profile in comparison with the commonly used vaccine strain (FCV F9), as tested with two separate viral panels of FCV isolates. The first viral panel consists of 45 FCV strains isolated around 1993. The second viral panel consists of 26 FCV strains with most isolated around 2003. The potential of using this strain as a vaccine, in a 3-way (FCV+FHV+FPV) or 4-way (FCV+FHV+FPV+FCp) format, was tested by using a highly virulent vs FCV strain (FCV-33585) as a challenge virus. The mortality induced by this vs FCV in unvaccinated control cats was 78% (7 out of 9 cats). The mortality decreased to 44% (4 out of 9 cats) in cats vaccinated with a 4-way vaccine containing FCV F9. However, when this novel FCV vaccine strain (FCV 21) was used, either in combination with FCV F9 or by itself, the mortality decreased to 0% (0 out of 10 cats). The 3-way vaccine (FCV+FHV+FPV) that contained both FCV 21 and FCV F9 also had mortality of 0% (0 out of 10 cats). The clinical scores, as calculated taking into consideration the frequency and severity of various clinical signs, correlated with mortality data. The results suggested this FCV vaccine has the potential to be broadly protective against newly emergent FCV isolates, including complete protection against challenge with a highly virulent vs FCV 33585.

Rypula, K., K. Ploneczka-Jacekcko, K. Bierowiec, A. Kumala, and G. Sapikowski
This study included data from 676 cats in southwestern Poland examined between 2006 and 2010. Examinations were performed to diagnose the following infections: feline leukemia virus (FeLV), feline immunodeficiency virus (FIV), feline coronavirus (FCoV), feline calicivirus (FCV), and feline herpesvirus (FHV). The presence of antibodies or antigens was
assessed in samples from all cats. Among examined cats, 46.9% were positive for FCV, 50% for FHV, and 38.5% for FCoV. Retroviral infections were detected more rarely: FeLV in 6.4% and FIV in 4.3% of cases.

PALLIATIVE RADIATION THERAPY OUTCOMES FOR CATS WITH ORAL SQUAMOUS CELL CARCINOMA (1999-2005).
Vet Radiol Ultrasound (2014)
Sabhlok, A., and R. Ayl
Squamous cell carcinoma (SCC) accounts for approximately 10% of all feline tumors. The purpose of this retrospective study was to describe outcomes for a group of cats with oral SCC that were treated with palliative radiation therapy. Fifty-four cats met the inclusion criteria of nonresectable, oral SCC treated with coarse fractionated megavoltage (MeV) radiation therapy. Radiation therapy for all cats was delivered with a 6 MeV linear accelerator. Total radiation doses of 24 Gray to 40 Gray were administered in three to four fractions, once-per-week over 4 to 5 weeks. Concurrent chemotherapy protocols varied and were administered at the discretion of the clinician and client. Forty-nine patients completed the planned treatment protocols. Overall mean and median survival times for cats completing the planned treatment protocols were 127 and 92 days (n = 49). Mean and median survival times of cats receiving palliative radiation therapy alone were 157 and 113 days (n = 12). Mean and median survival times of patients receiving both radiation therapy and chemotherapy were 116 and 80 days (n = 37). Patients with sublingual tumors had a median survival time of 135 days (n = 15), compared to mandibular tumors that had a median survival time of 80 days (n = 26). For the majority of patients that completed the planned treatment protocol (69%), owners reported a subjectively improved quality of life. Findings from this uncontrolled study supported the use of palliative radiation therapy for cats with nonresectable oral squamous cell carcinoma.

Genetic diversity of feline morbilliviruses isolated in Japan.
J Gen Virol (2014)
Feline morbillivirus (FmoPV) is an emerging virus in domestic cats and considered to be associated with tubulointerstitial nephritis. Although FmoPV was first described in China in 2012, there has been no report of the isolation of this virus in other countries. In this study, we describe the isolation and characterization of FmoPV from domestic cats in Japan. By using RT-PCR, we found that 3 of 13 urine samples from cats brought to veterinary hospitals were positive for FmoPV. FmoPV strains SS1 to SS3 were isolated from the RT-PCR-positive urine samples. CRFK cells exposed to FmoPV showed cytopathic effects with syncytia formation, and FmoPV N protein was detected by indirect immunofluorescence assays. In addition, pleomorphic virus particles with apparent glycoprotein envelope spikes were observed by electron microscopy. By sequence analysis of FmoPV H and L genes, we found that FmoPVs showed genetic diversity, however signatures of positive selection were not identified.

Cardiac biomarkers in hyperthyroid cats.
BACKGROUND: Hyperthyroidism has substantial effects on the circulatory system. The cardiac biomarkers NT-proBNP and troponin I (cTNI) have proven useful in identifying cats with myocardial disease but have not been extensively investigated in hyperthyroidism. HYPOTHESIS: Plasma NT-proBNP and cTNI concentrations are higher in cats with primary myocardial disease than in cats with hyperthyroidism and higher in cats with hyperthyroidism than in healthy control cats. ANIMALS: Twenty-three hyperthyroid cats, 17 cats with subclinical hypertrophic cardiomyopathy (HCM), and 19 euthyroid, normotensive healthy cats >/=8 years of age. Fourteen of the hyperthyroid cats were re-evaluated 3 months after administration of radioiodine ((131)I). METHODS: Complete history, physical examination, complete blood count, serum biochemistries, urinalysis, blood pressure measurement, serum T4 concentration, plasma concentrations of NT-proBNP and cTNI, and echocardiogram were obtained prospectively from each cat. RESULTS: Hyperthyroid cats and cats with HCM had plasma NT-proBNP and cTNI concentrations that were significantly higher than those of healthy cats, but there was no significant difference between hyperthyroid cats and cats with HCM with respect to the concentration of
either biomarker. In hyperthyroid cats that were re-evaluated 3 months after (131) I treatment, plasma NT-proBNP and cTNI concentrations as well as ventricular wall thickness had decreased significantly. **CONCLUSIONS AND CLINICAL IMPORTANCE:** Although there may be a role for NT-proBNP in monitoring the cardiac response to treatment of hyperthyroidism, neither NT-proBNP nor cTNI distinguish hypertrophy associated with hyperthyroidism from primary HCM. Therefore, the thyroid status of older cats should be ascertained before interpreting NT-proBNP and cTNI concentrations.

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**Formulation of a standardized protocol and determination of the size and appearance of the spleen in healthy cats.**


**Sayre, R. S., and K. A. Spaulding**

Standard protocol for splenic measurement is warranted to aid in interpretation when sonographically imaging the spleen of cats. The purpose of this study was to describe the appearance and size of healthy cat spleens, and to develop a standard method of evaluation. Data were obtained from 31 clinically healthy non-sedated cats with no sonographic abnormalities. The sonographic appearance of the spleen’s relative echogenicity compared to the left renal cortex and the hepatic parenchyma was recorded. Splenic height was measured at three sites. Three measurements were determined at each site, and the mean value of these three measurements was determined and used for data analysis. A significance level of $P < 0.05$ was used for analysis, which was performed using S-PLUS software (version 8.1). The mean proximal height of the spleen was 7.1 mm. The mean body sagittal height was 9.3 mm. The mean height of the tail of the spleen was 8.7 mm (95% confidence interval). The splenic parenchymal echogenicity was less than the left renal cortex echogenicity and greater than the liver in 17/31 cats; less than the left kidney cortex and equal to the liver in 5/31 cats; equal to the cortex of the left kidney and greater than the liver in 5/31 cats; equal to the liver and renal cortex in 2/31 cats; and less than the liver and kidney with the renal cortex less than the liver in 2/31 cats. The protocol recommended for consistent evaluation of the spleen in the cat includes three specific measurements.

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**Clinical, laboratory and pathological findings in cats experimentally infected with Aelurostrongylus abstrusus.**


**Schnyder, M., A. Di Cesare, W. Basso, F. Guscetti, B. Riond, T. Glaus, P. Crisi, and P. Deplazes**

Aelurostrongylus abstrusus parasitizes the respiratory tract and can heavily affect the breathing and general condition of cats. Experimental infections of six cats were initiated by intragastric administration with 100 or 800 third-stage larvae (L3) obtained from the terrestrial snail Helix aspersa. First-stage larvae were isolated from faecal samples after 35-41 days post infection (dpi) in five animals and until end of study (84 dpi) in two cats. Cough and respiratory sounds were observed starting from 28 to 41 dpi and dyspnoea and panting starting from 52 dpi. All cats had enlarged lymph nodes and, starting from 56 dpi, reduced body weight, and four cats showed intermittent reduced general condition with apathia and anorexia. Eosinophilia and leucocytosis partially with massive lymphocytosis, and occasional basophilia and monocytosis were observed. Mild anaemia was present in five cats, while alterations in coagulation parameters suggested stimulation of the coagulation cascade with increased consumption of coagulation factors (delayed PT, hypofibrinogenemia). Adult A. abstrusus specimens were isolated from the five patent cats at necropsy and all six cats showed pathological changes in the lungs, including disseminated inflammatory cell infiltrates, often associated with incorporated larvae and eggs. There was some degree of overlap between the severity and the inoculation doses. Infections starting from 100 L3 of A. abstrusus had an impact on the lung tissues and on the health of the cats, despite the presence of only mild haematological abnormalities. Due to the worldwide occurrence of feline lung worms, parasitic infections should be considered in the differential diagnosis of lung diseases regardless of the presence of clinical signs and larval excretion.

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**Tachycardia-induced cardiomyopathy in a cat.**

*Schweiz Arch Tierheilkd (2014) 156:133-139.*

**Schober, K. E., A. M. Kent, and F. Aeffner**

A 10-year-old male castrated Domestic Shorthair cat was evaluated for an asymptomatic tachyarrhythmia noted two weeks prior. Electrocardiography revealed a normal sinus rhythm with atrial premature complexes and paroxysms of supraventricular tachycardia with a heart rate between 300 and 400 min-1. Echocardiography was unremarkable, and
concentrations of circulating cardiac troponin I, T4, and blood taurine were within reference ranges. The cat was treated with sotalol (2.1 mg/kg q12h, PO) but the arrhythmia was insufficiently controlled as determined during several re-examinations within a two-year time period. Twenty four months after initial presentation atrial fibrillation with fast ventricular response rate (200 to 300 min-1) was diagnosed, along with severe eccentric chamber remodeling and systolic dysfunction. The cat developed congestive heart failure and cardiogenic shock and was euthanized nearly 27 months after the first exam. Gross and histopathologic findings ruled out commonly seen types of primary myocardial disease in cats. The persistent nature of the tachyarrhythmia, the progressive structural and functional cardiac changes, and comparative gross and histopathologic post-mortem findings are consistent with the diagnosis of tachycardia-induced cardiomyopathy.

Antiviral efficacy of nine nucleoside reverse transcriptase inhibitors against feline immunodeficiency virus in feline peripheral blood mononuclear cells.


OBJECTIVE: To compare cytotoxic effects and antiviral efficacy of 9 nucleoside reverse transcriptase inhibitors (NRTIs) against FIV in feline peripheral blood mononuclear cells. SAMPLE: Peripheral blood mononuclear cells obtained from 3 specific pathogen-free cats. PROCEDURES: 3 of the 9 NRTIs had not been previously assessed in feline cell lines. Cytotoxic effects were determined by colorimetric quantification of a formazan product resulting from bioreduction of a tetrazolium reagent by viable peripheral blood mononuclear cells; uninfected cells from 1 cat were used in these assays. Cells from all 3 cats were infected with a pathogenic clone of FIV, and in vitro antiviral efficacy of each NRTI was assessed with an FIV p24 antigen capture ELISA. RESULTS: Cytotoxic effects in feline peripheral blood mononuclear cells were observed only at concentrations > 10 μM for all 9 NRTIs. Comparison of the cytotoxic effect at the highest concentration investigated (500 μM) revealed that didanosine and amdoxovir were significantly less toxic than abacavir. All drugs induced a dose-dependent reduction of FIV replication. At the highest concentration investigated (10 μM), there was no significant difference in antiviral efficacy among the test compounds. CONCLUSIONS AND CLINICAL RELEVANCE: The evaluated NRTIs had low cytotoxicity against feline peripheral blood mononuclear cells and appeared to be safe options for further in vivo evaluation for the treatment of FIV-infected cats. There was no evidence suggesting that the newly evaluated compounds would be superior to the existing NRTIs for reducing FIV burden of infected cats.

Seroprevalence of Neospora caninum in cats from the Czech Republic.

Sedlak, K., E. Bartova, and T. Machacova

Sera of 414 cats coming from different parts of the Czech Republic were tested for N. caninum antibodies. Sera samples were collected during years 2002-2011. N. caninum antibodies were detected by a commercial competitive-inhibition enzyme-linked immunosorbent assay (cELISA) with cut off >/=30% inhibition. Samples positive in cELISA were confirmed by an indirect fluorescence antibody test (IFAT); titre >/=50 was considered positive. In total, 137 (33%) cats reacted positively in cELISA; N. caninum antibodies in IFAT were detected in 16 (3.86%) cats with titres 50 and 100. In 6 cats, positive for N. caninum antibodies, T. gondii antibodies were also detected by IFAT. It is the first report of N. caninum antibodies in domestic cats from the Czech Republic and third report in Europe.

Seasonal variation in the voluntary food intake of domesticated cats (felis catus).

Serisier, S., A. Feugier, S. Delmotte, V. Biourge, and A. J. German

There are numerous reports about seasonal cycles on food intake in animals but information is limited in dogs and cats. A 4-year prospective, observational, cohort study was conducted to assess differences in food intake in 38 ad-libitum-fed adult colony cats, of various breeds, ages and genders. Individual food intake was recorded on a daily basis, and the mean daily intake for each calendar month was calculated. These data were compared with climatic data (temperature and daylight length) for the region in the South of France where the study was performed. Data were analysed using both conventional statistical methods and by modelling using artificial neural networks (ANN). Irrespective of year, an effect of month was evident on food intake (P<0.001), with three periods of broadly differing intake. Food intake was least in the summer.
months (e.g. June, to August), and greatest during the months of late autumn and winter (e.g. October to February), with intermediate intake in the spring (e.g. March to May) and early autumn (e.g. September). A seasonal effect on bodyweight was not recorded. Periods of peak and trough food intake coincided with peaks and troughs in both temperature and daylight length. In conclusion, average food intake in summer is approximately 15% less than food intake during the winter months, and is likely to be due to the effects of outside temperatures and differences in daylight length. This seasonal effect in food intake should be properly considered when estimating daily maintenance energy requirements in cats.

Serrano, C., and J. Rodriguez
It is described a new version of modified Hotz-Celsius technique performed in four patients, two cats and two dogs. The surgery was carried out using CO2 laser in order to avoid bleeding and decrease the anesthetic time. Besides, the wound created was not sutured and it healed by secondary intention without any complication. As a conclusion, this modification is a successful alternative to treat entropion in a safe and fast way.

An increase in the number of eosinophils in bronchoalveolar lavage fluid (BALF) is a hallmark of feline asthma; however, a wide range in the percentage of eosinophils in BALF has been documented in healthy cats. In this study, BALF and lung tissue were collected from 15 cats without respiratory disease, BALF was taken from 15 cats with asthma and lung tissue was collected from six different asthmatic cats. Total nucleated cell count (TNCC) and inflammatory cell percentages were measured in BALF and lung tissue was evaluated microscopically. Asthmatic cats had a significantly higher eosinophil count in lung tissue, but BALF TNCC did not differ significantly between groups. Cats without respiratory signs had significantly more numerous macrophages and lymphocytes in BALF than asthmatics, but significantly lower percentages of eosinophils (4.2 +/- 7.8% versus 49.4 +/- 20.6%, P <0.001). In healthy feline airways a BALF eosinophil percentage of <5% can be expected. Dominant microscopical findings in feline asthma include high eosinophil counts, airway remodelling and inflammation. There is good correlation between the findings in BALF and tissue in feline asthma.

Shiraishi, R., M. Nishimura, R. Nakashima, C. Enta, and N. Hirayama
In Japan, the import quarantine regulation against rabies has required from 2005 that dogs and cats should be inoculated with the rabies vaccine and that the neutralizing antibody titer should be confirmed to be at least 0.5 international units (IU)/ml. The fluorescent antibody virus neutralization (FAVN) test is used as an international standard method for serological testing for rabies. To achieve proper immunization of dogs and cats at the time of import and export, changes in the neutralizing antibody titer after inoculation of the rabies vaccine should be understood in detail. However, few reports have provided this information. In this study, we aimed to determine evaluated, such changes by using sera from experimental dogs and cats inoculated with the rabies vaccine, and we tested samples using the routine FAVN test. In both dogs and cats, proper, regular vaccination enabled the necessary titer of neutralizing antibodies to be maintained in the long term. However, inappropriate timing of blood sampling after vaccination could result in insufficient detected levels of neutralizing antibodies.

Trained vs untrained evaluator assessment of body condition score as a predictor of percent body fat in adult cats. J Feline Med Surg (2014)
Shoveller, A. K., J. Digennaro, C. Lanman, and D. Spangler
Body condition scoring (BCS) provides a readily available technique that can be used by both veterinary professionals and
theories that sonographic echoes within the urinary bladder of clinically normal cats may be due to urine lipid.

...within the urinary bladder of clinically normal cats may be due to urine lipid. An association between increased amounts of urine diacylglycerol and the amount of lipid measured on thin layer chromatography or the number of lipid droplets seen on urinalysis. An increased amount of urine diacylglycerol was significantly associated with clumping of echoes (P = 0.02) and the amount of lipid droplets seen on urinalysis (P = 0.04). An association between increased amounts of urine diacylglycerol and the amount of echoes seen on ultrasound approached significance (P = 0.05). Findings from this study support previously published theories that sonographic echoes within the urinary bladder of clinically normal cats may be due to urine lipid.

Antifungal Drug Susceptibility and Phylogenetic Diversity among Cryptococcus Isolates from Dogs and Cats in North America.
Singer, L. M., W. Meyer, C. Firacative, G. R. Thompson, E. Samitz, and J. E. Sykes
Molecular types of the Cryptococcus neoformans/Cryptococcus gattii species complex that infect dogs and cats differ regionally and with host species. Antifungal drug susceptibility can vary with molecular type, but the susceptibility of Cryptococcus isolates from dogs and cats is largely unknown. Cryptococcus isolates from 15 dogs and 27 cats were typed using URA5 restriction fragment length polymorphism analysis (RFLP), PCR fingerprinting, and multilocus sequence typing (MLST). Susceptibility was determined using a microdilution assay (Sensititre YeastOne; Trek Diagnostic Systems). MICs were compared among groups. The 42 isolates studied comprised molecular types VG1 (7%), VGIIa (7%), VGIIb (5%), VGIIc (5%), VGIII (38%), VGIV (2%), VNI (33%), and VNII (2%), as determined by URA5 RFLP. The VGIV isolate was more closely related to VGIII according to MLST. All VGIII isolates were from cats. All sequence types identified from veterinary isolates clustered with isolates from humans. VGIII isolates showed considerable genetic diversity compared with other Cryptococcus molecular types and could be divided into two major subgroups. Compared with C. neoformans MICs, C. gattii MICs were lower for flucytosine, and VGIII MICs were lower for fluconazole and itraconazole. For all drugs except itraconazole, C. gattii isolates exhibited a wider range of MICs than C. neoformans. MICs varied with Cryptococcus species and molecular type in dogs and cats, and MICs of VGIII isolates were most variable and may reflect phylogenetic diversity in this group. Because sequence types of dogs and cats reflect those infecting humans, these observations may also have implications for treatment of human cryptococcosis.

Ultrasonographic characteristics of lipiduria in clinically normal cats.
Sislak, M. D., K. A. Spaulding, D. L. Zoran, J. E. Bauer, and J. A. Thompson
Echoes are frequently seen in the urinary bladder of cats during abdominal ultrasound. These have been attributed to hematuria, pyuria, crystalluria, and lipid. However, sonographic findings have not been previously correlated with urinalysis. We prospectively evaluated 40 clinically normal cats via ultrasound, serum chemistry, and urinalysis. Thin layer chromatography was performed on the urine to determine the amount (mg) of lipid subfractions including diacylglycerol, triglyceride, phospholipid, free fatty acid, cholesterol, and cholesterol ester. Ninety percent (36/40) of the cats in our population had sonographic echoes suspended in the urinary bladder, with most having a subjective score of mild echoes (n = 20). None of the sonographic echoes were gravity dependent or caused distal acoustic shadowing, reverberation, or twinkle artifact. Of the cats with sonographic echoes in the urine, 66% (24/36) had no significant findings on urinalysis other than the presence of lipid. The total amount of subjective sonographic echoes was not significantly related to the total amount of fat measured on thin layer chromatography or the number of lipid droplets seen on urinalysis. An increased amount of urine diacylglycerol was significantly associated with clumping of echoes (P = 0.02) and the amount of lipid droplets seen on urinalysis (P = 0.04). An association between increased amounts of urine diacylglycerol and the amount of echoes seen on ultrasound approached significance (P = 0.05). Findings from this study support previously published theories that sonographic echoes within the urinary bladder of clinically normal cats may be due to urine lipid.
Mycobacterium bovis infection in cats and people.
Sless, R.

A Study on Borna Disease Virus Infection in Domestic Cats in Japan.
Borna disease virus (BDV) infection causes neurological disease in cats. Here, we report BDV infection in 199 hospitalized domestic cats in the Tokyo area. BDV infection was evaluated by detection of plasma antibodies against BDV-p24 or -p40. BDV-specific antibodies were detected in 54 cats (27.1%). Interestingly, the percentage of seropositive cats was not significantly different among the three clinical groups, i.e., healthy (29.8%), neurologically asymptomatic disease (22.2%) and neurological disease (33.3%). The specific antibodies were present even in cats aged below one year. The seropositive ratio was constant, irrespective of age and sampling season. The present study suggests that additional factors are required for onset of Borna disease in naturally infected cats and that BDV is transmitted through vertical routes in cats.

Nocardia cyriacigeorgica as the causative agent of mandibular osteomyelitis (lumpy jaw) in a cat.
Soto, E., M. Arauz, C. A. Gallagher, and O. Illanes
An unusual case of osteomyelitis caused by Nocardia cyriacigeorgica infection and resulting in mandibular osteomyelitis and cellulitis (lumpy jaw) is described in a young cat. A 1-cm hard nodular mass was an incidental finding in the right mandible of a 14-month-old cat during routine physical examination. The lesion was fast growing, reaching up to 6 cm in its largest dimension over a 5-week period. A core biopsy of the affected mandible revealed foci of osteolysis, woven bone formation, and a few large clusters of filamentous bacteria surrounded by fine eosinophilic amorphous material bordered by neutrophils, plasma cells, macrophages, and occasional multinucleated giant cells. Pure cultures of acid-fast variable, Gram-positive filamentous bacteria were recovered on blood and chocolate agar plates at 48-hr postinoculation. On amplification and sequencing of the 16S ribosomal RNA and 65-kDa heat shock protein genes, the microorganisms were identified as N. cyriacigeorgica, within the actinomycetes.

Signalment and blood types in cats being evaluated as blood donors at two Italian university blood banks.
Spada, E., A. Miglio, D. Proverbio, M. T. Antognoni, G. Bagnagatti De Giorgi, E. Ferro, and V. Mangili
Data from potential feline blood donors presented at two university blood banks in Italy were recorded. Blood typing was performed using an immunochromatographic method. Over the three years of the study 357 cats representing 15 breeds, 45.3% female and 54.7% male, with a mean age of 3.8 years were evaluated. Of these 90.5% were blood type A, 5.6% type B, and 3.9% type AB. The majority of the cats (54.6%) were European DSH (92.3% were type A, 5.1% type B, and 2.6% type AB), and 21% were Maine Coon (MCO) cats (100% blood type A). The estimated frequencies of transfusion reactions following an unmatched transfusion between DSH (donors and recipients), MCO (donor and recipients), DSH donors and MCO recipients, and MCO donors and DSH recipients were 4.8%, 0%, 0%, and 5.1% for major reactions and 7.2%, 0%, 7.7%, and 0% for minor transfusions reactions, respectively. In a population of blood donors that includes DSH and MCO the risk of transfusion reaction is between 5% and 8% if typing is not performed on donor and recipient blood. Blood typing should therefore be performed before transfusion to remove the risk of transfusion reactions due to blood type incompatibilities.
Multiplex SYBR(R) green-real time PCR (qPCR) assay for the detection and differentiation of Bartonella henselae and Bartonella clarridgeiae in cats.
Staggemeier, R., D. A. Pilger, F. R. Spilki, and V. V. Cantarelli
A novel SYBR(R) green-real time polymerase chain reaction (qPCR) was developed to detect two Bartonella species, B. henselae and B. clarridgeiae, directly from blood samples. The test was used in blood samples obtained from cats living in animal shelters in Southern Brazil. Results were compared with those obtained by conventional PCR targeting Bartonella spp. Among the 47 samples analyzed, eight were positive using the conventional PCR and 12 were positive using qPCR. Importantly, the new qPCR detected the presence of both B. henselae and B. clarridgeiae in two samples. The results show that the qPCR described here may be a reliable tool for the screening and differentiation of two important Bartonella species.

Training veterinary students in shelter medicine: a service-learning community-classroom technique.
Stevens, B. J., and M. E. Gruen
Shelter medicine is a rapidly developing field of great importance, and shelters themselves provide abundant training opportunities for veterinary medical students. Students trained in shelter medicine have opportunities to practice zoonotic and species-specific infectious disease control, behavioral evaluation and management, primary care, animal welfare, ethics, and public policy issues. A range of sheltering systems now exists, from brick-and-mortar facilities to networks of foster homes with no centralized facility. Exposure to a single shelter setting may not allow students to understand the full range of sheltering systems that exist; a community-classroom approach introduces students to a diverse array of sheltering systems while providing practical experience. This article presents the details and results of a series of 2-week elective clinical rotations with a focus on field and service learning in animal shelters. The overall aim was to provide opportunities that familiarized students with sheltering systems and delivered primary-care training. Other priorities included increasing awareness of public health concerns and equipping students to evaluate shelters on design, operating protocols, infectious disease control, animal enrichment, and community outreach. Students were required to participate in rounds and complete a project that addressed a need recognized by them during the rotation. This article includes costs associated with the rotation, a blueprint for how the rotation was carried out at our institution, and details of shelters visited and animals treated, including a breakdown of treatments provided. Also discussed are the student projects and student feedback on this valuable clinical experience.

Efficacy of an inactivated FeLV vaccine compared to a recombinant FeLV vaccine in minimum age cats following virulent FeLV challenge.
Stuke, K., V. King, K. Southwick, M. I. Stoeva, A. Thomas, and M. T. Winkler
The aim of the study was to determine the efficacy of an inactivated feline leukemia virus (FeLV) vaccine (Versifel((R)) FeLV, Zoetis,) compared to a recombinant FeLV vaccine (Purevax((R)) FeLV, Merial Animal Health) in young cats, exposed under laboratory conditions to a highly virulent challenge model. The study was designed to be consistent with the general immunogenicity requirements of the European Pharmacopoeia 6.0 Monograph 01/2008:1321-Feline Leukaemia Vaccine (Inactivated) with the exception that commercial-strength vaccines were assessed. Fifty seronegative cats (8-9 weeks old) were vaccinated subcutaneously on two occasions, three weeks apart, with either placebo (treatment group T01), Versifel FeLV Vaccine (treatment group T02), or Purevax FeLV Vaccine (treatment group T03) according to the manufacturer’s directions. Cats were challenged three weeks after the second vaccination with a virulent FeLV isolate (61E strain). Persistent FeLV antigenemia was determined from 3 to 15 weeks postchallenge. Bone marrow samples were tested for the presence of FeLV proviral DNA to determine FeLV latent infection. At week 15 after challenge with the virulent FeLV 61E strain, the Versifel FeLV Vaccine conferred 89.5% protection against FeLV persistent antigenemia and 94.7% protection against FeLV proviral DNA integration in bone marrow cells. In comparison, the Purevax FeLV Vaccine conferred 20% protection against FeLV persistent antigenemia and 35% protection against FeLV proviral DNA integration in bone marrow cells following challenge. The data from this study show that the Versifel FeLV Vaccine was efficacious in preventing both FeLV persistent p27 antigenemia and FeLV proviral DNA integration in bone marrow cells of cats challenged with this particular challenge model under laboratory conditions and provided better protection than Purevax
Pediatric feline upper respiratory disease.
Sykes, J. E.
Infectious feline upper respiratory tract disease (URTD) continues to be a widespread and important cause of morbidity and mortality in kittens. Multiple pathogens can contribute to URTD in kittens, and coinfections are common in overcrowded environments and contribute to increased disease severity. Worldwide, the most prevalent pathogens are feline herpesvirus-1 and feline calicivirus. Primary bacterial causes of URTD in cats include Bordetella bronchiseptica, Chlamydia felis, and Mycoplasma species. Streptococcus canis and Streptococcus equi subspecies zooepidemicus occasionally play a role as primary pathogens in shelter situations and catteries. This article reviews the major causes of disease in kittens, and provides an update on treatment and prevention strategies.

Platelet activation in cats with hypertrophic cardiomyopathy.
Tablin, F., T. Schumacher, M. Pombo, C. T. Marion, K. Huang, J. W. Norris, K. E. Jandrey, and M. D. Kittleson
BACKGROUND: Cats with hypertrophic cardiomyopathy (HCM) are at risk for development of systemic thromboembolic disease. However, the relationship between platelet activation state and cardiovascular parameters associated with HCM is not well described. OBJECTIVES: To characterize platelet activation by flow cytometric evaluation of platelet P-selectin and semiquantitative Western blot analysis of soluble platelet-endothelial cell adhesion molecule-1 (sPECAM-1). ANIMALS: Eight normal healthy cats (controls) owned by staff and students of the School of Veterinary Medicine and 36 cats from the UC Davis Feline HCM Research Laboratory were studied. METHODS: Platelet-rich plasma (PRP) was used for all flow cytometry studies. Platelet surface CD41 and P-selectin expression were evaluated before and after ADP stimulation. sPECAM-1 expression was evaluated by Western blot analysis of platelet-poor plasma that had been stabilized with aprotinin. Standard echocardiographic studies were performed. RESULTS: Resting platelets from cats with severe HCM had increased P-selectin expression compared to controls, and expressed higher surface density of P-selectin reflected by their increased mean fluorescence intensities (MFI). Stimulation with ADP also resulted in significantly increased P-selectin MFI of platelets from cats with severe HCM. Increased P-selectin expression and MFI correlated with the presence of a heart murmur and end-systolic cavity obliteration (ESCO). sPECAM-1 expression from cats with moderate and severe HCM was significantly increased above those of control cats. CONCLUSIONS AND CLINICAL IMPORTANCE: P-selectin and sPECAM expression may be useful biomarkers indicating increased platelet activation in cats with HCM.

Antiviral treatment of feline immunodeficiency virus-infected cats with (R)-9-(2-phosphonylmethoxypropyl)-2,6-diaminopurine.
Feline immunodeficiency virus (FIV), the causative agent of an acquired immunodeficiency syndrome in cats (feline AIDS), is an ubiquitous health threat to the domestic and feral cat population, also triggering disease in wild animals. No registered antiviral compounds are currently available to treat FIV-infected cats. Several human antiviral drugs have been used experimentally in cats, but not without the development of serious adverse effects. Here we report on the treatment of six naturally FIV-infected cats, suffering from moderate-to-severe disease, with the antiretroviral compound (R)-9-(2-phosphonylmethoxypropyl)-2,6-diaminopurine ([R]-PMPDAP), a close analogue of tenofovir, a widely prescribed anti-HIV drug in human medicine. An improvement in the average Karnofsky score (pretreatment 33.2 +/- 9.4%, post-treatment 65 +/- 12.3%), some laboratory parameters (ie, serum amyloid A and gammaglobulins) and a decrease of FIV viral load in plasma were noted in most cats. The role of concurrent medication in ameliorating the Karnofsky score, as well as the possible development of haematological side effects, are discussed. Side effects, when noted, appeared mild and reversible upon cessation of treatment. Although strong conclusions cannot be drawn owing to the small number of patients and lack of a placebo-treated control group, the activity of (R)-PMPDAP, as observed here, warrants further investigation.
The silicon concentration in cat urine and its relationship with other elements.
Takano, T., H. Morioka, K. Gomi, K. Tomizawa, T. Doki, and T. Hohdatsu
To understand the effects of silicon (Si) in the urine with respect to the formation of urinary stones, the distribution of Si in urine was observed. Urine samples from cats with urolithiasis (n=10) and healthy cats (n=15) were used. The concentration of Si in the cats with urolithiasis was significantly higher (P<0.001). A significant correlation (P<0.05) was observed between the concentration of Si and those of other elements, such as calcium, magnesium, phosphorus, potassium and iron, only in the urine of the healthy cats. The distribution of elements in the urine differed between the cats with urolithiasis and the healthy cats. The Si concentration and its relationship with other elements were suggested to be useful biomarkers for urolithiasis in cats.

Screening and identification of T helper 1 and linear immunodominant antibody-binding epitopes in spike 1 domain and membrane protein of feline infectious peritonitis virus.
Takano, T., H. Morioka, K. Gomi, K. Tomizawa, T. Doki, and T. Hohdatsu
Feline infectious peritonitis virus (FIPV; FIP virus) causes a fatal disease in wild and domestic cats. The development of an FIP-preventive vaccine requires an antigen that does not induce antibody-dependent enhancement, and T helper (Th)1 activity plays an important role in protect against FIPV infection. In the present study, we identified synthetic peptides including Th1 and a linear immunodominant antibody-binding epitope in the S1 domain and M protein of FIPV. We also identified peptides that strongly induce Th1 activity from those derived from the structural proteins (S, M, and N proteins) of FIPV based on this and previous studies (Satoh et al. [19]). No Th1 epitope-containing peptide was identified in the peptides derived from the S1 domain of type I FIPV. In contrast, 7 Th1 epitope-containing peptides were identified in the S1 domain of type II FIPV, and no linear immunodominant antibody-binding epitope was contained in any of these peptides. Eleven Th1 epitope-containing peptides common to each serotype were identified in the M protein-derived peptides, and 2 peptides (M-11 and M-12) contained the linear immunodominant antibody-binding epitope. Of the peptides derived from the S, M, and N proteins of FIPV, those that induced significantly stronger Th1 activity than that of the FIPV antigen were rescreened, and 4 peptides were identified. When 3 of these peptides (M-9, I-S2-15, and II-S1-24) were selected and administered with CpG-ODNs to SPF cats, M-9 and II-S1-24 induced Th1 activity. Our results may provide important information for the development of a peptide-based vaccine against FIPV infection.

New insights on metastrongyloid lungworms infecting cats of Sardinia, Italy.
In addition to the well-known Aelurostrongylus abstrusus (Strongylida: Angiostrongylidae), Troglostrongylus brevior (Strongylida: Crenosomatidae) has recently been diagnosed as a causative agent of broncho-pulmonary infections of cats in Spain and Italy. However, information concerning the impact of this species of lungworm on feline population is limited to a few case reports. From July 2011 to May 2013 an epidemiological survey was carried out on Sardinia island (Italy), where 107 individual faecal samples were examined by Baermann technique, and first-stage larvae were identified based on their morphology and characterization of molecular markers. The 29.9% (32/107) of cats examined were infested by broncho-pulmonary nematodes and, although A. abstrusus was the most frequently detected (n=27; 25.2%), larvae of T. brevior were also found (n=7; 6.5%). In addition, two cats (1.9%) were co-infested by both species. Overall metastrongyloid infection was higher in female cats (n=22; 38.6%) than in males (n=10; 20%) (chi(2)=4.39; p=0.036). The mean age of positive animals was 21.1 (+/-29.8) months, being infected animals from 2 months to 10 years of age. Of the 32 animals that scored positive for lungworms only 6 (18.8%) displayed a respiratory condition associated with lungworm infestations. Biomolecular characterization confirmed the morphological diagnosis of A. abstrusus. Positive samples that were identified at genus level as Troglostrongylus spp. were molecularly characterized as T. brevior. This study represents the first epidemiological survey on metastrongyloid lungworms of domestic cats in Sardinia and the first report of T. brevior on this island.
Feline blood genotyping versus phenotyping, and detection of non-AB blood type incompatibilities in UK cats.
Tasker, S., E. N. Barker, M. J. Day, and C. R. Helps
OBJECTIVES: The aim of this study was to determine the agreement between AB blood phenotyping and genotyping and determine whether non-AB blood type incompatibilities exist in UK cats. METHODS: Blood samples underwent phenotyping (A, B or AB) using microplate agglutination, and genotyping (AA, Ab or bb) using pyrosequencing of a fragment of the cytidine monophosphate-N-acetylneuraminic acid hydroxylase gene. Non-AB blood type incompatibilities were investigated by cross-matching against reference blood of the same phenotype. RESULTS: Of 112 cats tested, 86 (77%) were blood phenotype A, 19 (17%) type B and 7 (6%) type AB. Genotype and initial phenotype agreed in 96% (107 of 112) of cats, but 5 were discordant; these were all B phenotype with either AA (n=2) or Ab (n=3) genotype. Two of the five cats had repeat blood samples tested: one was reclassified as phenotype A; the other remained phenotype B. Two cats had incompatibilities on minor cross-match, but these were attributed to phenotyping errors. CLINICAL SIGNIFICANCE: Unknown mutation(s) associated with phenotype B, resulting in false AA or Ab genotyping, were evident in a small number of cases in this study. No conclusive evidence for non-AB blood type incompatibilities was found.

Intraperitoneal antineoplastic drug delivery: experience with a cyclophosphamide, vincristine and prednisolone protocol in cats with malignant lymphoma.
Teske, E., A. J. van Lankveld, and G. R. Rutteman
In this retrospective study, the efficacy and safety were examined for an intraperitoneal chemotherapy protocol-cyclophosphamide, vincristine and prednisolone (IP-COP) in 26 cats with malignant lymphoma. Certainly in cats fiercely resisting IV administration the IP route is a more practical method, safer for the administrator and less stressful for the cat. Complete remission (CR) rate was 76.9% (n = 20). Median duration of first remission was 421 days. Estimated 1- and 2-year disease free period were 67.1 and 48.0%, respectively. Median duration of survival was 388 days and estimated overall 1- and 2-year survival periods were 54.7 and 46.9% respectively. Young cats had a more favourable prognosis. Reaching CR was essential for long-term survival. No specific IP-related adverse events (AE) were seen. AE were generally scored as mild and were not excessively abundant. These results indicate that the IP route is a safe and effective alternative for the administration of COP protocol chemotherapeutics.

Efficacy in cats of a novel topical combination of fipronil, (S)-methoprene, eprinomectin, praziquantel, against induced infestations of Echinococcus multilocularis.
Tielemans, E., C. Manavella, M. Visser, S. Theodore Chester, and J. Rosentel
Although foxes are the main reservoir of Echinococcus multilocularis, it is recognized that dogs and cats also may become infected. In cats the infection and egg production rates are usually low. Nevertheless, cats are a potential source of transmission of E. multilocularis. Due to the high human medical significance of E. multilocularis infection, it is important in endemic areas that owned cats are dewormed regularly. This paper presents the efficacy results of a new topical formulation, Broadline(R)) (Merial) tested against E. multilocularis infection in cats. Two blinded laboratory studies were conducted to evaluate this novel topical combination of fipronil, (S)-methoprene, eprinomectin, and praziquantel against E. multilocularis. In each study, purpose-bred cats were assigned randomly to two treatment groups of 10 cats each: one untreated control group and one group treated at the minimum therapeutic dose of 0.12 mL/kg bodyweight to deliver 10mg fipronil, 12 mg (S)-methoprene, 0.5mg eprinomectin and 10mg praziquantel/kg bodyweight. The cats were inoculated orally with E. multilocularis protoscolices, 22 or 23 days before treatment. Based on necropsy and intestinal worm count, 8 or 11 days after treatment, the two studies confirmed 100% efficacy of Broadline((R)) against adult E. multilocularis.

Efficacy of a novel topical combination of fipronil, (S)-methoprene, eprinomectin, and praziquantel, against the
ticks, Ixodes ricinus and Ixodes scapularis, on cats.
Tielemans, E., J. Prullage, M. Knaus, M. Visser, C. Manavella, S. T. Chester, D. Young, W. R. Everett, and J. Rosentel

Five controlled, blinded and randomized studies were conducted to examine the efficacy of a single topical application of a combination of fipronil, (S)-methoprene, eprinomectin, and praziquantel (BROADLINE(R), Merial) against induced infestations with Ixodes ticks on cats. Three studies investigated the efficacy against Ixodes ricinus and two against Ixodes scapularis. In each study, purpose-bred cats were assigned at random to an untreated group or to a treated group. For the studies using I. ricinus, cats were infested with 50 female ticks and a similar number of males 2 days before treatment application, and weekly afterwards on between four and six occasions. For the studies using I. scapularis, cats were infested with a total of 50 ticks (approximately 25 females and 25 males) according to the same schedule as for I. ricinus. Tick counts for the evaluation of efficacy were performed 48 h after treatment and 48 h after the subsequent weekly infestations. Weekly attachment rates to untreated cats of at least 29% for I. ricinus and at least 30% for I. scapularis demonstrated consistently that the ticks were vigorous and that the attachment rates were adequate for efficacy evaluation. In the I. ricinus studies, an efficacy of at least 93% was demonstrated for up to 37 days after the treatment. In the I. scapularis studies, the efficacy level was at least 95% 30 days after the treatment. The product was well tolerated and caused no adverse reaction.

From FUS to Pandora syndrome: Where are we, how did we get here, and where to now?
Tony Buffington, C. A., J. L. Westropp, and D. J. Chew

New concepts: Ideas about the causes of lower urinary tract signs (LUTS) in cats have changed significantly in the past 40 years. Recent research is challenging the conventional view that the bladder is always the perpetrator of LUTS, and suggests that the bladder can also be one victim of a systemic process associated with a sensitized central stress response system.
Aim: In this article the authors provide their perspective on the implications of these findings for the diagnosis and treatment of cats with LUTS, provide some historical context, and suggest ways that the veterinary profession might work together to better understand the disorders underlying these signs, and possibly reduce their prevalence.

Electrochemotherapy with intravenous bleomycin injection: an observational study in superficial squamous cell carcinoma in cats.
Tozon, N., D. Pavlin, G. Sersa, T. Dolinsek, and M. Cemazar

The aim of this study was to evaluate the efficacy and safety of electrochemotherapy (ECT) with bleomycin for treatment of squamous cell carcinoma (SCC) in cats. Between March 2008 and October 2011, 11 cats with 17 superficial SCC nodules in different clinical stages (ranging from Tis to T4), located on nasal planum (6/11), pinnae (3/11) and both locations (2/11), were included in a prospective non-randomised study. Sixteen of 17 SCC nodules were treated with ECT (15/16 with single session and in one case with two sessions); one nodule was surgically removed. Altogether, complete response (CR) was achieved for 81.8% (9/11) cats and 87.5% (14/16) nodules, lasting from 2 months up to longer than 3 years. Only 2/9 cats in which CR was initially observed, had recurrence 2 and 8 months after the ECT procedure. In the remaining two cats with highly infiltrative spread into adjacent tissues, progression of the disease was observed, despite ECT, and both were euthanased 4 and 5 months after the procedure. ECT in cats was well tolerated and no evident local or systemic side effects were observed. The results of this study suggest that ECT is a highly effective and safe method of local tumour control of feline cutaneous SCCs. It should be considered as an alternative treatment option, especially when other treatment approaches are not acceptable by the owners, owing to their invasiveness, mutilation or high cost.

The clinicopathological and ultrasonographic features of cats with eosinophilic enteritis.
Tucker, S., D. G. Penninck, J. H. Keating, and C. R. Webster

Eosinophilic enteritis (EE) in cats is poorly characterized. The aim of the current study was to retrospectively evaluate the clinical and ultrasonographic findings in cats with histologic evidence of eosinophilic inflammation on gastrointestinal biopsy. Twenty-five cats with eosinophilia on surgical (10) or endoscopic (15) biopsy of the gastrointestinal tract,
having an abdominal ultrasound performed within 48 h of biopsy acquisition were enrolled. History, clinical presentation, clinical pathology and abdominal ultrasound findings were reviewed. Intestinal biopsies were evaluated by a single pathologist and separated into two groups based on the degree of eosinophilic infiltrate: mild [<10 eosinophils/high-power field (HPF), 11/25 cats], or moderate/marked (>10 eosinophils/HPF, 14/25 cats). The former were considered primary lymphoplasmacytic or lymphocytic inflammatory bowel disease (LPE) with subtle eosinophilic infiltrates, and the latter to have EE. Signalment, history and clinical signs were similar in all cats. Only cats with EE (6/14) had palpably thickened intestines. The only distinguishing clinicopathological feature of cats with EE was the presence of peripheral eosinophilia (6/14). On ultrasound, when compared with cats with LPE, cats with EE had a greater mean jejunal wall thickness (3.34 mm +/- 0.72 mm vs 4.07 mm +/- 0.58 mm, respectively) and an increased incidence of thickening of the muscularis layer (1/11 and 11/14, respectively). In conclusion, ultrasonographic evidence of a prominent intestinal muscularis layer, palpably thickened intestines and peripheral eosinophilia can serve as biomarkers for the presence of EE in cats with chronic intestinal signs.


Tynes, V. V., and L. Sinn

Abnormal repetitive behaviors (ARBs) represent a diverse group of behaviors whose underlying mechanism is poorly understood. Their neurobiology likely involves several different neurotransmitter systems. These behaviors have been referred to as compulsive disorders, obsessive compulsive disorders and stereotypies. Underlying medical conditions and pain can often cause changes in behavior that are mistaken for ARBs. A complete medical work-up is always indicated prior to reaching a presumptive diagnosis. The frequency of ARBs can be reduced but not always eliminated with the use of selective serotonin reuptake inhibitors (SSRIs) or tricyclic antidepressants (TCAs) in conjunction with behavior modification and environmental enrichment.

Distribution of Capnocytophaga canimorsus in dogs and cats with genetic characterization of isolates.

Umeda, K., R. Hatakeyama, T. Abe, K. Takakura, T. Wada, J. Ogasawara, S. Sanada, and A. Hase

Capnocytophaga canimorsus, which is often found in the oral cavities of dogs and cats, is sometimes transmitted to humans, causing severe infection. To elucidate the risk of C. canimorsus in humans and animals, this study was undertaken to characterize this bacterium epidemiologically and genetically. We examined the distribution of C. canimorsus in dogs and cats, and analyzed the correlation between the presence of bacteria and individual factors statistically. We also compared C. canimorsus isolates genetically using 16S rRNA gene sequence analysis and pulsed-field gel electrophoresis (PFGE). C. canimorsus was detected in 76 of 109 dogs (69.7%) and 57 of 104 cats (54.8%). A relation between C. canimorsus presence and some individual factors was detected both in dogs and cats, but the predictive factors of carrying the bacterium differed between dogs and cats. 16S rRNA gene sequences from C. canimorsus isolates in this study were combined with previously published sequences to assess their intra-specific phylogeny. Results show that C. canimorsus is classifiable into two main groups (I and II) with differing gamma-glutamyl aminopeptidase activity. Strains from human patients belonged unevenly to group I, possibly suggesting that group I can be transmitted to humans and group II is indigenous only to the oral cavities of dogs and cats. PFGE genotyping showed high discriminatory power, and the dendrogram accorded with genetic segregation between isolates of group I and II. Sma I-digest PFGE developed for this study is useful as a molecular typing method for additional epidemiological and phylogenetic studies of C. canimorsus.

Clinical findings, diagnostic test results, and treatment outcome in cats with spontaneous hyperadrenocorticism: 30 cases.


BACKGROUND: Spontaneous hyperadrenocorticism (HAC) is rare in cats. Clinical findings, diagnostic test results, and response to various treatment options must be better characterized. OBJECTIVES: To report the clinical presentation, clinicopathologic findings, diagnostic imaging results, and response to treatment of cats with HAC. ANIMALS: Cats with
spontaneous HAC. METHODS: Retrospective descriptive case series. RESULTS: Thirty cats (15 neutered males, 15 spayed females; age, 4.0-17.6 years [median, 13.0 years]) were identified from 10 veterinary referral institutions. The most common reason for referral was unregulated diabetes mellitus; dermatologic abnormalities were the most frequent physical examination finding. Low-dose dexamethasone suppression test results were consistent with HAC in 27 of 28 cats (96%), whereas ACTH stimulation testing was suggestive of HAC in only 9 of 16 cats (56%). Ultrasonographic appearance of the adrenal glands was consistent with the final clinical diagnosis of PDH or ADH in 28 of 30 cats (93%). Of the 17 cats available for follow-up at least 1 month beyond initial diagnosis of HAC, improved quality of life was reported most commonly in cats with PDH treated with trilostane. CONCLUSIONS AND CLINICAL IMPORTANCE: Dermatologic abnormalities or unregulated diabetes mellitus are the most likely reasons for initial referral of cats with HAC. The dexamethasone suppression test is recommended over ACTH stimulation for initial screening of cats with suspected HAC. Diagnostic imaging of the adrenal glands may allow rapid and accurate differentiation of PDH from ADH in cats with confirmed disease, but additional prospective studies are needed.

Seroprevalence of heartworm (Dirofilaria immitis) in feline and canine hosts from central and northern Portugal. J Helminthol (2014) 1-5.
Dirofilaria immitis is endemic in Portugal. Several studies have reported the presence of canine heartworm disease, although no previous studies on feline infections have been published. The aim of this study was to determine the prevalence of D. immitis in cats and dogs from central and northern Portugal. Blood samples from 434 cats were tested for circulating anti-D. immitis and anti-Wolbachia antibodies. Furthermore, 386 dogs were tested for circulating D. immitis antigens. Overall feline seroprevalence was 15%, while canine prevalence was 2.1%. The highest feline seroprevalences of 18.7% and 17.6% were found in Aveiro and Viseu, respectively, while the highest canine prevalences of 8.8% and 6.8% were found in Coimbra and Aveiro, respectively. Cats and dogs showing respiratory signs presented higher prevalences of 24.4% and 17%, respectively, while 50% of cats with gastrointestinal signs were seropositive. The present study confirms the seropositivity of D. immitis in the feline population in central and northern Portugal, and suggests the importance of including heartworm disease in the list of differential diagnoses of cats and dogs showing clinical signs compatible with the disease.

Wiggans, K. T., W. Vernau, M. R. Lappin, S. M. Thomasy, and D. J. Maggs
OBJECTIVE: To evaluate diagnostic utility of aqueous humor analysis in animals with anterior uveitis. ANIMALS: Client-owned dogs (n = 12) and cats (n = 10). PROCEDURES: Examination findings and diagnostic test results including aqueous humor cytology were compared. RESULTS: Disease duration prior to aqueocentesis was not significantly different between dogs with idiopathic anterior uveitis and those with an etiologic diagnosis, but was shorter in cats with feline infectious peritonitis (FIP) than those with idiopathic uveitis. Microbial nucleic acids, antigens, or antibodies against them were seldom found in blood/serum; however, serum feline coronavirus titers >/=1:6400 were detected only in cats with FIP. Aqueous humor cytology was diagnostic in no cats and two dogs, both with neoplasia. Although aqueous humor contained predominantly neutrophils in cats with FIP and large reactive lymphocytes and plasma cells appeared more frequent in cats with idiopathic uveitis, neither clinical nor cytologic assessment of anterior chamber contents differed significantly between cats with idiopathic or FIP-associated uveitis. Cytologically assessed plasma cell number was correlated with keratic precipitates and disease duration. Clinically detectable hyphema and cytologic erythrocyte number were correlated. However, cytologic cell grades and clinical grade of flare or cell numbers within the anterior chamber were not correlated. CONCLUSIONS: Aqueous humor cytology permitted diagnosis of neoplasia in dogs with anterior uveitis but was generally not helpful in cats. Poor correlation between clinical and cytologic assessment of cell numbers and type within the anterior chamber dictates that clinical grading should not be the sole criterion for electing to perform aqueocentesis.

Feline gastrointestinal surgery: principles and essential techniques.
Williams, J.
PRACTICAL RELEVANCE: Gastrointestinal (GI) surgical procedures are performed commonly in cats in general practice for both diagnostic and treatment purposes. It is essential that the surgeon understands and adheres to the principles of GI surgery in order that postoperative morbidity and mortality are kept to a minimum. AUDIENCE: This review is aimed at feline and general practitioners wanting to update their core skills in GI surgery. It discusses anatomical considerations and surgical principles, and aims to familiarise the surgeon with techniques (some well established, others newer) that will help to promote surgical success. EQUIPMENT: Standard general surgical equipment is required, together with the facilities to provide adequate pre-, intra- and postoperative patient care. EVIDENCE BASE: The author draws on clinical experience and evidence from the literature, where appropriate, in reviewing the guidance and techniques under discussion.

Interobserver variability of radiographic pulmonary nodule diameter measurements in dogs and cats.
Williams, J. M., J. P. Graham, and C. Wang
The purpose of this study was to determine the interobserver variability of radiographic pulmonary nodule diameter measurements among readers with varying levels of experience. Because interobserver variability may lead to inaccurate estimations of nodule growth on repeat radiographic assessment, an incorrect presumption of malignant etiology or misclassification of tumor response to treatment may result. The maximum diameters of 47 pulmonary nodules from 22 dogs and 7 cats were measured. Measurements were performed using one digital thoracic radiographic projection by eight clinicians. The eight clinicians included two interns, two residents, two board-certified veterinary specialists, and two board-certified veterinary radiologists. A mixed-effect analysis of variance model was used to evaluate the contribution of reader, experience level, patient, nodule, and nodule size to the overall variability in mean pulmonary nodule diameter. The interobserver variability in diameter measurement for any given nodule was 16%, and experience level and nodule size classification did not contribute to measurement variability. Linear measurements of the diameter of a pulmonary nodule can vary significantly among a group of clinicians; however, depending on the criteria used to evaluate nodule growth or tumor response, the 16% interobserver variability reported here is likely not clinically significant.

Association between urinary vascular endothelial growth factor excretion and chronic kidney disease in hyperthyroid cats.
Williams, T. L., J. Elliott, and H. M. Syme
Many hyperthyroid cats develop azotaemic chronic kidney disease (aCKD) following treatment, which has led to the hypothesis that hyperthyroidism might be detrimental to renal function. Renin-angiotensin-aldosterone system (RAAS) activation occurs in hyperthyroidism, which could cause peri-tubular hypoxia, tubular damage and the development of aCKD. Urinary vascular endothelial growth factor:creatinine ratio (VEGFCR) is postulated to be a marker of tubular hypoxia. VEGFCR was correlated with plasma renin activity (PRA) and compared between hyperthyroid cats that did and did not develop aCKD following treatment (pre-azotaemic and non-azotaemic groups respectively). PRA was positively correlated with VEGFCR (rs = 0.382; P = 0.028); however, pre-azotaemic hyperthyroid cats had significantly lower VEGFCR than non-azotaemic cats at baseline (median 122.3 fg/g versus 167.0 fg/g; P < 0.001). RAAS activation in hyperthyroidism is associated with increased VEGFCR; however, increased VEGFCR was not correlated with the development of aCKD. Therefore, tubular hypoxia may not be a mechanism for renal damage in hyperthyroid cats.

Effect on Renal Function of Restoration of Euthyroidism in Hyperthyroid Cats with Iatrogenic Hypothyroidism.
Williams, T. L., J. Elliott, and H. M. Syme
BACKGROUND: Iatrogenic hypothyroidism is associated with an increased incidence of azotemia after treatment of hyperthyroidism, and decreased survival time in azotemic hyperthyroid cats. HYPOTHESIS: Restoration of euthyroidism will decrease plasma creatinine concentrations. ANIMALS: Nineteen client-owned, methimazole- or carbimazole-treated, hyperthyroid cats with documented iatrogenic hypothyroidism (based on subnormal plasma total thyroxine concentrations
[TT4] and increased plasma thyroid-stimulating hormone concentrations). METHODS: Prospective interventional study. Doses of antithyroid medication were reduced until euthyroidism was restored (TT4 10-40 nmol/L). Plasma creatinine concentration and selected other clinicopathologic variables were evaluated before and after restoration of euthyroidism and compared by nonparametric statistics. Data are presented as median [25th, 75th percentile]. RESULTS: Restoration of euthyroidism was associated with a significant decrease in plasma creatinine concentrations (2.61 [1.90, 3.26] mg/dL versus 2.07 [1.42, 2.82] mg/dL; P <.001) and body weight (4.03 [3.59, 4.53] kg versus 3.89 [3.34, 4.18] kg; P =.019), and a significant increase in packed cell volume (30 [28, 39]% versus 34 [29, 39]%); P =.038), heart rate (174 [163, 201] bpm versus 190 [164, 202] bpm; P =.009), and plasma alkaline phosphatase activity (26.6 [17.0, 33.0] IU/L versus 38.0 [23.5, 46.5] IU/L; P <.001). CONCLUSIONS AND CLINICAL IMPORTANCE: Restoration of euthyroidism in medically treated hyperthyroid cats with iatrogenic hypothyroidism causes a reduction in plasma creatinine concentrations, and thus might improve renal function; however, this could be influenced by concurrent changes in body weight.

**Use of a morphometric method and body fat index system for estimation of body composition in overweight and obese cats.**


Objective-To develop morphometric equations for prediction of body composition and create a body fat index (BFI) system to estimate body fat percentage in overweight and obese cats. Design-Prospective evaluation study. Animals-76 overweight or obese cats >/= 1 year of age. Procedures-Body condition score (BCS) was determined with a 5-point scale, morphometric measurements were made, and dual-energy x-ray absorptiometry (DEXA) was performed. Visual and palpation-based evaluation of various body regions was conducted, and results were used for development of the BFI system. Best-fit multiple regression models were used to develop equations for predicting lean body mass and fat mass from morphometric measurements. Predicted values for body composition components were compared with DEXA results. Results-For the study population, prediction equations accounted for 85% of the variation in lean body mass and 98% of the variation in fat mass. Values derived from morphometric equations for fat mass and lean mass were within 10% of DEXA values for 55 of 76 (72%) and 66 of 76 (87%) cats, respectively. Body fat as a percentage of total body weight (ie, body fat percentage) predicted with the BCS and BFI was within 10% of the DEXA value for 5 of 39 (13%) and 22 of 39 (56%) cats, respectively. Conclusions and Clinical Relevance-The BFI system and morphometric equations were considered accurate for estimation of body composition components in overweight and obese cats of the study population and appeared to be more useful than BCS for evaluation of these patients. Further research is needed to validate the use of these methods in other feline populations. (*J Am Vet Med Assoc* 2014;244:1285-1290).

**Trans-iliac pin/bolt/screw internal fixation for sacroiliac luxation or separation in cats: six cases.**


Yap, F. W., A. L. Dunn, M. Farrell, and I. Calvo

Trans-iliac pin, bolt or screw stabilisation was performed on six cats with sacroiliac (SI) luxation and separation. For the purpose of this study, SI luxation is defined as the separation of the iliac wing from the sacrum without fracture of the sacral or iliac wing; SI separation is defined as the separation of the iliac wing from the sacrum secondary to fracture of the sacrum and/or the iliac wing. Complications, surgical time and medium-to-long-term outcome were assessed by a retrospective review of the clinical records and owner questionnaires. Postoperative reduction of the SI joint was good-to-excellent in all cases and the outcome was considered good-excellent in all cats apart from one, where the trans-iliac bolt migrated dorsally from the iliac wing. This cat had bilateral SI luxations. Based on our results, trans-iliac fixation of SI luxation/separation is associated with good clinical outcome and should be considered as a treatment option in unilateral SI luxation in cats. Caution should be exercised in the use of trans-iliac pin/bolt as the sole method of stabilisation in bilateral SI luxations.

**Performance of a veterinary urine dipstick paddle system for diagnosis and identification of urinary tract infections in dogs and cats.**

OBJECTIVE: To evaluate the performance of a veterinary urine dipstick paddle (UDP) for diagnosis and identification of urinary tract infection (UTI) in dogs and cats. DESIGN: Prospective, randomized, blinded study. SAMPLE: 207 urine specimens. PROCEDURES: UDPs were inoculated by 2 investigators and incubated according to manufacturer’s instructions. Results, including presence or absence of bacterial growth, organism counts, and identification of uropathogens, were compared between investigators and with microbiology laboratory results. A subset of UDPs with bacterial growth was submitted to the laboratory for confirmation. RESULTS: The laboratory reported 64 (30.9%) specimens had growth of bacteria. Bacterial growth was reported for 63 (30.4%) and 58 (28.0%) of the UDPs by investigators 1 and 2, respectively. Sensitivity and specificity of the UDP for detection of bacterial growth were 97.3% and 98.6%, respectively, for investigator 1 and 89.1% and 99.3%, respectively, for investigator 2. For UPDs with $\geq 10^5$ colony-forming units/mL, organism counts correlated well between the laboratory and investigators 1 ($r = 0.95$) and 2 ($r = 0.89$). Pathogen identification was not always accurate. Only 25 of 33 (75.8%) UDPs submitted for confirmation yielded bacteria consistent with those isolated from the original bacterial culture of urine. CONCLUSIONS AND CLINICAL RELEVANCE: The veterinary UDP system was a sensitive test for screening patients for bacterial UTI, but uropathogen identification was not always accurate. When UDPs have bacterial growth, a fresh urine specimen should be submitted to the laboratory to confirm the identity of the organisms and to permit antimicrobial susceptibility testing.

Contamination of live attenuated vaccines with an infectious feline endogenous retrovirus (RD-114 virus).
Yoshikawa, R., S. Shimode, S. Sakaguchi, and T. Miyazawa

Retroviruses are classified as exogenous and endogenous retroviruses according to the mode of transmission. Endogenous retroviruses (ERVs) are retroviruses which have been integrated into germ-line cells and inherited from parents to offspring. Most ERVs are inactivated by deletions and mutations; however, certain ERVs maintain their infectivity and infect the same host and new hosts as exogenous retroviruses. All domestic cats have infectious ERVs, termed RD-114 virus. Several canine and feline attenuated vaccines are manufactured using RD-114 virus-producing cell lines such as Crandell-Rees feline kidney cells; therefore, it is possible that infectious RD-114 virus contaminates live attenuated vaccines. Recently, Japanese and UK research groups found that several feline and canine vaccines were indeed contaminated with infectious RD-114 virus. This was the first incidence of contamination of ‘infectious’ ERVs in live attenuated vaccines. RD-114 virus replicates efficiently in canine cell lines and primary cells. Therefore, it is possible that RD-114 virus infects dogs following inoculation with contaminated vaccines and induces proliferative diseases and immune suppression, if it adapts to grow efficiently in dogs. In this review, we summarize the incidence of contamination of RD-114 virus in live attenuated vaccines and potential risks of infection with RD-114 virus in dogs.

Review of Parasitic Zoonoses in Egypt.
Youssef, A. I., and S. Uga

This review presents a comprehensive picture of the zoonotic parasitic diseases in Egypt, with particular reference to their relative prevalence among humans, animal reservoirs of infection, and sources of human infection. A review of the available literature indicates that many parasitic zoonoses are endemic in Egypt. Intestinal infections of parasitic zoonoses are widespread and are the leading cause of diarrhea, particularly among children and residents of rural areas. Some parasitic zoonoses are confined to specific geographic areas in Egypt, such as cutaneous leishmaniasis and zoonotic babesiosis in the Sinai. Other areas have a past history of a certain parasitic zoonoses, such as visceral leishmaniasis in the El-Agamy area in Alexandria. As a result of the implementation of control programs, a marked decrease in the prevalence of other zoonoses, such as schistosomiasis and fascioliasis has been observed. Animal reservoirs of parasitic zoonoses have been identified in Egypt, especially in rodents, stray dogs and cats, as well as vectors, typically mosquitoes and ticks, which constitute potential risks for disease transmission. Prevention and control programs against sources and reservoirs of zoonoses should be planned by public health and veterinary officers based on reliable information from systematic surveillance.
Vet Pathol (2014)

Zappulli, V., R. Rasotto, D. Caliari, M. Mainenti, L. Pena, M. H. Goldschmidt, and M. Kiupel

A large number of studies have investigated feline mammary tumors in an attempt to identify prognostic markers and generate comparative analyses with human breast cancer. Nevertheless, a retrospective base of assessments and the lack of standardization in methodology and study design have caused weakness in study results, making comparison difficult. We examined feline mammary tumor publications and evaluated postulated prognostic parameters according to the recently published “Recommended Guidelines for the Conduct and Evaluation of Prognostic Studies in Veterinary Oncology.” Using these criteria, we determined with statistically significant reliability that prognostic parameters for feline mammary tumors are tumor grading and lymph node/lymphovascular invasion. Furthermore, tumor subtype, size, and staging are worthy of further standardized investigation. We present statistical significance for each studied parameter as well as its relevance to disease progression and survival. Our evaluation suggests that marker expression (ie, Ki67, HER2, ER) may provide relevant information applicable for therapeutic predictions; however, consensus efforts and protocol standardization are needed. We identify and discuss major points of concern-such as sample preservation and selection, standardization of immunohistochemical protocols, and evaluation of results-to provide support for subsequent reliable analyses.